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USING SCIENCE TO HELP PEOPLE, RIGHT NOW

Oct 3, Thursday

Inspiring a Career in Research
Professors Berkovic, Scheffer and Zajac
Melb Brain Ctre Heidelberg
Thur 3 Oct 17:30-19:00

Oct 9, Wednesday

Dunlop Medical Research Foundation Symposium
John Lindell lecture theatre
L4 Lance Townsend Buildg
Wed 9 Oct 12:15-13:30

Austin Health Open labs
various locations
Registration required.
search Eventbrite.com.au
ResearchFest2019OpenLab
Wed 9 Oct 14:00 -15:00

Oct 10, Thursday

Nursing Quality & Research Forum
Education lecture theatre
L4 Austin Tower
Thu 10 Oct 14:00-15:00

Oct 14, Monday

Poster Opening; Chairmans Selection & CEO's choice
Education Precinct
L4 Austin Tower
Mon 14 Oct 17:30

Oct 15, Tuesday

ResearchFest Debate
John Lindell lecture theatre L4 Lance Townsend Buildg
Tue 15 Oct 12:30-13:30

Poster Author Sessions
Rooms 4.4 & 4.5
Education Precinct
L4 Austin Tower
Tue 15 Oct 14:30-15:30

Physiotherapy Research Event
Education lecture theatre
L4 Austin Tower
Tue 15 Oct 16:00-17:00

Oct 16, Wednesday

Grand Round, AMRF Young Investigator
John Lindell lecture theatre
L4 Lance Townsend Buildg
Wed 16 Oct 12:30-13:30

Consumer Engagement Awards
Education lecture theatre L4 Austin Tower
Wed 16 Oct 14:00-15:00

Poster Author Sessions
Rooms 4.4 & 4.5
Education Precinct
L4 Austin Tower
Wed 16 Oct 14:30-15:30

Oct 17, Thursday

Plenary Session followed by presentation of awards
Prof Wendy Chapman
"When will NLP be out of the box?"
John Lindell lecture theatre
L4 Lance Townsend Buildg
Thur 17 Oct 12:30-13:30

Poster Author Sessions
Rooms 4.4 & 4.5
Education Precinct
L4 Austin Tower
Thu 17 Oct 14:30-15:30

austin.org.au/ResearchFesthub/ResearchFestOct

Austin HEALTH

RESEARCH FEST
OCTOBER 2019

INTRODUCTION

Welcome to the 27th annual Austin LifeSciences Research Week. Once again we take time out to recognise and celebrate the quality and the breadth of the research being performed on this site through Austin health and its departments, its affiliated universities and research institutes, and also Mercy Hospital for Women. It is a time when people can share experiences and set up new collaborations, and to think towards the future in terms of cooperative grant applications, attracting future students and scientists, and cementing our place as one of the leading research centres in Australia. The research culture at Austin is vibrant and part of what we do every day. Already this is leading to changes in health care policy and practice and ultimately to better health outcomes for all of us.

This is the fourth year of the event being named ResearchFest as the number of activities spills across two weeks. The ResearchFest Committee has considered your feedback very carefully and made changes to the format. We recognise that not every solution is perfect for everyone and we will gratefully consider suggestions for future years.

In 2019 we have:

- instituted an Open Lab afternoon where four labs invite visitors to find out what is done in the Lab
- continued the format of three separate poster sessions;
- livestreamed the Plenary session;
- continued the ResearchFest debate that promises to be both entertaining and thought-provoking.

Our plenary session this year is highlighted by Prof Wendy Chapman, Associate Dean for Digital Health and Informatics, Director Centre for Clinical and Public Health Informatics, University of Melbourne
Her presentation is entitled "**When will NLP Be out of the box?**"

As always, the ResearchFest awards will also be presented at the plenary session. Make sure you lock all these exciting events into your diaries.

We thank all of our new and returning sponsors, and the contribution of the dynamic and energetic ResearchFest Committee without whom ResearchFest would not be possible.

I hope you find Austin LifeSciences ResearchFest 2019 to be most interesting and enjoyable.

Prof Paul Johnson
Chair
Austin LifeSciences ResearchFest Committee

ResearchFest2019 Abstract Book

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This abstract book is designed as a pdf book.
The pdf is arranged in a number of sections; the sections are bookmarked and each abstract is also bookmarked. Abstracts are included with the permission of the authors.

The sections appear in this order

SPONSORS

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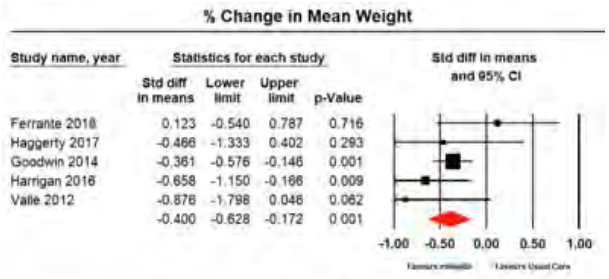
Murphy A[1], Koshy A[1,2], Clark D[1,2], Yeo B[1,3], Farouque O[1,2], Yudi M[1,2]

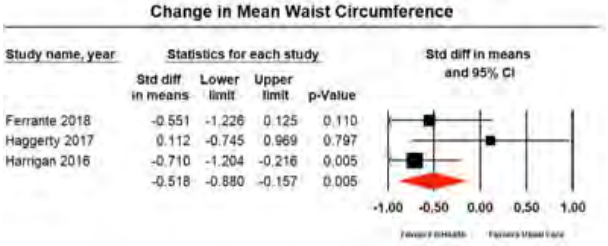
Mobile Health (mHealth) Cardiovascular Risk Reduction Strategies in Cancer: A Systematic Review and Meta-Analysis

1. *Cardiology Department, Austin Health*
2. *University of Melbourne*
3. *Olivia Newton John Cancer and Wellness Centre*

Background:
Cardiovascular disease (CVD) is the leading cause of death in survivors of cancer. Attention to reducing the risk of CVD should thus be a priority in their long-term management. Implementation of mHealth strategies have been proposed for CV risk reduction in this population, although limited by a paucity of evidence surrounding their efficacy.

Methods:
A systematic review of MEDLINE, PubMed and EMBASE was conducted by 2 authors for studies investigating mHealth-based cardiovascular risk reduction strategies in adult patients treated for cancer. Pre-specified outcomes assessed included physical activity, weight and cardiac risk factor parameters. Intervention and effect on the specified outcomes were assessed.





Results:
Nineteen trials representing 2021 patients were included. Thirteen were randomized controlled trials. Majority were app (n=7) or telephone-guided interventions (n=7). Follow-up varied widely, ranging from 4 weeks to 2 years. Most studies reported on physical activity (n=17), with 9 studies demonstrating a significant improvement. However, endpoints were heterogenous and unable to be synthesised. Random effects meta-analysis showed significant improvements in body weight (five studies; standardised mean difference (SMD) = -0.400; CI -0.628, -0.172) and waist circumference (three studies; SMD = -0.518; CI -0.880, -0.157). There was a paucity of literature reporting on cardiac risk factor parameters with only 2 studies assessing blood pressure change (p=ns).

Conclusion:
Publicly available mHealth programs are a convenient and easily disseminated intervention which may improve physical activity and weight among cancer survivors. Feasibility of cardiovascular risk factor reduction using mHealth technology in this population should be addressed in future research.

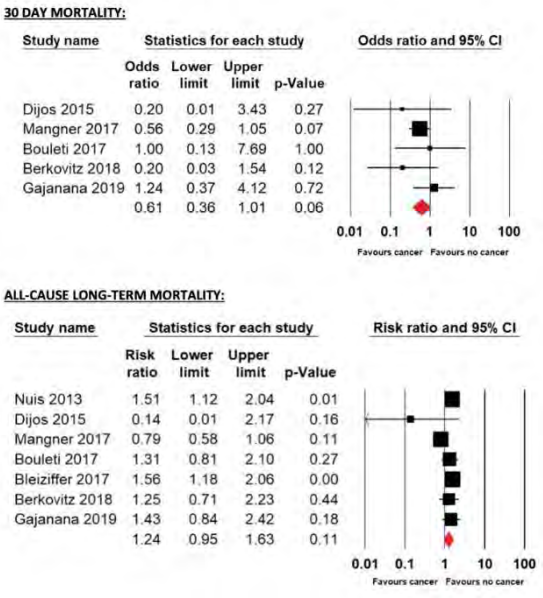
Murphy A[1], Koshy A[1,2], Mousley J[1], Cameron W[1], Horrigan M[1,2], Yeo B[1,3], Farouque O[1,2], Yudi M[1,2]

Outcomes of Transcatheter Aortic Valve Replacement in Oncology Patients with Severe Aortic Stenosis

1. *Cardiology Department, Austin Health*
2. *University of Melbourne*
3. *Olivia Newton John Cancer and Wellness Centre*

Background:
Current Heart Team risk assessment using the Society for Thoracic Surgeons (STS) score incorporates a history of cancer as a covariate. However, this has not been validated in patients undergoing transcatheter aortic valve replacement (TAVR). As the survivorship population increases, it is imperative to establish the efficacy and safety in those with a history of cancer as they represent a growing proportion of patients with severe aortic stenosis (AS).

Methods:
A systematic review of PubMed, MEDLINE and EMBASE was conducted to identify studies reporting outcomes in patients with a history of malignancy undergoing TAVR. A meta-analysis was performed using a random effects model with a primary outcome of all-cause mortality and cardiac mortality at longest follow-up. On secondary analyses, we evaluated procedural safety and efficacy.



Results:
A total of 7 observational studies with 6,323 patients were included in the quantitative analysis. Short-term mortality and long-term all-cause mortality were not significantly different when comparing patients with and without a history of cancer ((RR 0.61, 95%CI 0.36-1.01; p=0.06) (RR 1.24, 95%CI 0.95-1.63;p=0.11) respectively). No significant difference in the rate of periprocedural complications including stroke, bleeding, paravalvular leak and pacemaker implantation were noted.

Conclusion:
In patients with severe AS undergoing TAVR, a history of cancer was not associated with adverse short and long-term survival. Based on these findings, TAVR should be considered in all patients with severe aortic stenosis, irrespective of their history of malignancy.

Murphy A[1], Farouque O[1], Faroudi F[2], Chao M[2], Horrigan M[1], Undrill S[1], Koshy A[1], Yeo B[2], Yudi M[1], Lancefield T[1]

The Role of Serum Cardiac Biomarkers and Left Ventricular Strain Imaging for Detecting Early Radiation Induced Myocardial Damage in Women Undergoing Left-Sided Breast Radiation Therapy: A Pilot Study

1. Cardiology Department, Austin Health, Heidelberg, Vic, Australia;
2. Olivia Newton John Cancer and Wellness Centre, Heidelberg, Vic., Australia;

Background:
Radiation therapy (RT) is an established adjuvant treatment for breast cancer and is associated with a significant reduction in disease recurrence and death. Incidental exposure of the heart to radiation can result in cardiac disease. The use of ultra-sensitive biomarkers and global longitudinal strain (GLS) allows for a sensitive assessment of myocardial function and detection of early cardiac damage.

Methods:
20 women with Stage I left-sided breast cancer, receiving RT monotherapy were prospectively recruited. Sequential echocardiograms with GLS were performed before and immediately after RT (6 weeks) and analysed blinded to clinical information. NT-proBNP and hs-troponin T were measured throughout RT.

Results:
Mean age was 63±11 years), serial NT-proBNP and hs-troponin T throughout RT did not demonstrate significant change (NTproBNP 98 vs 98ng/L p=ns; hs-troponin T 6.3 vs 6.4ng/L, p=0.ns). Baseline left ventricular ejection fraction was 62±4% and GLS was -20±2. No significant change was recorded post RT in the LVEF (62% vs 63%, p=ns) or GLS (-20 vs -20, p=ns). One patient experienced a significant fall in LVEF (LVEF decline>10%) and three patients demonstrated a significant fall in GLS (GLS decline >12%).

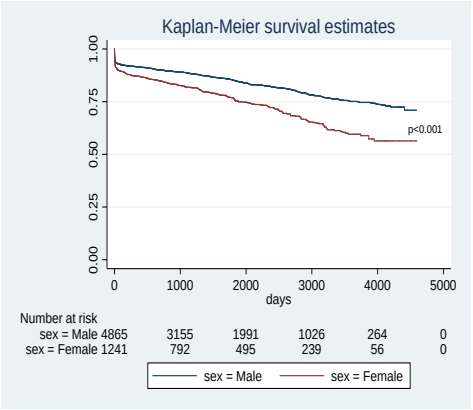
Conclusion:
While the use of cardiac biomarkers and GLS have shown potential for detecting early signs of cardio-toxicity in patients treated with chemotherapy, it remains unclear if there is a role in the RT population. Contemporary RT techniques may have reduced the risk of cardiac complications or simply delayed the time to onset. Larger studies with longer follow up are needed to understand the relationship between radiation therapy and early cardiac damage.

Murphy A[1], Yudi M[1,2], Farouque O[1,2], Dinh D[3], Duffy S[3,4], Brennan [3], Reid C[3,7], Andrianopoulos N[3], Koshy A[1,2], Martin L[1,2]Dagan M[4], Freeman M[5], Blusztein D[6], Ajani A[2,3,7], Clark D[1,2]

Impact of Gender and Door-to-Balloon Times on Long-Term Mortality in Patients Presenting with ST-Elevation Myocardial Infarction (STEMI)

1. Department of Cardiology, Austin Health
2. University of Melbourne
3. Centre of Cardiovascular Research and Education in Therapeutics (CCRE)
4. Department of Cardiology, Alfred Hospital
5. Department of Cardiology, Eastern Health
6. Department of Cardiology, Royal Melbourne Hospital
7. School of Public Health, Curtin University

Background:
Guidelines mandate urgent revascularisation in patients presenting with STEMI irrespective of gender. There is extensive literature describing gender differences in the clinical presentation and pathophysiology of STEMI that may influence management and outcomes. Accordingly, we sought to compare the door-to-balloon times (DTBT) and the impact of timely reperfusion on clinical outcomes in women compared to men presenting with STEMI undergoing primary percutaneous coronary intervention (PCI).
Methods:
6,179 consecutive patients presenting with STEMI undergoing PCI from the Melbourne Interventional Group (MIG) registry (2005-2017) were analysed. The primary outcome was long-term mortality determined via National Death Index (NDI) linkage.
Results:
1,258 (20.3%) were female and 4,921 (79.7%) were male. Female patients were older (69.4±13 vs 61.5±12 years; p<0.001), had more co-morbidities and had longer symptom-to-balloon times (204 (154,294) vs 181 (139,258) mins; p<0.001) and DTBT (81 (55,102) vs 75 (51,102) mins; p<0.001) while receiving less drug-eluting stents (DES, 38.7% vs 42.7%; p=0.01) and having less radial access for PCI (15.0% vs 21.3%; p<0.001). Unadjusted in-hospital and 30-day mortality rates were higher in women (8.8% vs 6.2%, 9.8% vs 6.9%; p<0.001). However, on Cox-proportional hazard modelling, gender was not an independent predictor of long-term mortality (HR 0.99, 95%CI 0.83-1.18; p=0.92) at a mean follow-up of 4.8±3.5 years.



Conclusion:
In this large multicentre registry of patients with STEMI, women had longer ischemic times, higher risk profiles and differing interventional approaches compared to men. Addressing these gender inequalities with greater radial access and use of DES, as well as early identification of symptoms, has the potential to further improve outcomes in women with STEMI.

Koshy A[1,2], Murphy A[1], Horrigan M[1,2], Farouque O[1,2], Yudi M[1,2]

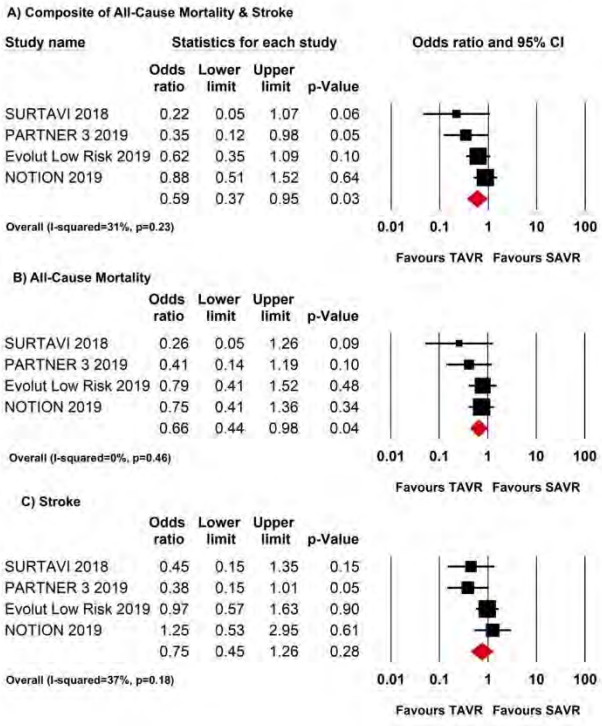
Outcomes of Transcatheter versus Surgical Aortic Valve Replacement in Low-Risk Patients: A Meta-Analysis of Randomized Controlled Trials

1. Department of Cardiology, Austin Health
2. The University of Melbourne

Background:
Transcatheter aortic valve replacement (TAVR) has revolutionized the treatment of severe aortic stenosis (AS), though its safety and efficacy in low-risk patients remains to be established.

Methods:
A systematic review of PubMed, MEDLINE and EMBASE identified four randomised controlled trials (RCTs) in patients at low surgical risk comparing TAVR to surgical aortic valve replacement (SAVR). A meta-analysis was performed using a random effects model with a primary outcome of a composite of all-cause mortality and stroke at longest available follow-up.

Results:
A total of 4 RCTs with 2,836 patients were included in the final analysis. 1,363 patients were randomised to SAVR and 1,473 to TAVR. The composite of all-cause mortality and stroke was significantly lower in patients undergoing TAVR compared with SAVR (OR 0.59, 95%CI 0.37-0.95, p=0.03) with low heterogeneity (I^2=31%). The difference in the primary composite outcome was driven by a difference in mortality (OR 0.66, 95%CI 0.44-0.98, p=0.04; I^2=0%) without significant differences in stroke (OR 0.75 95%CI 0.45-1.26, p=0.28; I^2=37%). Patients undergoing TAVR had a significantly higher risk of permanent pacemaker implantation (OR 3.9, 95%CI 1.8-8.4, p<0.001, I^2=84%) and moderate or severe paravalvular leak (OR 5.0, 95%CI 1.6-15.7, p=0.01; I2=19%). There was no significant difference in the risk of myocardial infarction and major vascular complications between groups.



Conclusion:
In patients with severe AS at low surgical risk, the rate of the composite of death and stroke was significantly lower with TAVR than with SAVR. Longer-term follow-up with a focus on the impact of PPM implantation, PVL and structural valve deterioration is essential before the use of TAVR can be generalized to the broader population of patients with AS.

Page KN[1], Hare DL[1,2], Farouque O[1,2], Deayton M[3], Wong E[3], Mathews S[4], Heland M[1], Driscoll, A[1,5]

Comparison of methods for the collection of Heart Failure Patient Reported Outcome Measurements (PROMs)

1. *Austin Health, Melbourne, Australia*
2. *University of Melbourne, Melbourne, Australia*
3. *Monash University, Melbourne, Australia*
4. *Swinburne University, Melbourne, Australia*
5. *Deakin University, Burwood, Australia*

Aim
To compare methods for the collection of Heart Failure Patient Reported Outcome Measurements (PROMs) within a tertiary health service

Method
An exploratory longitudinal non-interventional RCT where patients were randomised to one of three PROMs data collection methods: 1) paper, 2) phone or 3) web based.

A prospective convenience sample was chosen of patients (≥18 yrs) presenting to the Heart Function Outreach clinic, from April to September 2018, with a confirmed HF diagnosis. Recruitment continued until there was a minimum of 14 participants in each arm.

The International Consortium for Health Outcomes Measurement (ICHOM) Heart Failure standard set was collected at baseline, 30 days, three months and six months.

These data included the Kansas City Cardiomyopathy Questionnaire (KCCQ), a measure of heath related quality of life in HF; Patient Health Questionnaire (PHQ-2), a screening tool for likelihood of depression and four questions from the Patient-Reported Outcomes Measurement Information System (PROMIS).

Results
191 HF PROMS questionnaires were captured across six months. Questionnaire return rates at the three timepoints (30 days, three and six months) were well above expectations (79%, 59%, 61%, respectively)

Missing data were minimal with completion rates over 89%;

Group	Baseline n (%)	30 day n (%)	3 mth n (%)	6mth n (%)
Paper	27 (100)	19 (70)	18 (67)	18 (67)
Phone	26 (100)	22 (85)	18 (69)	18 (69)
Web based	23 (100)	16 (70)	9 (39)	10 (43)

Conclusion
It was feasible to implement PROMs collection in a health service as proven by the high quality of the data. Missing data was minimal. Paper and phone based methods had higher return rates than the web based group. All patients completed the PROMs via the web based application at baseline demonstrating that the majority of HF patients could potentially use a web based PROMs application.

Page KN[1], Hare DL[1,2], Farouque O[1,2], Tassos M[3], Pelly M[4], Steiniger J[4], Cheng E[4], Heland M[1], Conway J[5], Driscoll, A[1,6]

Heart Failure Patient Reported Outcome Measurements (PROMs)

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4. *Monash University, Melbourne, Australia*
5. *National Heart Foundation*
6. *Deakin University, Melbourne, Australia*

Aim

To implement the ICHOM Standard Set of Heart Failure Patient Reported Outcome Measurements (PROMs) in a tertiary health service

Method

A prospective convenience sample of patients (≥18 yrs) presenting to the Heart Function Outreach clinic, from April to September 2018, with confirmed HF diagnosis.

The HF Standard PROMs were administered at 30 days, 3 and 6 months including Kansas City Cardiomyopathy Questionnaire (KCCQ), heath related quality of life; Patient Health Questionnaire (PHQ-2), depression screening.

Results

76 patients were enrolled and 191 completed HF PROMS questionnaires were captured across six months. The median age was 69 years (range 39-91); majority (76%) were male.

Over time there was no significant reduction (χ^2= 1.17; P =1.0) in physical functioning, symptom frequency, quality of life and social limitation given HF is a chronic debilitating illness.

Risk of death and readmission decreased overtime from 12% at baseline to 4% at six months. Actual patient reported 12 month readmission rates were constant at 11%. Risk of depression was highest at 3 months and at 12 months over 25% remained at risk of depression

Risk of Six Month Admission/Death and/or Depression

Timepoint	6 mth risk admission/ death (KCCQ <25) n (%)	Risk depression (PHQ2 ≥3) n (%)	12 mth admissions >2 n (%)
Baseline	9 (12)	18 (31)	
30 days	5 (9)	10 (22)	6 (11)
3 months	4 (9)	20 (44)	
6 months	2 (4)	12 (26)	5 (11)

Conclusion

Importantly over time there was no significant reduction in health related quality of life given HF is a chronic debilitating illness. Over a fifth of the cohort at all time points was at risk of depression, which is similar to other reports in the literature. Although measured readmission rate was lower than actual numbers are small.

Toukhsati SR,[1,2,3], Fletcher S,[2], Pillay P,[2], Lam N,[2], Zheng JC,[2], Liu, M, [2], Kwee JK,[2], Hwang J,[2], Hare DL[2,3]

Depression is associated with lower haemoglobin levels in post-Acute Coronary Syndrome patients

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Aim
Depression is common following acute coronary syndrome (ACS) and is a risk marker for future ACS events. The aim of this study was to explore the relationship between depression and prognostic pathology markers, such as haemoglobin (Hb) levels, in post-acute coronary syndrome (ACS) patients.

Methods
A total of 207 consecutive adult post-ACS patients (167 men; mean±SD age 63.91±12.55 years) completed the Cardiac Depression Scale (CDS) and had their Hb levels (g/L) measured during an admission for STEMI/NSTEMI.

Results
One quarter of the sample (n = 51, 25.5%) screened positive for probable depression (CDS ≥ 95) (mean±SD 77.26±24.06, range 29–153). Mean peak Hb levels during admission for ACS were in the normal range for all patients (Males: mean±SD 147.86±17.88, range 97-182; Females: mean±SD 131.88±17.92, range 91-176). Almost one quarter of patients (22% of males; 23% of females) were in the low Hb range and 5% of males and females were in the high range. Depression (CDS Total) was inversely associated with Hb ($r = -.15$, $p < .05$). Linear Regression analyses revealed that higher levels of Depression ($\beta = -.25$), but not Psychological Resilience or Anxiety, significantly predicted lower Hb, after adjusting for demographic and clinical factors.

Conclusion
Depression, as measured by the CDS, inversely predicts Hb levels, independent of other psychosocial factors, age, gender, Troponin levels or ACS diagnosis (STEMI/NSTEMI). Given the adverse prognostic outcomes of depression and low Hb in this patient cohort, routine screening of depression during patient admission for an ACS event is recommended.

Toukhsati SR,[1,2,3], Xu K,[2], Nasarudin AA, [2], Bowers BJ,[2], Justice, KL,[2], Caruso K,[2], Muccitelli AA, [2], Smith ST, [2], Halim J, [2], Milligan DT, [2], Galea AK, [2], Duong LVN,[2], Hare DL[2,3]

Depression predicts psychological distress one month following an Acute Coronary Syndrome admission

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Aim
Acute coronary syndrome (ACS) is a stressful life event that can be psychologically traumatic. The aim of this study was to explore psychosocial, clinical and demographic predictors of psychological distress one month following an admission for ACS.

Methods
A total of 105 consecutive adult post-ACS patients (88 men; mean±SD age 65.27±11.73 years) completed the Cardiac Depression Scale (CDS) during an admission for STEMI/NSTEMI. One month following their ACS, patients completed the Impact of Event Scale Revised (IESR) as a measure of psychological distress.

Results
19% of the sample (n = 19) screened positive for probable depression (CDS ≥ 95) (mean±SD 73.74±22.30, range 29–140) during their ACS admission. One month following their ACS admission, 21% of patients had symptoms of post-traumatic stress disorder (PTSD) (IESR ≥ 24) and 11% had levels indicative of probable PTSD (IESR ≥ 33). Linear Regression analyses revealed that higher levels of Depression (β = .18), but not Psychological Resilience or Anxiety, significantly predicted psychological distress one month following an admission for ACS, after adjusting for demographic and clinical factors.

Conclusion
Depression, as measured by the CDS, is a risk marker for psychological distress one month following an admission for ACS, independent of other psychosocial factors, age, gender, Troponin levels or ACS diagnosis (STEMI/NSTEMI). Given the morbidity and mortality risks associated with depression, it is recommended that patients be routinely screened for depression during ACS admissions.

Qian P[1], Nedumannil L[1], Lim A[1], Walker S[2], Johnson P[3], Grigg A[1]

Is early cessation of antibiotics safe in high risk febrile neutropenic hematology patients with fever resolution, but persistent neutropenia?

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Introduction

Febrile neutropenia (FN) commonly occurs in hematology patients receiving myelosuppressive chemotherapy. Historically, empirical antibiotic treatment is given until clinical resolution and neutrophil recovery (neutrophils≥0.5x10^9cells/L), potentially causing adverse antibiotic-related effects.[1,2] Recent data suggest early antibiotic cessation despite ongoing neutropenia in low risk patients (no infective cause identified, ≥72hrs hemodynamically stable, afebrile) is safe.[3,4] This pilot prospective observational study assessed early antibiotic cessation in FN patients with ongoing severe neutropenia (<0.5x10^9cells/L for ≥7days), and hypothesised that this would not cause serious adverse outcomes (intensive care unit (ICU) admission, death).

Methods

Adult (18-75yrs) hematology FN in-patients at Austin Health (Sept.2018 – Jun.2019) were assessed for the following criteria: neutrophils<0.5x10^9cells/L for ≥7days, culture negative, no identifiable infective focus, ≥5 days empirical antibiotic therapy, ≥48hrs afebrile with stable vital signs, no severe mucositis and no significant co-morbidities. Antibiotics were ceased in eligible patients. The primary endpoint was “success”, defined as not requiring further antibiotics and absence of adverse events (recurrent fever, new infection, septic shock, ICU admission, death) until neutrophil recovery. Data was analysed with logistic regression.

Results

Of 107 assessed episodes, 37 were eligible. The most common exclusion reasons were neutrophil count recovery during antibiotic treatment (n=26) and positive cultures (n=20). Fever recurred in 16 cases (median 2.5days (IQR 0.75-3.5) after cessation), of which 8 were associated with new bacteremia and 1 with ICU admission (for polymicrobial sepsis after prolonged recurrent fevers). In 21 cases, no adverse events occurred. Of variables age, gender, hematological diagnosis, treatment type (chemotherapy/allograft/autograft), total neutropenia duration, neutropenia duration post cessation, fever duration and maximum temperature, only neutropenia duration post cessation was significant in estimating recurrent fever occurrence (OR 1.27; p-value=0.002) rather than FN severity.

Conclusion

Only a third of high risk FN episodes were eligible for cessation; of these, 57% were successes. A serious adverse outcome occurred in 1 patient, with no fatalities. Neutropaenia duration following cessation significantly reflected recurrent fever risk. This study suggests early antibiotic cessation is safe, but only modestly reduces antibiotic exposure. The study continues with the intention to identify patient groups in whom this approach is appropriate.

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A retrospective analysis of Life Prolonging Treatment Decision for adults with pre-existing Advance Care Plan (ACP) and/or Resuscitation plans (RP) presenting to the Emergency Department (ED).

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Aim

To investigate 1) How often patients attending Austin hospital's ED had an advanced care plan (ACP) or resuscitation plan (RP); 2) Factors associated with the presence of an ACP or RP and; 3) Whether Life Prolonging decision-making was in line with the ACP directive and/or previous RP records.

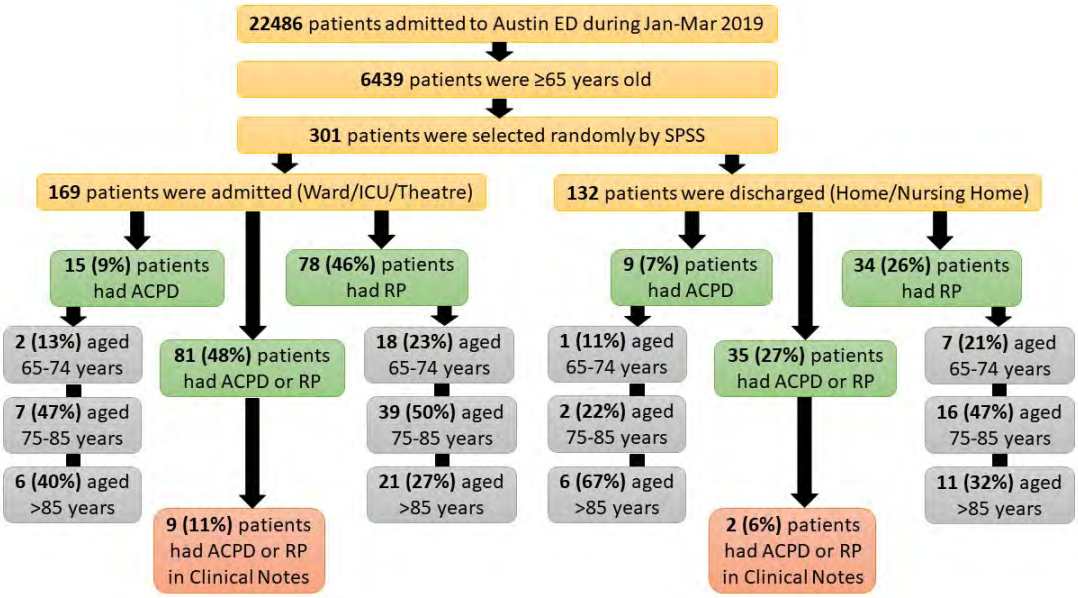
Method

A retrospective audit of patients aged 65 years and above who presented to Austin ED from 1st Jan 2019 – 31st March 2019 was undertaken. Data obtained was randomly sampled using OpenEpi and SPSS assuming a frequency of outcome in the population of 30%, power of 80% and confidence interval of 95%.

Results

The study population comprised 28.6% of total ED presentation during study period (Fig 1). ACP were present in 8% while RP frequency was 37.2%. Amongst patients admitted to hospital, ACP or RP were present in approximately 50%. In only 8% of instances did the treating clinician document acknowledgement of an ACP/RP. Acknowledgment of ACPD/RP in clinical notes were more likely if the patients had ACP (55% vs. 16%, p = 0.009, OR 4.85, 95% confidence intervals 1.62-14.5). Treatment was found to be consistent with the ACP directive and resus plan in 99.1% of instances.

Figure 1.



Conclusion

Our study results indicate, ACP is uncommon (1/12), RP is more common (1/3), clinician acknowledgement of either was infrequent (8%). There is a need to improve ACP uptake and acknowledgement of such plans by our ED clinicians.

Varan AK,[1,2] Tuitama MD,[3] Elia L,[4] Moynihan G,[5] Millar J,[6] Tofa T,[3] Warrillow S,[7] Galler D[8]

Paediatric sepsis in Samoa: Prevalence and time-to-antibiotics for outpatient admissions.

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Aim
Despite bearing the greatest disease burden, low-resource settings are underrepresented in sepsis prevalence data. Our study aimed to evaluate sepsis prevalence and time-to-antibiotics in the paediatric outpatient clinic at Tupua Tamasese Meaole Hospital (TTMH), Samoa's tertiary hospital. To our knowledge, this is the first study of paediatric sepsis in Samoa.

Methods
We identified paediatric outpatient clinic encounters during 2018 among children aged ≥29 days to <13 years which resulted in ward admission. Using retrospective medical notes, we assessed sepsis positivity per International Paediatric Sepsis Consensus Conference (IPSCC) criteria.[1] Among sepsis-positive patients, we determined time-to-antibiotics and admission outcome. Using logistic regression modelling, we assessed predictors of sepsis positivity and delayed antibiotic administration (≥3 hours after clinic review).

Results
Among 20,681 outpatient encounters, 562 (3%) met study inclusion criteria, of which 331 (59%) were sepsis positive. Children aged <1 year were less likely to be sepsis positive (aOR=0.67; 95% CI: 0.48–0.94). Eighty-eight percent of septic patients received ≥1 empiric antibiotic, of whom 71% had delayed administration. Delayed ward admission was the only significant predictor of antibiotic delay (aOR=11.1; 95% CI: 5.5–22.6). No septic patients died during admission and sepsis positivity did not predict increased admission duration.

Conclusion
Among paediatric admissions in Samoa, we detected a high prevalence of sepsis but low associated disease severity. Our findings provide baseline statistics and a methodological framework for evaluating paediatric sepsis management in Samoa and the Pacific.

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Safire Valentine[1], Nicole Gant[1], James Majer[1], David Taylor[1,2]

The patient consent process and its effect on study outcome measures: a randomised, controlled trial

1. University of Melbourne 2. Austin Health

Aim
Telephone follow up without prior consent has been associated with loss to follow-up and adverse patient and researcher experiences. Its effect on study outcome measures is not known. We aimed to determine if the timing and context of informed consent is associated with loss to follow-up and refusal rates and which variables are associated with patient satisfaction with pain management.
Method:
We conducted a randomised, controlled trial of adult patients with a triage pain score of ≥4, in a single ED. Patients were randomised to consent in the ED or at follow-up. Clinical care was unchanged. Patients were followed-up by telephone (or ward visit) 48 hours post ED discharge and administered a questionnaire. Outcomes were loss to follow-up and refusal rates, and satisfaction with pain management.
Results:
414 and 411 patients were randomised to consent in the ED and at follow-up, respectively (no difference in baseline characteristics). Loss to follow-up, refusal rates and acceptability of the consent process did not differ between the groups (Table). At follow-up, 329 and 326 patients were very/not very satisfied with their pain management. Male gender, presenting with chest pain and a higher triage category were associated with being very satisfied ($p<0.05$). Patients consented in the ED, who had adequate analgesia administered (that decreased the pain score by ≤2 and to <4) and who were given pain advice in the ED (treatment of pain is important so tell the staff if you have pain) were significantly more likely to be very satisfied ($p<0.1$).
Conclusion:
Consent in the ED and at follow-up are both acceptable to patients and neither affects loss to follow up nor refusal rates. However, the timing and context of the consent process may significantly bias subjective outcome measures and should be considered during study design development.

Table. Effects of the nature and timing of patient consent (N=825)

	consented in ED n (%)	consented at follow-up n (%)	p
Lost to follow-up	70 (16.9)	66 (16.1)	0.74
Refused to participate	18 (4.3)	15 (3.6)	0.61
Consent process acceptable†	315 (96.9)	327 (99.1)	0.05

†of the 655 patients with complete data

James Majer[1], Safire Valentine[1], Jaimee Warren[1], Nicole Grant[1], Muhuntha Sri-Ganeshan[1], Anton Jermakoff[1], Blake Cooper[1], Jonathan Knott[1,2], David Taylor[1,3]

Outcomes of laceration suture repair in the Emergency Department

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3. *Austin Hospital*

Aim
Previous studies of emergency department (ED) laceration repair have focused on specific complications and physician-rated repair cosmesis. We aimed to assess adult patient satisfaction with laceration cosmesis, post-ED care and overall management.
Method
We undertook a prospective cohort study of adult patients with lacerations sutured in two EDs. ED data included patient demographics, laceration characteristics and management. At least 14 days post-ED discharge, patients were surveyed regarding their outcomes and satisfaction with wound cosmesis, post-ED pain management, advice on wound care and follow-up, and overall management. A six-item satisfaction scale (very dissatisfied to very satisfied) was employed.
Results
Complete data were obtained on 84 participants. The numbers (%) of patients very satisfied with their management were: cosmetic appearance 46 (54.8%), post-ED pain management 52 (62.7%), wound care advice 48 (57.1%), follow-up advice 38 (45.2%) and overall management 58 (69%). Infection, dehiscence and untied sutures occurred in 3 (3.6%), 7 (8.3%) and 7 (8.3%) cases, respectively. These complications were not associated with being very satisfied overall ($p=0.83$). Being very satisfied with wound cosmesis, post-ED pain management, wound care advice and follow-up advice were each significantly associated with being very satisfied overall ($p<0.001$). Older age and a longer laceration length were associated with being very satisfied with overall care ($p<0.03$ and <0.01, respectively).
Conclusion
Most patients are very satisfied with their laceration management. However, there is scope for improvement, especially in the areas of follow-up and wound care advice. Complications are infrequent and not associated with overall satisfaction.

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Overuse of empirical antibiotics in viral meningitis: a tertiary centre study

1. Austin Health

Background
Emergency physicians often prescribe empirical antibiotics for patients with suspected viral meningitis while a diagnosis of bacterial meningitis is excluded through cerebrospinal fluid (CSF) testing. Given the consequences of unnecessary antibiotic administration, including side effects and the development of antimicrobial resistance, reduction of antibiotic overuse in viral meningitis is important.

Aim
To identify the rate of empirical antibiotic administration in viral meningitis cases.

Method
Retrospective case series of all patients who received a lumbar puncture in the emergency department (ED) of a major Australian tertiary hospital from August 2017 to July 2018. Individuals of all ages were included.

Results
79 lumbar punctures were performed to evaluate for suspected meningitis. 13% (10/79) of patients had viral meningitis proven by CSF polymerase chain reaction testing. 1% (1/79) had bacterial meningitis. All patients with viral meningitis were aged 18 years or older. 50% (5/10) of viral meningitis cases received empirical antibiotics in ED. The patient with bacterial meningitis received appropriate empirical antibiotics in ED. 41% (17/41) of adults with a negative lumbar puncture for bacterial and aseptic meningitis received empirical antibiotics for bacterial meningitis. In comparison with the above results, a multicentre study published in The Lancet Infectious Diseases in 2018 found that 69% of proven viral meningitis cases across 42 hospitals in the United Kingdom received empirical antibiotics.(1)

Conclusion
Half of all viral meningitis cases received empirical antibiotics in ED. Empirical antibiotics were administered in a large proportion of cases negative for both bacterial and viral meningitis. More research is needed on safe clinical strategies for diagnosing meningitis and distinguishing between bacterial and viral meningitis. Clinicians should consider waiting for lumbar puncture results without administering empirical antibiotics in stable patients with suspected viral meningitis.

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Who needs our attention most? Comparison of admission medication errors in surgical and medical patients.

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Aim
The emergency department (ED) is a high-risk environment for medication errors and adverse drug events (ADEs). Having a clinical pharmacy service in ED has been demonstrated to improve detection and management of medication errors. However, limited funding and high patient turnover restricts the number of patients who can be reviewed by a pharmacist. It is therefore important to ensure that ED pharmacy services are targeted to patients who are at greatest risk of medication errors and consequently ADEs.
To compare the prevalence of admission medication errors in surgical versus medical patients admitted to the wards from ED.

Methods
A prospective observational study was conducted over a 4-month period. Patients were included if: admitted under a general medical or surgical unit, >18 years, admitted >72 hours and taking at least four regular pre-admission medications. The primary endpoint was the number of admission medication errors in the first 72 hours in surgical versus medical patients. Secondary endpoints included:

- Number of potential ADEs associated with admission medication errors;
- Number of medication errors in the first 72 hours when reviewed by a pharmacist in ED compared to on the wards

Results
60 patients were included in each medical and surgical group. There were no statistically significant differences in medical versus surgical patients in the number of medication errors (median 5 cf. 7 respectively, p=0.14) or the number of potential ADEs (9 cf. 5 respectively, p=0.26). There was no statistically significant difference in the number of medication errors when patients were seen by a pharmacist in ED or on the wards (median 5.5 cf. 6, p=0.59).

Conclusion
Surgical patients were at an equivalent risk of medication errors and ADEs as medical patients. ED pharmacists should therefore prioritise patients based on known risk factors for medication errors, regardless of the admitting unit.

ABSTRACT

Introduction: The epidemiology of early hourly net ultrafiltration rate (UF^{NET}) in patients receiving continuous renal replacement therapy (CRRT) has not been studied.

Objectives/Aims: To investigate the characteristics and outcome associations of early (first 48 hours after CRRT start) hourly UF^{NET} rate.

Methods: We studied patients treated with CRRT from 2016 to 2018 who survived >48 hours after CRRT initiation. We obtained detailed data on hourly UF^{NET} during the first 48 hours of CRRT and assessed time-weighted average UF^{NET} in the first 48 hours of therapy ($TwUF^{NET}$) as primary exposure of interest with in-hospital mortality as primary outcome.

Results: We studied 350 patients, with 231 (66%) receiving mechanical ventilation and 217 (62%) receiving vasopressors. Hospital mortality was 109 (31.1%). Need of mechanical ventilation, presence of fluid overload at baseline and heavier body weight were all significantly associated with increased UF^{NET} in the first 48 hours. In contrast, vasopressor therapy was associated with decreased UF^{NET}. Early $TwUF^{NET}$ corrected by body weight > 1.75 ml/kg/h was associated with increased risk of in-hospital mortality (odds ratio 1.98; [1.06–3.70]; p = 0.031). The maximum UF^{NET} and the amplitude of UF^{NET} variability corrected by body weight were also associated with increased risk of in-hospital mortality, ICU mortality and ICU length of stay.

Conclusions: Among treated with CRRT and surviving >48 hours, early $TwUF^{NET}$ corrected for body weight > 1.75 ml/kg/h, its maximum value, and its variability were independently associated with increased risk of mortality.

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Post-operative discharge medication patient education: evaluation of training for advanced practice hospital pharmacy technician roles

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2. *Allied Health Education Unit, Austin Health, Heidelberg, Vic., Australia*

Aim
To develop and evaluate a comprehensive training program for pharmacy technicians to undertake discharge medication patient education for selected short-stay surgery patients.

Methods
The project team comprised surgical and education pharmacists and pharmacy technicians, with governance from senior staff. A literature review was undertaken and legislation reviewed. Technician scope of practice and procedures were informed by Pharmacy Board of Australia requirements. The training program addressed communication skills, medication knowledge, surgical procedures and orientation to a clinical setting. Clinical education experts (pharmacists and allied health educators) ensured training and scope development were robust. Health department supervision and delegation frameworks also informed the program design.

Training comprised online interactive learning modules, observations of pharmacists and practising skills under direct and indirect supervision. Several existing departmental observational tools and competency assessments used for pharmacists were modified for use by a technician. Pharmacists with subject-matter expertise reviewed each module for content accuracy. These modules and assessments were uploaded onto the hospital's electronic learning management platform.

Results
The first technician to undertake the program has found it to be challenging and comprehensive. Further evaluation is ongoing to establish whether patients' satisfaction with their education experience is equivalent, whether it is provided by a pharmacist or technician.

Conclusion
This comprehensive training development model may be applied to other pharmacy technician role expansion projects. Such roles may afford technicians increased job satisfaction and enable pharmacists to better use their clinical decision-making expertise.

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Optimising venous thromboembolism prophylaxis in post-surgical patients: are electronic medication management systems a silver bullet?

***Aim*:** To examine VTE prophylaxis practices in post-surgical patients in a tertiary hospital with comprehensive eMMS implementation. Whilst hospitalised patients are often at risk of venous thromboembolism (VTE), many do not receive appropriate prophylaxis. Electronic medication management systems (eMMS) with decision support may improve documentation of such assessments and use of prophylaxis, by providing alerts and decision support.

Methods: A prospective study of VTE prophylaxis was conducted over five consecutive days in 2018. All adult surgical patients hospitalised for >24 hours after their procedure were included. Data collection comprised: treating unit, procedure, VTE prophylaxis timing post-surgery, pharmacological prophylaxis used, reason for withholding prophylaxis and VTE risk assessment completion within eMMS.

Results: Overall, 171 patients were included (age 60.5±18.6 years; 71 (41.5%) female; 50 (29.2%) general surgery, 16 (9.4%) orthopaedic patients. VTE risk assessment was completed for 36 (21%) patients. The 2018 Australian Commission on Safety and Quality in Health Care national audit of paper-based inpatient medication charts found that 9.0% of hospitalised patients had a VTE risk assessment documented. Overall, 115 (67.3%) patients received pharmacological VTE prophylaxis. Concordance with hospital guidelines regarding timing of VTE prophylaxis commencement for various patient populations was poor; 9/50 (18%) general surgery patients received intra-operative prophylaxis, while 1/16 (6.3%) orthopaedic patients received prophylaxis 6 hours post-operatively. Of 56 patients who did not receive any VTE prophylaxis, 43 (76.8%) underwent surgery of <1 hour duration, and of the remaining 13 who underwent procedures for ≥1 hour, 11 (84.6%) had a reason for prophylaxis not being prescribed.

Conclusion: Whilst VTE risk assessment completion was superior to paper-based documentation, there is still room for improvement in an eMMS environment. The majority of post-surgical patients received VTE prophylaxis, however future interventions must focus on tailoring the timing of commencement of prophylaxis and optimal use of decision-support and alerts.

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3. *Austin Health – Department of Rheumatology*
4. *University of Melbourne*

"Big data" automated approach to Adverse Drug Reaction detection – refined ICD-10 coding tool in practice

Background: Across the hospital sector, widespread under-reporting of Adverse Drug Reactions (ADRs) is concerning for patient safety: both at patient and population levels. One targeted strategy proposed to overcome this is the use of ICD-10 coding, to flag patient episodes where a significant ADR event may have occurred.

Aim: Since 2016, our institution has trialled automated ICD-10 coding pharmacovigilance tools, complementary to our existing well-established voluntary reporting system. We have sought to create and use a refined machine learning algorithm, to improve both accuracy and efficiency.

Method: A medical doctor with experience in data analytics created a machine learning tool, around ICD10 codes of specific interest; i.e. ICD10 code range Y40.0 – Y59.9 and their associated external injury codes. The output report filtered routinely collected discharge coding data.

The output report could be run and reviewed retrospectively on a monthly basis. An experienced clinical pharmacist reviewed the flagged cases using electronic health records (i.e. Cerner electronic medication management system, scanned medical records). Cases were assessed for veracity against established institutional criteria, to establish whether an ADR report was necessary.

Results: A 6-month data collection phase from November 2018 to April 2019 flagged 84 patient episodes where potential ADRs may have occurred (mean 14/month). Upon subsequent expert review, 46 cases met our criteria for requiring an ADR report; the tool sensitivity in identifying ADR cases was 55%. On 15 occasions, the tool flagged patient episodes where a voluntary report had already been completed by a clinician. The pharmacist labour time to process the monthly report averaged 73 minutes.

Conclusion: Our centre found this an efficient, automated, supplementary tool for detection of ADRs with flow-on benefits for patient safety. The project's implementation was possible because of multidisciplinary input, a well-established pharmacovigilance process, and access to staff with data analytic skills.

Evaluating research capabilities in allied health professionals

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Aim: Evidence suggests that a strong research culture is associated with increased organisational performance and improved patient care[1]. This study aimed to measure self-reported research participation, interest and experience of allied health professionals (AHPs) at Austin Health.

Methods: Allied Health Division professionals were invited via email to participate in the online survey based on the Research Spider Tool[2]. Capabilities were assessed on a 5-point scale and mapped to the three key research themes; 1) consumption (finding and interpreting literature), 2) participation (using research methods) and 3) production (leading and publishing research). Research experience was categorised on a five point scale based on prior research paper publications and/or successful grant applications. Results are summarized descriptively and presented visually relative to published data from another Melbourne health service.

Results: Of the 290 AHPs at Austin Health in 2019, 201 (69%) responded to the survey. Sixty five percent of respondents reported no previous research grants or publications, while seven percent were a holder of a research grant ≥ $25,000 and/or author of ≥ four peer-reviewed publications. AHPs reported higher capabilities in the areas of research consumption (2.9) and participation (2.5). This was comparable to another health service, albeit less in "Analysing and interpreting results"[3] (Figure 1). Lowest scores were reported in research production (1.9).

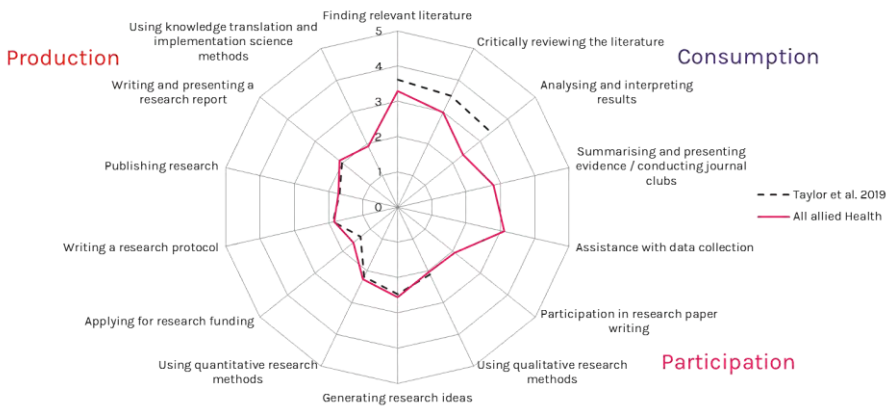

Figure 1 Research Capability Spider plot

Conclusion: Research capability across Allied Health is unequally distributed across consumption, participation and production and appeared broadly comparable to peers on participation and production, but less so on consumption. These results highlight that AHPs have scope for ongoing development across consumption, participation and production of research. The data will direct education and capacity building. The survey will be repeated in 2021 to assess intervention efficacy.

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Sobia Amjad[1], James Bailey[1], Karin Verspoor[1], Rinaldo Bellomo[2], Natasha Holmes[3]

Early prediction of delirium using electronic health records.

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Introduction:
In this study delirium is predicted using electronic health records of patients through machine learning models. All the measurements selected to predict delirium are easily available at the time of hospital admission and are routinely collected without a pre-existing clinical suspicion of delirium.

Methods:
The datasets used is formed by almost 82,000 hospitalized adult patients between May 1, 2013 and Dec 31, 2018. It only contains records for first hospital admission of patient and primary outcome measured was the algorithm's ability to identify delirium at the time of inpatient admission, 24h and 48 h after the admission.

Results:

Dataset size = 82002 **Delirium positive patients** = 4.52 % **Delirium negative patients** = 95.47 %			
	Results	**Description**	**Dataset size, Number of features, Target variable distribution**
Patient's data available at IP Admission (Demographics = 100 % Observation data = 49% and Pathology results = 58%)			
Baseline dataset (badm)	ROC - AUC: 0.83 PR- AUC: 0.23	At the time of admission	Features: 90
Patient's data available after 24 h of IP Admission (Demographics = 100 % , Observation data = 73% and Pathology results = 83%)			
Baseline dataset (b24h)	ROC - AUC: 0.87 PR- AUC: 0.258	Within 24 h of IP admission	Features: 90
Patient's data available after 48 h of IP admission (Demographics = 100 %, Observation data = 77% and Pathology results = 86%)			
Baseline dataset (b48h)	ROC - AUC:0.88 PR-AUC: 0.283	Within 48 h of IP admission	Features: 90

Conclusion:
The above machine learning algorithms hold promise to predict early the likelihood of having delirium with an AUC of above 0.87. The accuracy of model varies based on the amount of data available at the time of inpatient admission and within 24h and 48h. It also effects the ranking of important parameters which contributes to prediction of having delirium.

Nicole Grant[1], Safire Valentine[1], James Majer[1], David Taylor[1,2]

Medical practitioner sanction and deregistration: An international study

1. University of Melbourne 2. Austin Hospital

Aim
Practitioners who breach professional and ethical standards or commit criminal offences may be deregistered from practice or have limitations imposed on their practice. We aimed to determine the nature of, and risk factors for, medical misconduct; and the sanctions applied.
Method
We analysed 565 medical board decisions handed down, between 2013 and 2017, in Australia, New Zealand, Canada, Singapore and Hong Kong. A legally-trained investigator extracted data from publically available databases: practitioner characteristics (gender, specialty, international medical graduate [IMG] status), types of misconduct and sanctions applied.
Result
Misconduct varied by practitioner group ($p<0.001$). Inappropriate medical care was most commonly observed among physicians, surgeons and 'other' specialties. Sexual misconduct was most common among psychiatrists. Misconduct varied by jurisdiction ($p<0.001$). Australian practitioners were most likely sanctioned for sexual misconduct and illegal or unethical prescribing. Sexual misconduct was very uncommon in Singapore and Hong Kong. The misconduct of locally trained practitioners and IMGs varied ($p<0.01$). IMGs were more likely to be sanctioned for sexual misconduct. Sanction varied by misconduct ($p<0.001$, Table). Doctors found guilty of sexual misconduct were very likely to be deregistered or suspended from practice. Inappropriate medical care, misconduct not in relation to a patient and other types of misconduct more often resulted in suspension.
Conclusion
The nature of medical misconduct varies widely and across jurisdictions. Inappropriate medical care was the most common overall. Sexual misconduct was more common among psychiatrists, Australian practitioners and IMGs and was more likely to result in deregistration or suspension.

Table. Sanctions by misconduct type: n (%) of sanctions within misconduct type

	Cancellation of registration	Suspension from practice	Restriction on practice	Non-restrictive sanction
Sexual misconduct	67 (58)	32 (28)	9 (8)	7 (6)
Illegal or unethical prescribing	30 (30)	36 (36)	25 (25)	9 (9)
Inappropriate medical care	19 (13)	73 (49)	17 (11)	40 (27)
Misconduct not in relation to patient	13 (24)	32 (58)	5 (9)	5 (9)
Other	13 (13)	58 (57)	7 (7)	24 (24)

Emotional eating in people seeking treatment for obesity: Prevalence and associated factors

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Introduction: Emotional eating is linked to a series of disordered eating behaviours and associated with reduced weight loss success. Furthermore, the prevalence of emotional or stress-related eating has been seen to increase in the general population over past decades, which mirrors the current rise in obesity rates. However, limited information is available on the prevalence and factors associated with emotional eating in a weight loss seeking population. Hence, the aim of this study is to estimate the prevalence and factors associated with emotional eating in a weight loss seeking population.

Methods: 387 adults from medical or surgical weight loss clinics completed the Emotional Eating Scale (EES) questionnaire. Age, height, weight, weight loss medications and history of bariatric surgery was extracted from medical records. Prevalence was defined by an EES score of ≥25, and strength of associations were estimated by boot-strapped quantile regression. Results are presented as quantile difference (QD) of EES scores at 25th, 50th and 75th quantile, and 95% confidence interval (CI).

Results: Study participants consisted of 70.5% females with a median age of 51.6 years (interquartile range: 19.7) and a body mass index of 42.1 kg/m2 (interquartile range: 12.1).The prevalence of emotional eating was 57.9% (95% CI: 52.8%, 62.9%). Emotional eating was associated with age <40 years (25th QD: 10 [95% CI: 2.1, 17.9]), female sex (50th QD: 9 [95% CI: 2.7, 15.3]); 75th QD: 12 [95% CI: 3.8, 20.2]), use of glucagon-like peptide-1 agonists (GLP-1; 25th QD: -7 [95% CI: -13.2, -0.8]), history of sleeve gastrectomy (25th QD (-9 [95% CI: -17.3, -0.7]) and bariatric surgery within 365 days (25th QD: -10 [95% CI: -17.3, -2.7]; 50th QD: -12 [95% CI: -22.9, -1.1]).

Conclusion: These findings suggest that many patients seeking obesity treatment are affected by emotional eating, especially younger people and women. Furthermore, use of GLP-1 agonists, sleeve gastrectomy and recent bariatric surgery are associated with lower levels of emotional eating. These findings allow hypothesis generation for further studies, providing a clue to the underlying physiological mechanisms behind emotional eating.

Systematic review of emotional eating change after bariatric surgery

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Introduction: People do not eat purely due to hunger, but also in response to life stressors and emotions. Emotional eating is linked to disordered eating behaviours and associated with reduced weight loss success and weight regain. However, as bariatric surgery results in sustained weight loss over time, it is possible that part of the success behind surgery may be due to changes in non-hungry eating. Hence, this systematic review aims to examine changes in emotional eating behaviour after bariatric surgery.

Methods: Sixteen electronic databases were searched on June 11th 2019. Studies were included if they included primary bariatric surgery patients, quantitatively assessed emotional eating behaviours, and reported emotional eating both before and after bariatric surgery. Papers were excluded if they only included revisional bariatric surgery, did not include human participants, were not in English language, or full text was not available. Study quality was assessed using the Quality Assessment Tool for Before-After (Pre-Post) Studies With No Control Group by the National Heart, Lung and Blood Institute.

Results: Out of 1265 studies, 23 pre-post studies were included containing 6494 participants with a range of post-operative follow up periods between 2 weeks and 48 months. Emotional eating scores dropped between 2 weeks to 12 months post-bariatric surgery, although results were mixed between 12 months to 36 months, and no longer significant in follow up over 36 months. Six studies were poor quality, 13 were fair quality, and four were good quality.

Conclusion: Emotional eating behaviour was found to be reduced in the short to medium term period following bariatric surgery, suggesting that bariatric surgery may play a role in mitigating emotional eating behaviour. These findings provide a clue to the underlying physiological mechanisms behind emotional eating, that may eventually allow for the development of targeted management for people affected by emotional eating.

ResearchFest Abstract:

Comparing two questionnaires for assessment of emotional eating in people seeking treatment for obesity.

Background: Emotional eating may contribute to weight gain and difficulty with weight loss. Questionnaires are currently the primary method used to identify this behaviour, however there is no consensus on which questionnaire is most reliable for this purpose. This study aims to compare two questionnaires that are validated for identifying emotional eating in patients with overweight or obesity who are seeking weight loss. It was hypothesised that the agreement between questionnaires would not be substantial (kappa <0.6) as each questionnaire assesses different aspects of emotional eating.

Methods: Responses from 387 adult participants recruited from medical and surgical obesity management clinics at Austin Health were obtained for the 25-item Emotional Eating Scale (EES) and the 4-item coping subscale of the Palatable Eating Motives Scale (PEMS). Agreement was analysed using quadratically weighted kappa scores.

Results: The median body mass index of participants was 42.1 kg/m^2 (interquartile range 12.1 kg/m^2), median age was 51.6 years (interquartile range 19.7 years) and 70.5% of participants were female. The EES and PEMS were found to have substantial agreement based on a score of 0.71 (95% CI 0.65-0.76). Agreement remained in the 'substantial' reference range when comparing responses from males (0.61 (95% CI 0.47-0.73)), females (0.73 (95% CI 0.67-0.79)) and post-bariatric surgery patients (0.72 (95% CI 0.62-0.82)) separately.

Conclusion: This substantial agreement suggests that the questionnaires are identifying respondents' susceptibility for emotional eating with consistency. This agreement was maintained in subgroup analysis of sex and history of bariatric surgery. Therefore, the PEMS coping subscale may be preferred due to its shorter length and specificity to highly palatable food consumption. Developing a consensus on which questionnaire to use in future studies is important for furthering our understanding of emotional eating with a view to developing a more individualised approach to obesity management.

Title: Audit on Documentation of Recognition and Follow-up Plan of Confusion in an Australian Acute Geriatric Ward

Author: Dr Henry Yao, Dr Maggie Chua, Dr Celia Ting, Dr Mary Britton & A/Prof Michael Murray

In the geriatric population, confusion is frequently under-recognized and poorly documented. The diagnosis of confusion is also consistently under-reported, with lack of follow-up plan communicated across to patient's GP to monitor its resolution or to specialist for further assessment. This audit looked at the documentation regarding recognition and follow-up plan for elderly patients presenting with confusion to the acute geriatric ward, building up on previous work done by the Department commencing in 2011 & an initial audit in 2016.

Method:
Using electronic medical records, 150 consecutive hospital admissions into the Acute Geriatric wards were reviewed. De-identified information collected include patient baseline demographic characteristics, identification of confusion and its potential aetiology, documentation on discharge summary, formulation of follow-up plan, and complications. Descriptive statistics was expressed as means with standard deviations (SD), medians with ranges, or proportions. The two groups were then tested using either unpaired t-test or z-score.

Result:
In this audit, the average age of patient was 85 (SD 7.7) and gender ratio of F:M of 2:1. Average length of stay as inpatient was 7.2 days (SD 6.2 days). Majority of the patients (120) were from home, and 83 of those received formal services in the community. Median Charlson's Comorbidity Index score was 7 and median Clinical Frailty Scale score was 6 (moderately frail). 46 were known to have underlying dementia or cognitive impairment, and another 51 had other underlying neurological or psychiatric co-morbidity that may affect cognition.

60 patients were documented to have confusion during their inpatient stay, with 57 (95%) receiving diagnosis regarding the aetiology of confusion, with delirium being most common, accounting for 29 cases (48.3%). The rate of diagnosis was in keeping with the 2016 audit. There was better identification of depression (8/60, 13.3%). 16 of the confused were from Residential Aged Care Facility (RACF). There was decline in documentation regarding use of tools such as Confusion Assessment Method (CAM) and Abbreviated Mental Test Score (AMTS) noticed on re-audit (86.2% vs 45% and 82.8% vs 33% respectively). Upon discharge, 38 (63%) has confusion (and its diagnosis) documented in the discharge summary. Additional 16 patients were discharged into RACF. 8 has documented follow up plan, including referral to either Memory or General Aged Care Clinic.

Discussion:
Baseline patient demographics were similar compared with 2016. Incidence of delirium in the acute geriatric ward was high, affecting almost fifty percent of the cohort admitted. This likely reflected on the lower cognitive reserve in the vulnerable cohort group of population. Cognitive assessments were performed regularly as part of required standard of care, allowing for early recognition of confusion & defining its potential aetiology, especially that of delirium. Despite the non-compliance with using standardized tool (CAM & AMTS), the rate of delirium diagnosis remained the same which potentially indicated the improved multidisciplinary effort at recognizing delirium. The poor documentation could also be explained by time and personnel constraint, which may be improved by using a shorter cognitive screen, such as the Abbreviated Mental Test 4 questions (AMT4).

Documentation for follow up plan was suboptimal. However, this could be related to the higher proportion of patients being discharged into RACF, which might be followed up more appropriately in the facility rather than through the outpatient clinic. Family and GP had previously reported increased satisfaction with better communication and information provision; however, this was not captured and quantified in this study. Since 2011, there had been organizational-wide training and education on delirium for both medical and non-medical staffs, as well as more recent changes to incorporate CAM within the electronic medical record. Perhaps AMTS or other cognitive screening could also be included in the electronic system, with prompts encouraging for its completion. Other strategies to improve and sustain the uptake include regular feedback provision, use of local champion and advocacy, and empowering or educational strategies.

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Identification of visceral leishmaniasis using metagenomic sequencing

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Aim
There has been considerable interest in using metagenomic next-generation sequencing (metaNGS) as an unbiased approach for diagnosing infectious diseases, but remains an experimental approach. We aimed to determine if metaNGS could a) identify the causative organism in a patient with visceral leishmaniasis (VL); b) accurately speciate the organism; and c) assist with determining the geographic location for acquisition of VL – key information for epidemiological surveillance and assessing duration of infection.

Methods
Whole-community DNA was extracted directly from the bone marrow aspirate sample using the QIAGEN Mini DNA Prep kit. DNA libraries were prepared using Nextera XT protocols and sequenced together with a no template control on the Illumina NextSeq. Raw sequencing data underwent initial trimming and quality control. Sequencing reads were initially classified with *Kraken2* using exact *k*-mer matches to exclude human sequences. The remaining metagenomic sequence data were assembled into contiguous sequences using *Megahit*. The organism genome was reconstructed using repeat assembly of *Leishmania*-classified reads and contigs.

Results
MetaNGS generated 121,364,564 raw sequencing reads. After removing human genome sequences, 905,743 (0.75%) sequencing reads remained, of which 294,673 (32.53%) were classified as *Leishmania*. Previously published polymerase chain reaction targets for small subunit rRNA, kinetoplast minicircle DNA, and the conserved REPL-repeat region of the *Leishmania* genome were identified *in silico* from the reconstructed genome. The species, *Leishmania infantum*, was confirmed by *in silico* reconstruction of the *hsp*70 gene, a species widely reported in the Mediterranean region. This correlated with acquisition of VL infection during the patient's most recent epidemiological exposure in southern Italy 12 months prior.

Conclusion
This case demonstrates the potential application of metaNGS for identification and speciation of *Leishmania* in cases of VL, though further assessment is required using other more readily obtained clinical samples such as blood. Genome reconstruction through metaNGS can provide greater detail on the organism to assist clinical care than current microscopy-based methods to identify *Leishmania* parasites.

The effects of a change in circulating *Neisseria meningitidis* serogroups on the clinical presentation of invasive meningococcal disease

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Aim
Invasive meningococcal disease (IMD) is a major cause of morbidity and mortality worldwide. Since 2015 an increase in cases due to *Neisseria meningitidis* serogroup-W (MenW) and serogroup-Y (MenY) has been noted in Victoria.
This study aims to assess the change in clinical characteristics of IMD over a time period encompassing the emergence of MenW and MenY.

Methods
We performed a retrospective review of IMD cases notified to Department of Health and Human Services Victoria between 2013-2017. We compared the period between January 2013 and June 2015 (defined as P1) immediately before the increase in MenW and MenY was noted, with the equal time period of July 2015 to December 2017 (P2), when these circulating strains were observed. Clinical data were recorded prospectively using a standardised case-report form.
All data in this study were obtained and reported under the legislative authority of the Public Health and Wellbeing Act 2008.

Results
IMD was notified more frequently in P2 than P1 (187 vs 80 cases; 1.24 vs 0.53 per 100,000 population; $p<0.001$). IMD cases in P2 were older (46 vs 19 years; $p<0.001$), and more likely to have a MenW (49.2% vs 13.8%, $p<0.001$) or MenY (16.6% vs 5.0%, $p=0.01$) strain detected. IMD cases from P2 were more likely to manifest as bacteraemia (80.7% vs 68.8%, $p=0.04$) or pneumonia (13.4% vs 1.3%, $p=0.001$), while meningitis (36.4% vs 51.3%, $p=0.03$) and rash (35.9% vs 57.7%, $p=0.002$) were less frequently reported. ICU admission rates and in-hospital mortality were unchanged.

Conclusion
Since the proliferation of MenW and MenY strains in Victoria an increase in notification of IMD has occurred, with more cases affecting older patients, and more often identified through meningococcal bacteraemia rather than meningitis or purpura fulminans. Clinicians should be aware of these changes to facilitate earlier identification and treatment of IMD.

Automated reporting of tau PET quantification on brain surface

V. Dore, P. Bourgeat, R. Martins, C. L. Masters, D. Ames, C. C. Rowe, O. Salvado, J. Fripp, V. L. Villemagne

Background:

In the recent years, there has been an increasing number of tau imaging studies, mainly with ^{18}F-AV1451 and ^{18}F-MK6240 tracers. Automatic quantification of tau scans has thus become a priority. However, unlike Aβ imaging, the topological distribution of tau is as critical as its total level. In this work, we extended our cortical surface based visualisation (CapAIBL) to tau images and developed a CenTauR measure to capture the characteristics and stages of tau deposition and spreading.

Method:

Two hundred and forty-three participants from the AIBL study underwent tau imaging with either ^{18}F-AV1451 (n=83) or ^{18}F-MK6240 (n=140). PET scans were quantified using CapAIBL with a tau specific atlas. Cortical tau burden, normalized to the cerebellar cortex, were then extracted, projected on a cortical surface template and compared to a distribution of Aβ-ve healthy controls (Aβ-HC). Three tau masks: Mesial-temporal (*Me*), temporoparietal (*Te*) and the Rest (*R*) of the neocortex. In each regional mask, the cortical area higher than a specific threshold (AV1451: Neocortical 1.25SUVR, Me 1.35SUVR, Te 1.30SUVR, R 1.25SUVR, and MK6240: Me 1.3SUVR, Te 1.28SUVR, R 1.11SUVR) was extracted. Measures of tracer retention and measures of extent were combined in a single measured denominated CenTauR [SUVR * (1+ %_of_area_higher_than_threshold)].

Results:

Alzheimer's disease (AD) subjects were significantly older than HC. Mild cognitive impaired (MCI) and AD participants had significantly higher Centiloid values as well as global and regional tau Z-score SUVR when compared to HC. CenTauR Z-scores were also significantly higher for MCI and AD when compared to HC and always provided a higher effect size (d>3.05) than SUVR Z-scores alone. SUVR and CenTauR Z-scores were highly and similarly associated with MMSE (r>0.46) and Episodic memory (r>0.46).

The resulting CapAIBL report provides not only the surface projection of cortical tracer retention, but also Z-scores generated using Aβ-HC. It also provides global and regional tau measurements as well as their associated CenTauRs.

Conclusion:

Our tau reporting tool discriminates well between MCI, AD and HC. CenTauR Z-score, which captures the degree of tau deposition and its extent, provide high effect size when comparing groups and allow the combination of results obtained with different tau tracers.

Diag	NC	MCI	AD
Sample size	178	30	16
Gender (M)	80	12	10
Age	75.2	73.5	70.1*
Centiloid	15.9	67.2***	105***
Nctx. $SUVR_z$ (Z-score)	0.4	2.1***	12.1***
Me $SUVR_z$ (Z-score)	0.5	2.9***	6.6***
Te $SUVR_z$ (Z-score)	0.4	2.6***	13.5***
R $SUVR_z$ (Z-score)	0.3	1.2*	8.7***
Nctx. $CenTauR_z$ (Z-score)	0.5	2.8***	15.0***
Me $CenTauR_z$ (Z-score)	0.6	4.3***	9.7***
Te $CenTauR_z$ (Z-score)	0.6	3.6***	17.6***
R $CenTauR_z$ (Z-score)	0.4	1.7**	10.6***

Table1: Demographic of the population, * p-value<0.01, ** p-value<0.001, *** p-value<0.0001compare to NC.

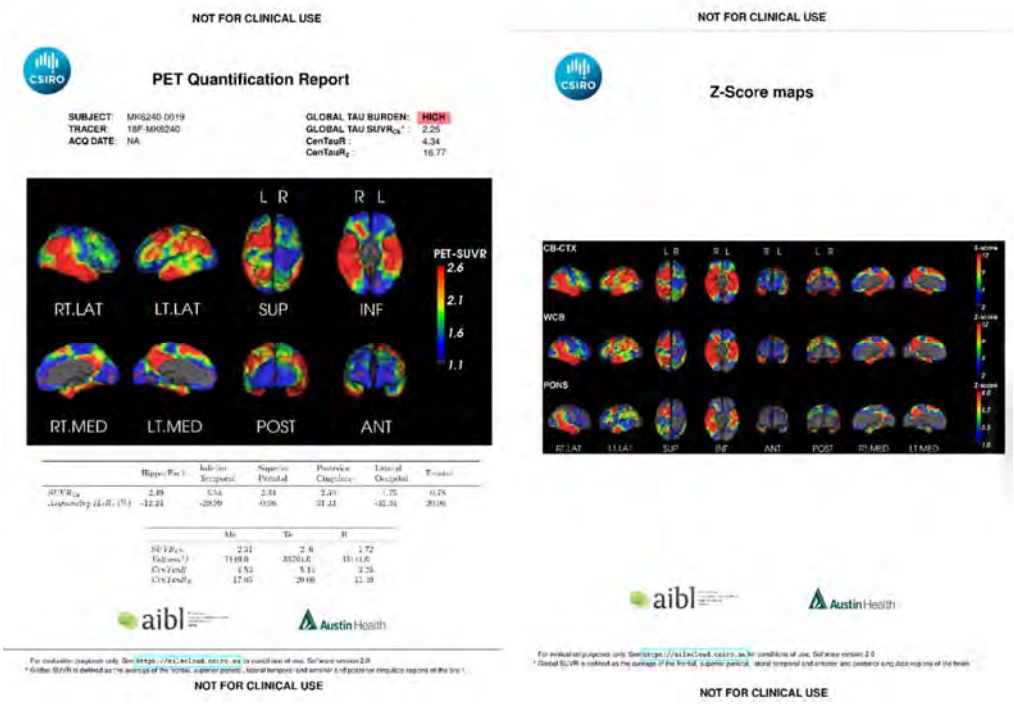

Figure1: CapAIBL report of a ^{18}F-MK6240 scan.

Kennedy C [1,2], **Bernhardt J** [1,2], **Churilov L** [1,2], **Hayward KS** [1,2]

Factors associated with time to independent walking recovery post stroke in A Very Early Rehabilitation Trial (AVERT)

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2. The University of Melbourne, Parkville, Vic., Australia.

Aim
Recovery of independent walking is important for people with stroke, their families and health services. We aimed to investigate the relationship between pre-stroke factors and factors collected within 24 hours of stroke and number of days to walking 50 metres unassisted using data from A Very Early Rehabilitation Trial (AVERT). We hypothesised that younger age, less severe stroke and ischaemic stroke would be associated with earlier walking recovery.

Methods
AVERT was an international, multisite, randomised controlled trial. Patients were eligible if stroke unit admission occurred within 24 hours of first or recurrent stroke (infarct or intracerebral haemorrhage), aged ≥18 years and met physiological safety criteria. The primary outcome for this study was number of days from stroke onset to walking 50 metres unassisted. Three participant demographic, five pre-stroke and six stroke-related factors were investigated for association with days to walking 50 metres unassisted using a cause-specific competing risk Cox proportional hazards model.

Results
A total of 2104 participants (median 73 years) with stroke were recruited from 56 stroke units internationally. There was no difference between participants exposed to very early mobilisation or usual care for days to walking 50 metres unassisted (caHR 1.038, 95% CI 0.940-1.146). The cohort was collated for all subsequent analyses. The median time to walking 50 metres unassisted was six days (IQR 2-63). As hypothesised, adjusted Cox regression indicated earlier return to walking was associated with younger age (caHR 0.986, 95% CI 0.983-0.990), less severe stroke (caHR 0.854, 95% CI 0.844-0.865) and ischaemic stroke (caHR 0.790, 95% CI 0.675-0.925). Diabetes was also associated (caHR 0.836, 95% CI 0.740-0.945).

Conclusion
Future clinical trials of early mobilisation should stratify participants based on age and stroke severity. There is increasing need for tailored stroke rehabilitation based on target groups, in particular people with intracerebral haemorrhage and severe stroke.

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Functional MRI event-related independent component analysis: The ERICA toolbox

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2. The University of Melbourne

Aim

To develop an easy to use software toolbox that enables event-related independent component analysis of functional MRI. This is a largely data-driven method that assumes only that the fMRI signal is similar around the time of each behavioural event of interest, without any other assumption regarding the spatial or temporal shape of the signal (1).

Methods

The ERICA toolbox is written in MATLAB and utilises several existing other software packages including SPM (www.fil.ion.ucl.ac.uk/spm/) and ICASSO (2). The toolbox is based on software written by Richard A. J. Masterton during his PhD studies, and the present authors acknowledge his substantial contribution to this work. The present version has been updated and incorporates a range of deconvolution procedures that enable better handling of closely spaced events and/or event jitter for improved temporal resolution.

Results

Versions of this software have been successfully utilised in house at The Florey Institute for several years, e.g. in studies of epilepsy (1,3,4) and cognition (5).

Conclusion

We hope that public availability of this software package will facilitate wider adoption of the method for the types of studies that would most benefit, including simultaneous EEG-fMRI of epileptic spikes, and fMRI studies of cognitive tasks or stimuli that elicit a neuronal or haemodynamic response train that is difficult to predict.

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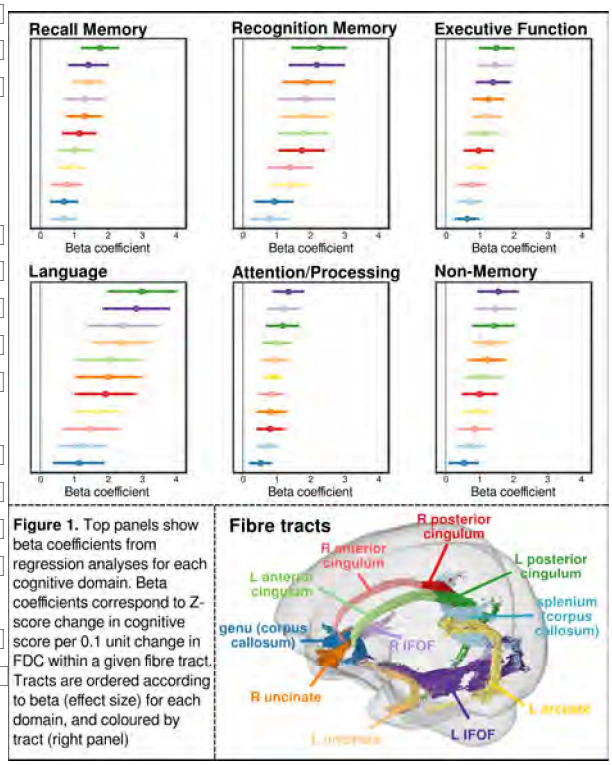

Figure 1. Top panels show beta coefficients from regression analyses for each cognitive domain. Beta coefficients correspond to Z-score change in cognitive score per 0.1 unit change in FDC within a given fibre tract. Tracts are ordered according to beta (effect size) for each domain, and coloured by tract (right panel)

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Empowering point-of-care nurses to better assess, document and escalate patient-reported antibiotic allergies: the implementation of a validated antibiotic allergy assessment tool (AAAT) in the inpatient haematology setting

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Aim: To evaluate point-of-care nursing staffs understanding, engagement and experience in the assessment and management of patient-reported antibiotic allergies post the implementation of a validated antibiotic allergy assessment tool (AAAT[1]).

Background: Patient-reported antibiotic allergies are entered in the medical record in up to 1 in 4 hospitalised cancer patients. Most often these allergies are not clarified by clinicians. This, when coupled with the fear associated with life-threatening reactions to betalactam antibiotics often results in the prescription of alternate antibiotics which has implications both for the individual patient and more broadly for antimicrobial stewardship(AMS).
Specialist haematology nurses (N=13) participated in the validation of the AAAT and were found to perform better than other key stakeholders (e.g. pharmacists, doctors) at assigning the correct allergy phenotype and management directive[1]. The key role of nurses in AMS and drug allergy is increasingly noted in health services program.

Methods: A survey sent to all nursing staff on the inpatient haematology ward to explore their awareness, understanding, experience and confidence in using the AAAT and audit of completed tools and EMR allergy data.

Results: The data are still being collected and analysed. Preliminary findings (n = 25 patients Jan to Feb 2019) indicate that there has been an increase in the accuracy of complete antibiotic allergy document in the EMR (complete documentation 63% pre vs. 97% post), improving medication safety and enabling of point-of-care de-labelling for identified low risk allergy phenotypes.

Conclusion: The role of nurses in medication safety incorporating drug allergy reconciliation and AMS should not be underestimated. Nursing staff provide care to patients across the 24-hour continuum and are professionally responsible and accountable for the medications that they administer. Empowering nurses by providing them with a validated tool to assess patient-reported antibiotic allergies has had a direct impact on accuracy of the EMR and proportion of patients identified as appropriate for timely de-labelling.

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Walker S, [1,2], Cohen E,[1] Grigg A, [1,] Trubiano J,[3]

A NIFTY intervention: empowering nursing staff to initiate pre-prescribed antibiotic order for haematology patients that develop febrile neutropenia

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Aim
To evaluate the nursing experience with a pathway (Nursing-Initiated Febrile neutropenia TherapY (NIFTY)) allowing nurse initiation of pre-prescribed first dose intravenous antibiotics in febrile neutropenia (FN).

Methods
The NIFTY pathway (implemented October 2017) involves a clinical criteria to allow nurse initiation of a pre-prescribed antibiotic order for adult (≥18 years) haematology patients that developed FN during hospital admission (see Figure 1). A retrospective chart audit (31/10/17-30/4/18) evaluated nursing compliance with the NIFTY pathway. The audit focused on the proportion of episodes; i) activated outside eligibility criteria, ii) associated with an alert for medical review immediately following initiation iii) delay despite initiation criteria being met. Impact on median (IQR) time to antibiotic administration (TTA) from first recorded fever in an included episode of FN was determined by comparing episodes in the pre- (31/10/16-30/4/17) and post-pathway implementation (31/10/17-30/4/18).

Results
The retrospective chart audit included 61 episodes of FN in 52 patients. A NIFTY order was nurse-initiated outside eligibility in one episode (1/61; 1.6%). Following initiation, alert for medical review occurred in all episodes (61/61; 100%). The NIFTY order was delayed despite initiation criteria being met in 11.5% (6/61) of episodes. However, this was because a NIFTY order was not pre-prescribed at the time of criteria being met rather than a consequence of nursing delay. The survey revealed a high level of nursing high satisfaction with the increased autonomy that has accompanied this pathway. Median (IQR) TTA in the pre-implementation group was significantly reduced in comparison to the post-implementation group [66 (40-100) minutes *vs* 29 (20-41) minutes; $p<0.001$].

Conclusion
There was a high level of nursing compliance and satisfaction with the NIFTY pathway and significant reduction in median TTA. This initiative has empowered nursing staff to make decisions about the management of patients with FN.

Cohen E, [1], English, C,[1] Yeomans M,[2] Tan C[2], Meyer I[2]

Clinician knowledge, acceptance and experience of using an algorithm developed to standardise the management of mucositis pain

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Aim
To examine clinician knowledge, acceptance and experience of using a consensus-based algorithm for the management of mucositis pain in patients undergoing an autologous or allogeneic stem cell transplant.

Methods
A survey was distributed to the nursing team on the inpatient haematology ward, specialist pain nurses, specialist haematology nurses as well as key medical stakeholders including haematology and anaesthetic, particularly those working in acute pain services, and consultants. The purpose of the survey was to determine: 1) awareness of the algorithm; 2) experience of using the algorithm including understanding of their individual roles/responsibilities in terms of prescribing and/or administration (as relevant); 3) perception of the algorithms impact on patient's pain control and; 4) familiarity and acceptability of the minimum assessment requirements for patients with mucositis.

Results
Data collection is ongoing but will be completed in July 2019. Preliminary results indicate high awareness of the algorithm amongst point-of-care nursing and haematology registrars, however, less familiarity amongst consultant haematologists. Awareness was high in the acute pain services team.

Conclusion
This is the first algorithm to standardise the management of mucositis pain. Since its implementation there has been high compliance by medical registrars and nursing staff and widespread belief that it both simplifies and promotes optimal analgesia for patients. Patient pain and other mucositis related outcomes are currently being analysed and will be published.

Cohen E[1], McCormack B[1], Shuttleworth P[1], Rowe T[1], Wooster J[1], Wise, T[1], Cameron A[1], Mellerick A[1]

The development of specialty haematology nurses: book smarts versus street smarts

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Aim
To describe the barriers and facilitators to developing nurses specialty skills and knowledge since opening an allograft service in Oct 2015.

Background:
There is increased global understanding that time spent at the bedside and specialisation in nursing leads to improve patient outcomes. In the haematology setting, specialist training for nurses most commonly involves on-the-ward experiential learning in addition to attendance at hospital designed and run education/study days. Formal post-graduate educational qualifications in haematology and stem cell transplant are limited because of a lack of availability in both university subjects and courses. Additionally, across nursing specialties, cancer nurses have been identified as having a high turnover of staff and this poses a perpetual challenge for wards and organisations in terms of maintaining a safe skill-mix.

Methods
Survey of nurses that provide care for allogeneic stem cell transplant recipients and key nursing stakeholders in the ICU department to explore their understanding and confidence in providing care to patients undergoing allogeneic stem cell transplantation and their experience of, and opportunities to, learn about the care needs of this cohort of patient (formal and informal). Audit of nursing turnover since the service opened.

Results
Data collection and analysis to be completed by August 2019.

Conclusion
Establishing an allograft service has highlighted the need to review specialist training programs for nurses working in haematology and stem cell transplant centres. Organisational based teaching and learning initiatives have been invaluable in developing specialty knowledge, however, expertise is also shaped by experience and we are still to establish a critical mass of specialist nursing staff.

The exponential increase in new and innovative therapies e.g. CAR-T cells further highlight the need for improved sharing of policies, training resources and experiential learning opportunities for point-of-care nurses between like-units to ensure high quality, safe care that does not vary unnecessarily.

Cohen E[1], Wooster, J[1], English C[1], Rowe T[1], Tarasenko E[1], Mahony B[1]

HALT, WHINE STOPR! Development, implementation and evaluation of an individual and nursing team wellness initiative in the inpatient haematology setting

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Aim:
To develop, implement and evaluate the introduction of an end-of-shift wellness huddle and individual reflection tool for nurses working in an inpatient haematology/bone marrow transplant setting.

Background:
Cancer nurses have been identified as having high rates of burnout, compassion fatigue and job-related stress. Haematology nurses provide care to patients at all stages of the illness and treatment trajectory. This can include providing end-of-life care to patients who have relapsed after receiving multiple different treatment regimens with curative intent. The complexity of care delivery, the emotional burden coupled with shift-work and a junior workforce puts inpatient haematology nurses at high risk of burnout and is a likely contributor to high turnover rates often seen in this setting.

Method:
A Plan-Do-Study-Act cycle was used. This wellness initiative combined two previously described self-reflection tools. Hungry, Angry, Lonely, Tired (HALT) which has been used to promote wellness in nurses both nationally and internationally and is designed to aid nurses recognise what might be contributing to their stress. The second tool was adapted from an ED ‘going home self-checklist’ but renamed WHINE STOPR: Wellness Huddle Initiative for Nurses at End of Shift Supporting the Team to Observe, Pause and Reflect and designed as an end-of-shift huddle for all nurses. Evaluation included audit of attendance and nurse survey on their experiences.

Results
The initiative was implemented in June 2019. Preliminary findings indicate support from nursing staff, however, the practicalities of a set time for WHINE STOPR each shift is proving challenging. The first nurse survey will be conducted in the first week of August.

Conclusion
This wellness initiative incorporated both an individual and team component. Finding a set time in the dynamic clinical environment is a challenge, however, nurses are reporting that their self-reflection and finding positives in each day is improving.

Dufton P [1,2], Mellerick A[1], Wang X [1], Debska I [1], Krishnasamy M [1,2,3,4]

Pre-treatment patient education: Establishing a shared understanding of best-practice.

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Aim
Training to deliver pre-treatment patient education varies across organisations and there is currently no standardised approach to nurse delivery of the pre-treatment education session. The research questions for this study were:

1) how much diversity is there in the content and delivery of the pre-treatment education sessions by oncology nurses?

2) how do nurses assess and tailor information to meet the needs of patients?

Methods
Face-to-face, pre-treatment patient education sessions delivered by nurses working in the Day Oncology Unit at a large tertiary referral Cancer Centre in Melbourne, Australia were audio recorded. Audio recordings were transcribed and underwent descriptive, content analysis.

Results
Three themes were identified in the audio recorded patient education sessions: 1) patient +/- carer participation; 2) assessment of patient needs; 3) tailoring of information to the patient's unique situation.

Patient and carers were active participants in 8/15 sessions, with some nurses using evidence-based communication techniques to build rapport and develop an empathic approach to the interactions, while others used a more didactic approach to progress through a set agenda. There were varying levels of patient assessment by nurses including information and supportive care needs. No nurse purposefully assessed health literacy. The majority of nurses (8/15) delivered information based on their agenda; focusing on the treatment schedule and potential side-effects of treatment.

Conclusion
In our organisation there was considerable variation in the delivery (style and content) of nurse-led pre-treatment education. The audio recorded data identified a sub group of nurses who were skilled communicators and who drew upon evidence to support patients through the process of having cancer treatment. This study has allowed us to develop and implement a pre-treatment patient education training package for nurses, to improve the quality and consistency in the delivery of pre-treatment education.

Whitcher B[1], Chapman B[1,2], Hanrahan TP[3], Testro A[1,3]

Predictive equations are inaccurate in determining resting energy expenditure in patients awaiting liver transplantation

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Aim
This study aims to compare measured resting energy expenditure (REE) via indirect calorimetry (IC) to predicted REE, as well as explore the association between REE and liver disease severity and nutritional markers. Effective nutritional management requires an accurate estimation of REE for which IC is considered gold standard. Predictive equations have been developed for estimation of REE but are modelled from healthy population data.

Methods
We performed a prospective observational study in adult patients awaiting liver transplant. REE of wait-listed patients was measured using IC and predicted by the Harris-Benedict and Schofield equation. Discrepancy between measured and predicted REE was identified with a ratio >1.2 considered hypermetabolic and a ratio <0.8 considered hypometabolic. Nutritional markers assessed were weight, handgrip strength (HGS), triceps skinfold thickness (TSF) and mid-upper arm circumference (MUAC). Severity of liver disease was calculated using MELD-Na score. Regression analysis was used to determine factors influencing the discrepancy between measured and predicted REE.

Results
30 patients (19 M, 11 F) were assessed. Mean MELD-Na was 18.3 ± 6.9. Nutritional markers assessed were weight (83.3±21.3kg), HGS (27.3±12.1kg), TSF (12.2±5.3mm) and MUAC (30.2±5.8cm). There was no significant difference when comparing mean measured REE (1701 ± 484kcal/day) to mean predicted REE via Harris-Benedict (1656 ± 330kcal/day) or Schofield (1651 ± 287kcal/day). However, hypermetabolism and hypometabolism was identified in 23% and 10% of patients respectively. Using binary logistic regression analysis, a MELD-Na≥20 was associated with significantly greater odds of hypermetabolism compared to MELD-Na <20 (OR=25.20; p=0.030). Nutrition markers were not significant in this model.

Conclusion
Reliance on predictive equations to guide nutrition prescription in patients awaiting liver transplant may result in significant under or over-feeding. Elevated REE appears most pronounced in those with MELD-Na ≥20. Therefore, a tailored energy prescription, based on IC is recommended in those with increased severity of liver disease.

Natalie Nguyen[1], A/Prof Lisa Hui[1,2,3] and A/Prof Natalie Hannan[1,2,3]

Anti-thrombotic and anti-platelet therapy and their influence on placental cell-free DNA release

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Aim

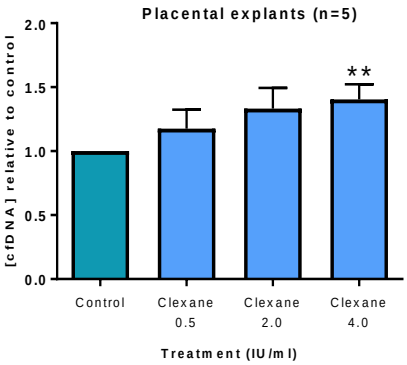
This study aimed to measure cell-free DNA (cfDNA) release from placental tissue *in vitro* when treated with anti-thrombotic and anti-platelets drugs.
Anti-thrombotic and anti-platelet therapy have been implicated to improve pregnancy outcomes by promoting cell survival in placenta and restoring normal placental function. This has also been suggested to be a possible cause for the increased rates of failed non-invasive prenatal testing results due to a low fetal fraction.

Methods

Five women presenting for term caersarean delivery at Mercy Hospital for Women and Northern Health were included in this study. Placental explants were cultured and treated in media containing various concentrations of enoxaparin (Clexane), aspirin, clopidogrel, prasugrel and ticagrelor. After 24 hours of incubation, cfDNA was extracted from the media, quantified and normalized to explant weight.

Results

Treatment of placental explants with 4.0IU/ml Clexane caused an unexpected significant increase in the relative amount of cfDNA released compared to untreated control and other Clexane doses (p=0.009). This suggests that Clexane causes an increase in cellular turnover. There were no statistically significant differences in amount of cfDNA release in other drug treatments.



Conclusion

Clexane caused a significant increase in amount of cfDNA released from placental explants contrary to our initial hypothesis, indicating a more complicated relationship between anti-thrombotic therapy and cfDNA release other than influencing cell survival.

Nagpal A, [1,2], **Redvers R**,[2,3] **Ayton S**, [4] **Denoyer D**[1,2], **Pouliot N**[1,2,5]

Neoadjuvant neratinib promotes ferroptosis and inhibits brain metastasis in a novel syngeneic model of spontaneous HER2^{+ve} breast cancer metastasis

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Aims

Human epidermal growth factor receptor-2 (HER2)-targeted therapies prolong survival in HER2^{+ve} breast cancer patients. However, benefit stems primarily from improved control of systemic disease and up to 50% of patients progress to incurable brain metastases. Neratinib, a potent irreversible pan-tyrosine kinase inhibitor, prolongs survival in the extended-adjuvant setting. However, its efficacy as a first line therapy against brain metastatic disease has not been fully explored, in part due to lack of relevant pre-clinical models that faithfully recapitulate this disease.
This work aimed to i) characterise a novel syngeneic mouse model of spontaneous HER2^{+ve} breast cancer brain metastasis (TBCP-1) and ii) evaluate the efficacy and mechanism of action of neratinib.

Methods

TBCP-1 cells were derived from a Balb/c spontaneous mammary tumour and characterised for hormone receptors and HER2 expression by immunoblotting, FACS and/or immunohistochemistry. TBCP-1 metastasis was analysed in immune-competent Balb/c mice. Response to neratinib was evaluated *in vitro* and *in vivo* in the metastatic and neoadjuvant setting. Its mechanism of action was examined by expression profiling, function inhibition assays and immunoblotting.

Results

TBCP-1 cells express high levels of HER2 but lack expression of hormone receptors. TBCP-1 tumours/metastases maintain a HER2^{+ve} phenotype *in vivo* and give rise to a high incidence of spontaneous and experimental metastases in brain and other organs. Cell proliferation *in vitro* is inhibited by neratinib and by other HER2 inhibitors, but not by anti-oestrogens, indicating phenotypic and functional similarities to human HER2^{+ve} breast cancer. Mechanistically, neratinib promotes a non-apoptotic form of cell death termed ferroptosis. Importantly, neratinib potently inhibits TBCP-1 tumour growth and metastasis, including to brain, and prolongs survival when used as a neoadjuvant therapy.

Conclusion

The TBCP-1 model provides a unique tool to identify novel therapeutics and biomarkers. Neratinib-induced ferroptosis provides new therapeutic opportunity and its further clinical evaluation in neoadjuvant setting is warranted.

Title: **Immunomodulatory effect of Renin-angiotensin inhibitors on T-lymphocytes in mice with Colorectal Liver Metastases**

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Abstract

Background: Colorectal cancer is the third most common cancer diagnosed in the developed world and second most frequent cause of cancer related deaths mostly caused by liver metastases. Current literature and our research show that tumor infiltrating immune cells positively or negatively contribute to tumor progression, depending on the cell type. We have shown that inhibitors of the Renin Angiotensin system (RAS) inhibit tumor growth by modulating the tumor infiltrating immune cells.
Aim: To investigate the effects of RAS inhibition on tumor T lymphocyte distribution in a mouse model of colorectal liver metastases (CRCLM).
Methods: Liver metastases were established using an orthotopic mouse model. The mouse host is immunocompetent ensuring full spectrum of immune responses. Following tumor induction, the mice were separated into two groups; control (saline) and RAS inhibitor (Captopril) treatment. Saline or Captopril was administered daily via intraperitoneal injection, from day 1 post-tumor induction to endpoint. Tumor growth was determined using stereology proliferation markers and IHC on days 15 or 21 following tumor induction. Lymphocyte subsets in the tumor and liver tissues were analysed by flow cytometry and immunohistochemistry.
Results: The results show that Captopril significantly decreased tumor viability and impaired metastatic growth. Flow cytometry analysis showed T cells ($CD3^+CD45^+$) were significantly increased in the captopril treated group compared to control for both surrounding liver and tumor at day 15. These results were also confirmed by IHC. Interestingly, flow cytometric analysis indicated that a T cell phenotype double negative for the CD4 and CD8 markers was significantly increased in the captopril treated group while the $CD3^+CD4^+$ T cells were significantly decreased compared to control group for both surrounding liver and tumor.
Conclusion: RAS inhibitors reduce tumor growth and modulate the immune response by increasing the infiltration and altering the phenotype of T lymphocytes. The exact nature of these changes needs to be further characterized, especially the identity and function of the double negative $CD3^+$ T cell population need to be elucidated.

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Calcitonin receptor and Cancer: Friends or Foes?

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Aim

Studies have proposed that calcitonin receptor (CTR) acts as a tumour suppressor in glioblastoma. We have also considered CTR as an oncogene. With protein blotting and long-range sequencing of CTR mRNA, we have identified modifications to CTR in glioblastoma derived cancer stem cell lines. Establishing the role of CTR as a tumour suppressor or oncogene has important implications for novel treatments of glioblastoma.

Methods

Monoclonal anti-CTR antibodies that bind three discrete linear epitopes of the G protein-coupled receptor have been developed by our group. These are deployed to detect CTR variants and the insert-positive isoform by immunoblotting protein derived from the cell lines. Furthermore, long-range sequencing of CTR mRNA extracted from these cell lines confirms the precise nature of RNA sequence modifications contributing to variations of the receptor.

Results

Immunoblot analysis communicates patterns of CTR expression as combinations of N-terminal truncation, the $447_{Leu/Pro}$ polymorphism and the insert-positive/negative isoforms. Pharmacological data[1], which measures second messenger systems in response to classical ligands of CTR in the four cancer stem cell lines, demonstrated that CTR is non-functional in 3 out of 4 lines. This is rationalized on the basis of receptor modifications and exposure to the cell surface. These data are discussed in terms of the molecular detail derived from the long-range sequencing.

Conclusion

CTR is expressed in each of the glioma cell lines but remains non-functional in all but one. Genetic variations lead to receptor inactivation including expression of the pharmacologically inactive insert-positive isoform. However, responses to novel surrogate ligands such as autologous nascent collagen V[2] is yet to be tested. The expression of inactive CTR conforms to a role as a tumour suppressor but further studies are required to demonstrate the role of inactive CTR as an oncogene.

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Vertebral fractures following stereotactic body radiotherapy for spine oligometastases: A multi-institutional analysis of patient outcomes

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Aim: Stereotactic body radiotherapy (SBRT) is a locally ablative therapy used for the treatment of patients with spine metastases. However, it is associated with higher rates of vertebral compression fractures (VCF) than conventional radiotherapy. The purpose of this study was to determine the rate of VCF following SBRT to spine metastases and identify risk factors associated with this outcome.

Methods: We retrospectively reviewed patients at 2 Victorian institutions from January 2015 to March 2019. Descriptive statistics were used to assess patient, tumour and treatment factors. Log-rank test and Cox proportional hazards model were applied in univariate and multivariable analyses to identify factors associated with VCF, local control (LC) and overall survival (OS).

Results: We evaluated 155 spinal segments from 116 patients, with a median follow-up time of 11.3 months. The most frequent dose/fractionation scheme utilised was 30Gy in 3 fractions (61.3%). Median Spinal Instability Neoplastic Score (SINS) of the lesions was 4/18, with the majority (79.4%) being SINS stable. 5 VCFs were observed; 3 progression of pre-existing fractures and 2 de novo, a cumulative VCF risk of 3.2%. 4 of 5 fractures occurred within the first year post-treatment, with a median time to VCF of 9.2 months. Pre-existing VCF ($p = 0.004$) and SINS > 6 ($p = 0.014$) were statistically associated with subsequent fracture, whilst all VCF segments displayed the appearance of lytic disease. All fractures were managed conservatively with analgesia, there was no requirement for subsequent surgical intervention.

Conclusions: SBRT to spine oligometastases is safe with respect to complications such as VCF, with rates around the lower limit observed in similar studies. Knowledge of factors which predispose to post-treatment fracture, such as pre-existing compression, lytic vertebral disease and SINS > 6 will aid in the counselling and selection of patients for this therapy.

IL33 signalling and mast cells as new therapeutic targets against gastric cancer

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Cytokine-mediated inflammation is a driver of gastric tumorigenesis. Interleukin 33 (IL-33) regulates inflammatory responses but only recently, a role of IL-33 in cancer starts to emerge. Depending on the cancer stage or type IL-33 can provoke either pro- or anti-tumoral responses.

Aims: Elucidate the function of IL-33 signalling, mast cells and macrophages in gastric cancer.

Methods: We utilise $gp130^{FF}$ mutant gastric cancer mice, compound mutants lacking IL33 signalling ($ST2^{-/-}$), mast cells ($c\text{-}kit^{W\text{-}sh/W\text{-}sh}$), macrophages ($Csfr1^{-/-}$) or drug treatments to interrogate the role of IL-33 and innate immune cells in the growth of gastric cancers.

Results: IL33 signals through its receptor ST2, which we found abundantly expressed in $gp130^{FF}$ tumours. Deficiency of IL33 signalling ($ST2^{-/-}$) diminished gastric tumour growth, and was associated with a decrease in tumour-adjacent mast cells and tumour-associated macrophages (TAM) as well as reduced angiogenesis. Indeed, mast cell and macrophage numbers are elevated in the $gp130^{FF}$-tumours compared to wild type stomachs. Genetic depletion or pharmacological inhibition of mast cells and macrophages reduced tumour burden, again associated with decreased angiogenesis. Mechanistically, we show that tumour-produced IL33 can activate gastric $gp130^{FF}$ mast cells, which in turn recruit pro-tumoral and pro-angiogenic macrophages to the tumour through release of chemo-attractants like Ccl2, Ccl3 and Ccl7[1].

Conclusion: We conclude, that tumour-derived IL33 promotes gastric cancer growth through tumour-associated mast cells and TAMs. The results of our genetic and pharmacological experiments in mice suggest that either the IL33/St2 signalling node or mast cells and macrophages may represent novel therapeutic targets against inflammation-associated gastric cancer.

[1] Eissmann M, *et al*. IL-33-mediated mast cell activation promotes gastric cancer through macrophage mobilization. *Nature Communications* 10;2735

Brachytherapy credentialing program: A proficiency – based training.

Sylvia Hanna

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Background

At the ONJ we use MRI planning for brachytherapy treatment of cervical cancer. While the service was being established it was evident that very little training for therapists in 3D MRI planning was available. This has resulted in inconsistency and inefficiency, prolonging the day for patients and staff.

Aim

A credentialing program to implement a structured approach for the upskilling of staff in the brachytherapy program was developed. The objective of the program was to gain consistency and proficiency in the planning processes, theatre processes and treatment delivery of brachytherapy to gynaecological cancers.

Method

A program was designed to cover different modules of the brachytherapy service. Some of the modules included self –directed theory and practical learning including reading protocols and guidelines and familiarization of equipment and safety in the brachytherapy setting. Practical sessions included theatre induction, ultrasound and one on one training session with the supervisor to go through examples of planning applicator placement and dosimetry. The trainee was asked to complete sample cases without time constraints, subsequently review by the supervisor. Then another set of cases under time restrictions that were assessed by the supervisor. Following this, a pass of at least 80% in the exist assessment was required to pass the credentialing program. The expected time frame for the completion of the program is 12 weeks with a dedicated 1 day per week session for training.

Discussion/Conclusion

The credentialing program was designed by the senior brachytherapist, reviewed by the Radiation Oncologists and assessed by the quality assurance committee. All new staff joining the ONJ brachytherapy team have participated in the program and have found it to be comprehensive and helpful in building their skills.

Title: Comparison of ESTRO and RTOG Contouring Guidelines for Target Volume Delineation in early stage breast cancers

Problem Statement: Adjuvant radiotherapy (RT), including regional lymph node (RLN) irradiation is an important treatment in early stage breast cancer patients after breast-conserving surgery. The Radiation Therapy Oncology Group (RTOG) and European Society for Radiotherapy and Oncology (ESTRO) have published contouring guidelines to aid Radiation Oncologists (ROs). Our primary aim was to quantitatively compare target volumes delineated by ROs specializing in breast cancer, to assess if either guideline has superior contouring reproducibility.

Methods: Three ROs contoured breast clinical target volumes (CTVs), axillary lymph node levels 1-3, supraclavicular and internal mammary nodal (CTVn_IMN) volumes for 8 post-operative (4 right-sided and 4 left-sided) patients, providing 24 sets of observations. The inter-observer variability in contouring was measured by the generalized Dice Similarity Coefficient (DSC), with a value of 1.0 indicating complete overlap and 0.0 indicating no overlap. The DSC was also used to assess the differences between volumes based on ESTRO and RTOG guidelines, delineated by the same RO.

Results: Within each guideline, the breast CTV contours showed the highest level of agreement between the ROs. This was also the only volume to show significant difference in the DSC mean value, with 0.92 (standard deviation 0.04) for ESTRO guidelines compared with 0.90 (0.03) for the RTOG guidelines ($p=0.031$). The mean DSC for CTVn_IMN was 0.63 (0.10) for ESTRO and 0.62 (0.20) for RTOG guidelines, showing the least level of agreement for both guidelines. Within the axillary nodal volumes, level 1 showed the greatest agreement among the ROs for both ESTRO and RTOG guidelines with a mean DSC of 0.81(0.08) & 0.82(0.06) respectively. The range of mean DSC values for ESTRO and RTOG guidelines is 0.66-0.92 and 0.62-0.90 respectfully and when comparing volumes produced using ESTRO to those using the RTOG guidelines the range of mean DSCs is 0.52-0.94.

Conclusion: Only the breast CTV volume suggested greater RO consistency with the ESTRO guidelines, although the discrepancy was small and unlikely to be of any clinical significance. All other volumes showed no significant difference between ESTRO and RTOG guidelines. Overall, neither guideline showed greater reproducibility between ROs.

Words (max 350): 337

Authors:

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Outcomes following stereotactic body radiotherapy (SBRT) for biopsy-confirmed vs. radiologically-diagnosed primary lung cancer

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Aims: Stereotactic body radiotherapy (SBRT) is increasingly used to treat inoperable lung cancer (LC). Obtaining tissue confirmation prior SBRT is not always feasible. We aim to evaluate clinical outcomes in biopsy-confirmed vs. radiologically-diagnosed LC treated with SBRT.

Methods: This is a single-institutional retrospective cohort of LC patients treated with SBRT between 2014 and 2018. The oncological outcomes of interest were: local failure (LF), distant failure (DF), and overall survival (OS). Probability of LF, DF and OS were estimated using the Kaplan-Meier method. The difference in outcomes between those who had biopsy confirmation vs. no biopsy was evaluated using the log-rank test.

Results: 63 lesions in 60 patients were treated with SBRT. Mean age was 76.8 years (SD=8.1). 22 (37%) patients had biopsy-confirmation while 38 (63%) were radiologically-diagnosed. No significant differences in baseline characteristic between the 2 groups. Of the 63 SBRT-treated lesions, 9 (14%) had 54Gy/3fractions, 44 (70%) had 48Gy/4fractions, 7 (11%) had 50Gy/5fractions, 2 (3%) had 40Gy/5 fractions, and 1 (1%) had 20Gy/1fraction. Median follow-up was 10.6 months (IQR=5.7-14.9). There were five LF (4 in biopsy-confirmed, 1 in non-biopsy), with 12-month LF-free survival of 95%, and no significant differences between biopsied vs. non-biopsied lesions (P=0.07). Of the 60 treated patients, 11 developed DF (8 biopsy-confirmed, 3 non-biopsied), with 12-month DF-free survival of 87%, and no difference between biopsied vs. non-biopsied patients (P=0.3). There were 11 deaths (one cancer-specific death), with 12-month OS of 83%, and no differences between biopsied vs. non-biopsied patients (P=0.1). No grade 3 toxicities were observed.

Conclusion: The LF, DF, and OS did not appear to be affected by biopsy confirmation in this cohort of LC patients. In situations where biopsy confirmation is not feasible, it is not unreasonable to offer SBRT to patients with presumed LC based on radiological suspicion following multidisciplinary discussions.

Outcomes following stereotactic radiosurgery (SRS) for limited brain metastases – an Australian single institutional experience

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Aim: Despite increasing use of stereotactic radiosurgery (SRS) for management of brain metastases (BM), published Australian data is scarce. We aim to report on the outcomes following SRS for limited BM in a single Australian institution.

Methods: This is a retrospective cohort of patients with limited BM treated with SRS between August 2015 and March 2019. A dose of 24Gy/3# were prescribed to intact lesion, and 21Gy/3# to surgical cavity post-surgical resection. All patients were followed with 3-monthly surveillance MRI brain. Primary outcomes were: local failure (LF: increased in size of SRS-treated BM lesion/ recurrence in surgical cavity), distant failure (DF: intracranial progression outside of the SRS-treated lesion/ cavity), and overall survival (OS). LF, DF and OS were estimated using the Kaplan-Meier method. Multivariate Cox regressions were used to evaluate factors associated with outcomes of interest, with death as competing-risk events for LF and DF.

Results: 76 SRS were delivered in 65 patients (54 unresected BM lesions, and 22 surgical cavities). 43 (66%) patients were ECOG0-1. 35 (54%) patients had solitary BM. 41 (63%) were symptomatic at presentation. Half of the patients had primary lung cancer. Median follow-up was 4.8 months (range:0.1-39 months). Ten LF were observed at a median of 3.5 month post-SRS, with 6- and 12-month LF cumulative incidence of 14% and 24% respectively. Thirty DF were observed at a median of 3.3 months, with 6- and 12-month DF cumulative incidence of 38% and 63% respectively. The 12- and 24-month OS were 39% and 26% respectively. In multivariate analyses, better ECOG status, solitary BM lesion, resection of BM pre-SRS, and use of subsequent systemic therapy were independently associated with improved OS.

Conclusion: This is one of the few Australian series reporting on outcomes following SRS for limited BM, with comparable outcomes to published international series.

Understanding patients' willingness to embrace the use of smartphone applications (apps) in routine radiation oncology care

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Aim: Integrating smartphone applications (apps) into radiation oncology (RO) care may improve clinician-patient communication and patient outcomes. We aimed to evaluate patients' willingness to utilise apps in RO care.

Methods: We conducted a cross-sectional survey of patients who attended RO clinics in an Australian metropolitan and regional cancer centre. The primary outcome was the proportion of patients who were willing to use apps in RO care. Differences in characteristics between those who were willing versus declined to use apps were assessed.

Results: Of 202 patients (102 metropolitan, 100 regional) who completed the survey, 177 (88%) owned smartphones. Of these, two-thirds (114/177) used apps in their daily life, but only half (97/177) were willing to use apps in RO care. Factors deemed very important in patients' willingness to use apps were: user-friendliness (58%), data protection (57%), and clinicians' response to information recorded in apps (55%). Patients willing to use apps were younger (mean age 63 vs. 67, P=0.009), and had a higher level of education (P=0.02). No difference in willingness for app-based care was observed between patients in metropolitan versus regional centre (P=0.6). Of the 97 patients who reported willingness to use apps in routine RO care, the majority (91/97) were willing to do so for self-reporting of toxicities during treatment at varying frequencies, ranging from daily (27%), weekly (25%) to monthly (12%). Almost all (96/97) were willing to report quality of life (QOL) data on apps during follow-up, either prior to clinic (11%), monthly (46%), 3-6 monthly (33%), or annually (11%).

Conclusion: Over half of the patients were willing to use apps in routine RO care. User experience, data protection and clinicians' response to patient-reported data are core features in ensuring patient engagement for app-based care.

PSMA-PET/CT-guided stereotactic radiotherapy (SBRT) for recurrent oligometastatic prostate cancer

Wee Loon Ong[1,2,3,4], Daryl Lim Joon[1], Michael Chao[1], Briana Farrugia[1], Eddie Lau[5,6], Vincent Khoo[7,8,9], Nathan Lawrentschuk[10,11], Damien Bolton[10], Farshad Foroudi[1]

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Aim: To report the outcomes of stereotactic body radiotherapy (SBRT) in men with oligometastatic prostate cancer (OPCa) diagnosed on prostate-specific membrane antigen positron emission tomography/ computed tomography (PSMA-PET/CT).

Methods: This is a cohort of first 20 consecutive OPCa patients treated with SBRT at the Austin Health, who had: biochemical recurrence following previous curative treatment (surgery/radiotherapy), no evidence of local recurrence, were not on palliative androgen deprivation therapy (ADT), and had PSMA-PET/CT confirmed oligometastatic disease (≤3 lesions). These patients were treated with SBRT to a dose of 30Gy/3# for bone metastases, and 35-40Gy/5# for nodal metastases. The outcomes of interest were: PSA response, local progression free survival (LPFS), distant progression free survival (DPFS), and ADT free survival (ADT-FS).

Results: The time from curative treatment to OPCa was 34months (range: 5-127months). Median PSA at OPCa diagnosis was 1.3ng/mL (range: 0.2-30 ng/mL). Fifteen (75%) patients had nodal metastases, 3 (15%) had bone metastases, and 2 (10%) had nodal and bone metastases. The median follow-up was 15.9months (range: 6.7-35.5months). Twelve patients (60%) had PSA decline post-SBRT. One patient had local progression 9.6months post-SBRT, with 12-month LPFS of 93%. Ten patients (50%) had distant progression outside of SBRT treatment field confirmed on PSMA PET/CT – 4 were treated with palliative ADT, 2 had radiotherapy for prostate bed progression, 4 had further courses of SBRT. The 12-month DPFS was 62%. At last follow-up, six patients were treated with palliative ADT, with 12-month ADT-FS of 70%. Men with longer interval between local curative treatment and SBRT had better DPFS (P=0.02) and ADT-FS (P=0.007).

Conclusion: This is one of the first series on PSMA-PET/CT-guided SBRT for OPCa, confirming the safety and oncological benefits of SBRT for OPCa. Patient selection based on natural history of PCa is crucial in identifying those who benefit the most from SBRT for OPCa.

Automated urine particle analysis: A performance evaluation of three analysers in the investigation of urinary tract infection.

Gregory C, Leroi, M

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Aim:

Whilst considered the gold standard, manual microscopy has become increasingly replaced with automation in the investigation of urinary tract infection. We evaluated the performance of cobas u 701 (Roche Diagnostics) and Atellica UAS 800 (Siemens Healthineers) against our incumbent IRIS iQ200 (Beckton Dickinson). Detection of particles was compared to the reference standard of microscopy, and a correlation of analyser organism detection was made to semi-quantitative culture counts and significant bacterial growth.

Methods:

608 urine samples were run on all analysers and compared to manual microscopy. Data was recorded quantitatively for white blood (WBC) and red blood cells (RBC), semi-quantitatively for bacteria and squamous epithelial cells (SEC), and qualitatively for yeast. WBC and RBC data were divided into categories of 0-10, 11-100, 101-500, and >500 cells/µL. Assessment of bacteria detection was also performed by comparison with total bacterial counts on culture, and with the presence of significant growth of bacteria requiring release of susceptibility results.

Results:

Within critical ranges of WBC counts of 0-10 and >500 cells/µL, all platforms had concordance of ≥85% with microscopy. In the non-critical cell types of RBC and SEC, concordance was lower with no clearly superior performance. Concordance for detection of yeast ranged from 72.9-81.7%. The NPV of nil organisms detected by each platform ranged from 74.9-77.9% across all analysers compared to microscopy. When compared to growth of a predominant organism, and to total bacterial counts on culture, the NPV remained below 80%.

Conclusion:

Both the u 701 and UAS 800 were considered acceptable alternatives to the iQ200. All performed similarly in correctly designating WBC, RBC, and SEC categories. However, performance for detection of RBC and SEC was poor. Additionally, the NPV for detection of bacteria using any method as the gold standard, was considered too low to permit screening out samples not requiring culture.

Hurren F, [1], Chua KY[1], Leroi M[1]

Evaluation of the Carbapenem Inactivation Method (CIM) as a predictor for carbapenemase producing Gram negative bacteria.

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Aim

To evaluate the specificity of the CIM for the detection of carbapenemase producing Gram-negative bacteria.
The specificity of the assay and its performance in specific genera are less well characterised.

Methods

37 clinical and screening isolates with elevated meropenem MICs were tested. Three variations of the CIM test were assessed;

1) The first described method by Van der Zwaluw *et al*[1] (oCIM)
2) A modification of the Van der Zwaluw *et al* method that included a prolonged incubation of the meropenem disc in the bacterial suspension (aCIM) CIM[2]
3) The modified CIM described in the 27th edition of the CLSI (mCLSI)[3]

Susceptibility testing was performed using the VITEK® 2 AST-N246 cards or by disk diffusion method according to CLSI guidelines. All isolates had Blue-Carba and genotypic testing. The Blue-Carba test, a rapid phenotypic screening method for carbapenemase production, was performed as previously described[4]. Molecular characterisation of carbapenemases by a multiplex PCR was performed by the Microbiological Diagnostic Unit Public Health Laboratory.

Results

18/37 isolates were genotypic carbapenemase producers.
9 isolates demonstrated concordant negative phenotypic (CIM and Blue-Carba) and genotypic results.
All genotypic carbapenemase producers yielded positive CIM results (by all 3 methods), although 3 isolates produced negative Blue-Carba results (all bla_{OXA} producers).
10/37 genotypically and Blue-Carba negative isolates yielded a positive CIM result using both the oCIM and aCIM methodology.

Conclusion

False positive results were commonly seen with *Enterobacterales* using the oCIM and aCIM tests. In contrast, mCLSI demonstrated greater specificity.

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R.Viswanath[1], M.Leroi[1]

Susceptibility patterns of clinical *Bacteroides* species collected between 2015-2019 at Austin Health

Department of Microbiology[1], Austin Health

AIM**:**

The study aimed to analyse the resistance patterns of *Bacteroides* spp from clinical specimens to amoxicillin-clavulanate, clindamycin and metronidazole.

Susceptibility testing is not routinely performed on anaerobes due to perceptions of predictable susceptibility, and lack of access to reference methods. Recently, reports of emerging resistance of anaerobes to antimicrobial agents demonstrate periodical monitoring of antimicrobial resistance patterns is important.

METHOD**:**

61 Austin Health clinical isolates were collected from sterile sites between 2015-2019. An E-test was performed on all isolates of *Bacteroides* spp isolated from these specimens. The final MICs were read at 48 hours and were categorised as R, S or I using 2019 CLSI[2] breakpoints.

RESULTS**:**

57% of the isolates tested were *B. fragilis* sp, and the remainder 43% were other *Bacteroides* spp. Amoxicillin-clavulanate and metronidazole susceptibility was noted at 95% and 93% respectively. Clindamycin susceptibility was most considerably lower at 61%.

CONCLUSION**:**

This survey found decreased susceptibility to clindamycin when compared to previous published Australian data of 86-89% in 1992 and 2018 by Chen *et al*. and Hughes *et al*. At the current level of resistance, empiric therapy with clindamycin is unreliable.

High rates of amoxicillin-clavulanate susceptibility remains concordant with previous national and international data[3,4]

Metronidazole non-susceptibility in local data is uncommon[1,3]. The rate of susceptibility at 93% in this study was more concordant with international data[5,6] raising the possibility of introduction of resistance determinants locally.

These results suggest amoxicillin-clavulanate and metronidazole remain suitable choices for empirical treatment. Clinicians should be aware of emerging resistances and should consider requesting antimicrobial susceptibility testing for critical infections to confirm susceptibility.

Due to the small number of isolates analyzed and the difficulty of extrapolating the data to a wider context, a national survey is required to confirm these findings.

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Hill CJ[1,2], O'Brien CE[1], Goh N[2,3], Holland AE[2,4], Dowman LM[1,2,3].

Feasibility of the ARIEL trial – water-based rehabilitation for connective tissue disease related interstitial lung disease.

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4. Department of Rehabilitation, Nutrition and Sport, LaTrobe University, Vic, Australia.

Aim
Pulmonary rehabilitation (PR) is an effective intervention for people with interstitial lung disease (ILD), however the standard gym-based PR program appears less effective in those with connective tissue related ILD (CTD-ILD). This study aimed to establish feasibility of water-based rehabilitation in people with CTD-ILD.

Methods
Twenty participants with CTD-ILD (15 female) were recruited from PR and ILD clinics to participate in a supervised water-based exercise program twice weekly for eight weeks. Feasibility was determined by attendance rate, number of adverse events and patient satisfaction using the water acceptability questionnaire and patient interview. Secondary outcomes of efficacy included repeated measures of exercise capacity, strength, symptoms and quality of life. Pre-post comparisons were analysed using paired t-tests.

Results
Participants had a mean (SD) age 69 (11) years, forced vital capacity 82 (23) percent predicted and attended a total 243 of 320 sessions (75%). Median attendance was 14.5 sessions, with 70% participants completing the program (>70% attendance). There were seven minor adverse events, two of which were related to the water based exercise (skin irritation, leg pain). Patient satisfaction overall was high and all participants reported they would recommend the water-based exercise training to other people with CTD-ILD. There was a significant improvement in pain severity ($p=0.02$ to $p=0.002$) and pain interference ($p=0.009$) using the brief pain inventory; and small, non-significant improvements in exercise capacity, strength, symptoms of dyspnoea and fatigue and quality of life.

Conclusion
Water-based rehabilitation is a safe and feasible training strategy for people with CTD-ILD and is associated with high patient satisfaction and a reduction in pain severity and interference in daily activity. It did not result in significant improvements in traditional PR outcomes in this small sample.

Dunlop D,[1] Kyriacou E,[1] Boden I[2,3], Berlowitz DJ,[1,3,4]

The effect of different counting rules on rates of post-operative pulmonary complications

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Aim: Postoperative pulmonary complications (PPCs) are associated with increased morbidity, mortality and longer hospital stay. Accurate measurement of the incidence of PPCs is therefore vital. The Melbourne Group Scale Version 2 (MGS-2) is a method of screening for PPC incidence. Recent trials have used an updated version of the Melbourne Group Scale (MGS-3) to report PPC incidence. The aim of this paper is to determine the rates of PPC with both scoring rules.

Methods: Austin Health is a site for a prospective, multi-national observational cohort trial examining PPC (ANZCTR 12616001020471). Fifty consecutive participants each in cardiac, thoracic, open upper abdominal and liver transplant cohorts were included. Quantitative (chest radiograph, temperature, oxygen saturation, white cell count, positive sputum culture, abnormal breath sounds, physician diagnosis of PPC, production of sputum different from baseline) and qualitative (clinician review of the clinical care notes) data were extracted by two experienced cardiorespiratory physiotherapists (EK, DD). PPC incidence using both MGS-2 and MGS-3 was determined each day over the first seven postoperative days. McNemar's test of consistency between dichotomous traits within the same group of patients compared PPC rates between MGS-2 and MGS-3.

Results: The overall MGS-2 PPC rate was 19% and the MGS-3 was 22% (p=0.016).

Surgical Cohort. N=200, 50 in each group	Cardiac Surgery	Thoracic Surgery	Open Upper Abdominal Surgery	Liver Transplant
Age, mean (SD)	68 (11)	66 (15)	61 (15)	55 (10)
Gender (male), n (%)	32 (64%)	28 (56%)	29 (58%)	37 (74%)
BMI, mean (SD)	30 (6.6)	28 (5.3)	27 (6.1)	28 (6.4)
Functional Comorbidity Index, mean (SD)	2.1 (1.4)	1.3 (1.1)	1.3 (1.3)	1.9 (1.4)
Current smoker, n (%)	9 (18%)	5 (10%)	10 (20%)	4 (8%)
Anaesthetic duration (mins), mean (SD)	317 (108)	206 (141)	300 (139)	581 (156)
MGS-2 PPC event rate, n (%)	10 (20%)	7 (14%)	9 (18%)	11 (22%)
MGS-3 PPC event rate, n (%)	11 (22%)	8 (16%)	11 (22%)	14 (28%)

Conclusion: Differences in PPC incidence can be observed with alternate scoring rules. Future research should relate these changes to clinically important, patient-centred outcomes.

Janssen H[1,2], Shakespeare D[1], Luker J[3], McCluskey A[4], Bernhardt J[5], Ada L[3], Churilov L[6], Middleton S[7], Nilsson M[1], Pollack M[1,2], Blennerhassett J[8], Taylor M[8], Egan C[9], De Melo M[9], Schurr K[9], New P[10], Lipman W[10], Faux S[11], Clark N[11], Carrabine M[11], Levi C[12] and Spratt NJ[1,2].

Altering the rehabilitation environment to improve stroke survivor activity (AREISSA trial): patient perceived barriers and enablers to activity when in a rehabilitation unit with a patient-driven model of environmental enrichment.

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Aim
Use of environmental enrichment significantly improves sensorimotor recovery in experimental models of stroke. The AREISSA trial, a multi-site (N=4), cluster, cross-over trial, determined whether a patient-driven model of environmental enrichment reduced stroke survivor inactivity and was safe in the clinical setting. This qualitative sub-study within AREISSA sought to describe stroke survivor perceived barriers and enablers to engaging in activity during rehabilitation in a site that had implemented a patient-driven model of environmental enrichment.

Methods
The environmental enrichment under investigation in AREISSA included access to communal and individual physical, cognitive and social stimulation. Face to face semi-structured interviews were conducted (by a speech pathologist) with stroke survivors (n=31) following discharge from rehabilitation. Descriptive content qualitative methods using thematic analysis were used.

Results
Seven main themes arose: (i) poor communication between staff and patients about options for activity limited awareness and subsequent engagement with the program, (ii) family provide a lot of support, which facilitates engagement in activity, (iii) stroke related disability limits capacity for activity, (iv) personal preferences, beliefs and personality types influence choice of activity, (v) socialisation (involving patients, visitors and staff) promotes activity, (vi) hospital rules (real or perceived) can limit activity, and (vii) wayfinding and hospital layout has an effect on social and physical engagement.

Conclusion
Stroke survivor heterogeneity (stroke and personality related factors), hospital culture and the built environment were perceived to impede activity when attempting to implement a patient-driven model of environmental enrichment on a rehabilitation ward. Future iterations of this model of environmental enrichment must address these barriers, increase involvement with family and provide more opportunities to socialise.

Janssen H[1,2], Shakespeare D[1], Luker J[3], McCluskey A[4], Bernhardt J[5], Ada L[3], Churilov L[6], Middleton S[7], Nilsson M[1], Pollack M[1,2], Blennerhassett J[8], Taylor M[8], Egan C[9], De Melo M[9], Schurr K[9], New P[10], Lipman W[10], Faux S[11], Clark N[11], Carrabine M[11], Denham A[1], Levi C[12] and Spratt NJ[1,2].

Altering the rehabilitation environment to improve stroke survivor activity (AREISSA trial): staff experience of implementing a patientdriven model of environmental enrichment

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Aim
Use of environmental enrichment significantly improves sensorimotor recovery in experimental models of stroke. The AREISSA trial, a multi-site (N=4), cluster, cross-over trial, determined whether a patient-driven model of environmental enrichment reduced inactivity and was safe in the clinical setting. This qualitative sub-study within AREISSA sought to describe the staff experience of implementing a patient-driven model of environmental enrichment for stroke survivors in a mixed rehabilitation unit.

Method
The environmental enrichment implemented by the multi-disciplinary teams at sites participating in AREISSA included access to communal and individual physical, cognitive and social stimulation. Purposive sampling of these teams was employed to ensure most disciplines were represented. Participants who were staff (n=22) then completed telephone based semi-structured interviews. Descriptive content qualitative methods using thematic analysis were utilised/used.

Results
Five main themes arose: (i) staff attitudes, awareness and engagement with the model of environmental enrichment influenced implementation, (ii) the built environment made implementation difficult, (iii) activity limitations restricted stroke survivor engagement with environmental enrichment, (iv) stroke survivor preference for how to spend non-therapy time differed, and (v) stroke survivor mood was variable and affected engagement in activity.

Conclusion
Implementation and stroke survivor use of a patient-driven model of environmental enrichment was perceived by staff to be influenced predominantly by stroke survivor-specific variables. Staff behaviour and knowledge and the built environment were also perceived to affect successful implementation. These results highlight the complexities of clinical translation of environmental enrichment and can inform future attempts to improve activity by stroke survivors.

WOODBURN, M[1,3]; OSSANDÓN, T; WAINSTEIN, G; ROJAS-LÍBANO, D; KHANNA, Rahul[1,3]

A deep convolutional neural network can detect ADHD in children by interpreting pupil responses to working memory tasks

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Background: Attention Deficit/Hyperactive Disorder (ADHD) is diagnosed in children based on reports from parents, teachers, and close contacts. Although considered a neurodevelopmental disorder, there are no neurological or biological tests that are used for diagnosis. However, the causative neurological circuits affect physiological markers in a measurable way. Differences in pupil behaviour in ADHD were identified in 2018 in a dataset[1] in which the pupil response to a working memory task was recorded from 22 control, and 28 ADHD-diagnosed children.

Aim: In this study, machine learning methods were used to train a deep convolutional neural network (CNN) to recognize those ADHD-characteristic responses.

Methods: The resnet50 CNN and the Gramian Angular Summation Field[2] method were used to maximise the accuracy of the CNN.

Results: It was possible to generate a diagnostic model which predicts whether a child has ADHD with modest internal accuracy (AUC = 0.82).

Conclusion: The novel machine-learning based diagnostic approach used in this study may be able to detect ADHD in external subjects and may be generalizable to other disorders.

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EVALUATION OF TRAUMA IN CONVERSION DISORDER

Introduction:

Trauma is key to the psychiatric view of conversion disorder (functional neurological disorder (FND)), and the identification and evaluation of these traumas represents a critical step in FND assessment. The role of trauma and its relationship to symptoms has been the subject of controversy, however, and DSM-5 dropped the presence of traumas as a mandatory criterion for the diagnosis of FND. We hypothesized that the specific symptom may represent a solution for patient's traumatic situation: if the patient had a funeral which would be stressful to attend, for example, he/she might escape it by blindness or paralysis but not by dysphonia. So, we wished to examine if there was a link between types of preceding trauma and types of symptom.

Methods:

Firstly, we retrospectively assessed patients who had attended the functional neurology outpatient clinic at Austin hospital. They had completed a questionnaire which included sociodemographic questions, screening for stressful life events in the past year and assessing their physical and mental health. We also reviewed the clinic letters that formulated their assessment. Secondly, we prospectively investigated preceding trauma in patients with FND presenting with acute stroke symptoms admitted to Austin hospital. We assessed these through a semi-structured interview, the life events and difficulties schedules (LEDS), with all events evaluated by panel. This detects stressful life events experienced by patients in the year before their illness. Through the LEDS we can not only assess the severity of events but also determine whether the conversion symptoms would potentially offer a solution to the trauma.

Results:

There was a relationship between types of trauma and functional symptoms. We found that patients who experienced relationship problems showed more fatigue than other functional symptoms. Also, health related issues were associated with functional gait difficulties. Furthermore, patients who were exposed to bullying during their childhood had more functional visual symptoms and non-epileptic seizures.

Conclusion:

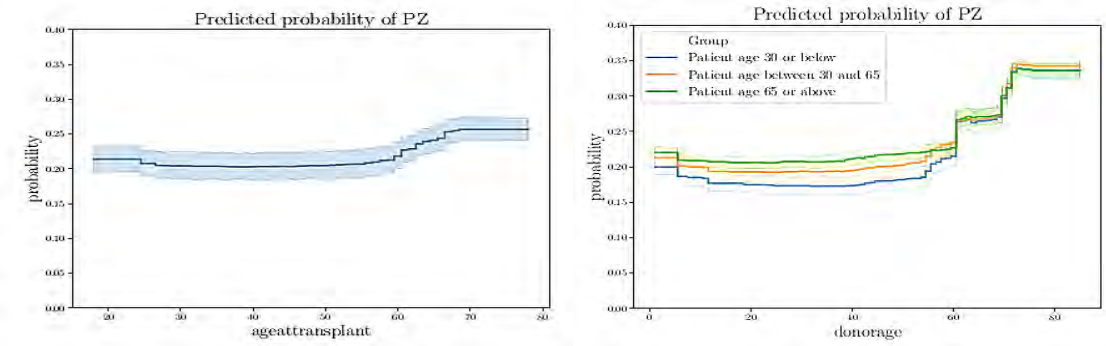
The type of experienced trauma was related to the type of conversion symptom. This suggests that the relationship is more than simple stress-diathesis, and provides some support for a conversion model for FND.

Aims: Machine learning (ML) approaches have increasingly being used to analyse complex clinical data. Techniques using Random forests[1] are a popular approach due to their flexibility and wide applicability. Compared to regression models, ML approaches have the capacity to capture more complex associations and detect variable interactions without previous specification of interaction terms. The disadvantage can be that the resulting model is more difficult to interpret. We present a method for investigating the effects of donor and recipient variables on transplant outcomes in a Random Forest model.

Methods: A Random Forest model was applied to ANZDATA/ANZOD renal transplant data 1994-present, incorporating a wide range of potentially predictive pre-transplant variables. By tracing predicted probabilities, we are able to examine the role of these variables in detail, and to compare the effects in different graft cohorts under the same model.

Results: We plot the effects of variable manipulation within the model to explore interactions and assist in hypothesis generation. We are also able to examine non-trivial behaviour for some predictive variables, such as the non-linear risk associated with patient age.

Conclusions: The method has to date suggested interesting hypotheses including: (a) older kidneys may have a noticeably lower detrimental effect in older patient cohorts; (b) Noradrenaline may have a protective effect on lower-quality or older kidneys in particular; (c) patient age may begin to affect outcomes more severely at a critical "threshold" age. Further investigation of predictive variables as well as validation of effects discovered so far would be valuable



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Wilson DL,[1,2,3] Walker S,[2,4] Fung A,[2] Pell G,[4] O'Donoghue F,[1,3] Barnes M,[1,3] Howard M,[1,3]

Sleep-disordered breathing in gestational hypertension and preeclampsia: Impact on maternal and fetal outcomes

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Aim
Hypertensive Disorders of Pregnancy (HDP) include Gestational Hypertension (GH) and Preeclampsia (PE), both are associated with worse maternal and perinatal outcomes. Sleep-disordered breathing (SDB) reportedly occurs more commonly in HDP, although the confounder of obesity has been variably accounted for. We aimed to (i) confirm if the link between SDB and HDP persists after controlling for obesity, and (ii) determine if SDB amplifies the risk of adverse outcome among women with HDP, owing to similar pathological pathways.

Methods
Women diagnosed with HDP and normotensive BMI-and gestation-matched controls underwent PSG with fetal heart rate monitoring in the third trimester. Fetal growth was assessed by ultrasound and maternal venous and fetal cord blood were sampled at delivery for markers of HDP severity and fetal growth.

Results
Forty women with HDP and 40 matched controls were recruited. The frequency of SDB (RDI≥5) in the cases was 52.5% compared to 37.5% in the controls ($p = .18$), but more severe SDB (RDI≥10) was twice as common in women with HDP (35% vs 15%, $p = .04$). SDB had no impact on outcomes for GH and PE women, including gestation at diagnosis, severity of hypertension or biomarkers of disease severity. There was no relationship between maternal apnoea and fetal distress on CTG. The presence of SDB had no influence on birthweight centile, third trimester fetal growth trajectory or regulators of fetal growth in cord blood. Among the HDP women, infants of those with SDB were larger at birth ($p = .02$).

Conclusion
Mild SDB occurs in half of women with HDP, but also in over a third of BMI-matched normotensive women, suggesting the link between SDB and HDP is in part due to the confounding effect of obesity. SDB did not affect the course of GH or PE nor adversely affect fetal health. Given the high prevalence of mild SDB and that only more severe SDB was related to HDP, a threshold for clinical significance likely exists. Future research needs to identify the proposed causative pathways to inform clinical trials investigating the role of CPAP to improve pregnancy outcomes.

Tolson J[1,2,3], Barnes M[1,2,4], Bartlett D[5,6], Rochford P[1,2], Jordan A[2,3], Trinder J[3], Jackson M[2,7]

CPAP usage is increased after a psychoeducation program at 1 month, but not at 4 months

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Aim
Continuous Positive Airway Pressure (CPAP) is a first line treatment for Obstructive Sleep Apnoea (OSA), however in many patients usage is sub-optimal. The aims of this study were to determine whether a novel psychoeducation program could improve 1) CPAP usage, and 2) scores on the Self-Efficacy Measure for Sleep Apnea (SEMSA) questionnaire, compared to a treatment as usual program, up to 4 months after CPAP titration.

Methods
Eighty-one OSA patients commencing CPAP were randomised into 2 groups: treatment as usual (TAU; N=43) or a psychoeducation program (PSY CPAP; N=38). TAU participants underwent the standard laboratory protocol to commence CPAP. PSY CPAP participants underwent the same protocol as TAU, plus a novel psychoeducation program. The SEMSA questionnaire consists of 3 subscales; risk perception, outcome expectancies and treatment self-efficacy and was completed at baseline, on the evening of CPAP titration (post intervention) and at 1 and 4 months post CPAP titration. CPAP usage data (hrs/night) were downloaded at 1 week, 1 month and 4 months.

Results
PSY CPAP group had significantly higher CPAP usage compared to TAU group at 1 week (mean±SD=5.6h±2.4 vs 4.2h±3.0; p=0.03) and at 1 month (mean±SD=5.0h±2.8 vs 3.8h±2.8; p=0.04), but not at 4 months (mean±SD=4.6h±2.9 vs 3.5h±2.9; p=0.11). A significant interaction was found, with scores on the SEMSA outcome expectancies subscale improving from baseline to post intervention, in the PSY CPAP group compared to the TAU group (p=0.007). No other significant interactions were found.

Conclusion
CPAP usage was higher in the group that underwent the psychoeducation program compared to standard laboratory care, at 1 week and 1 month, but not at 4 months. Ongoing psychoeducation sessions, may help to sustain an increased level of CPAP usage over the longer term.

Sim E, [1] , Ruehland W,[1,2,] Lanteri C, [1,2,] Brazzale D[1,2]

Lung function testing after a recent myocardial infarction is safe

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Aim
Patients with a recent myocardial infarct (MI) sometimes require pre-operative respiratory function tests (RFTs). Based on theoretical risk, American Thoracic Society/European Respiratory Society guidelines suggest avoiding RFTs within 1 month of a MI[1]. Based on evidence from exercise testing, other recommendations suggest that testing 7 days after an MI would be safe[2]. Given the lack of direct evidence on which RFT safety recommendations are made, the aim of this study was to assess the safety of RFTs performed after a recent MI.

Methods
A retrospective search was performed identifying all in-patients having RFTs performed within 30 days of MI since 2010. The medical records were examined to identify if there were any symptoms reported after RFTs (within 4 days) that could be related to the tests.

Results
172 patients were identified as having RFTs with 30 days of an MI. The mean (SD) FEV1 was 2.21L (0.81). 114 of these patients had tests within 7 days of an MI. 8 patients had symptoms within 4 days post RFT (angina: 5, acute pulmonary oedema: 2, dyspnoea: 1). 4 of these patients had symptoms within 24hrs, and only 2 had symptoms during or immediately post RFT. Of these two patients: (i) one had in-laboratory RFTs 18 days post MI, the other 5 days post MI; (ii) both reported chest pain, however only one had increased chest pain during the RFT (reported afterwards), and; (iii) both had chest pain unrelated to RFTs at other times during their admission.

Conclusion
Lung function testing after a recent MI was found to be safe in this group of in-patients. These findings may provide evidence for future lung function testing guidelines.

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Ruehland W,[1,2,] Churchward T, [1,2,] Tolson J[1,2,3], Melehan K[4,5], Wilson D[1,2]

The impact of excluding arousals scored in awake epochs of polysomnography on the arousal index

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Aim
The arousal index (AI) in polysomnography (PSG) allows for quantification of sleep disruption; however current American Academy of Sleep Medicine (AASM) and Australasian guidelines conflict on whether to include EEG arousals in awake epochs when calculating the AI. The aim of this study was to investigate the impact of excluding EEG arousals scored in awake epochs on the AI.

Methods
Fifty consecutive diagnostic PSG's for investigation of OSA were reviewed. Two different arousal indices were calculated from each PSG; one excluding (AI^{exc}) and one including (AI^{inc}) arousals scored in awake epochs.

Results
The median (IQR) decrease in AI^{exc} was 5.3/h (3.3, 9.7) as compared to AI^{inc} (AI^{exc} = 24.0 (14.7, 33.2) vs. AI^{inc} = 29.5 (20.9, 40.6)). The reduction in AI was greater with increasing apnoea hypopnoea index (AHI); 75% of patients with AHI >30/h (n=16) had a decrease in AI of >5/h, compared to 56% with an AHI 15-30/h (n=16), and 33% with an AHI <15/h (n=18).

Conclusion
There was a 22% decrease in arousal index by excluding arousals during awake epochs, with this discrepancy being greatest for those with a high AHI. This study informs clinical practice for those departing from current AASM arousal reporting guidelines, highlights the pitfalls of scoring sleep with epochs, and informs future standards for the scoring of sleep and associated events.

Khor YH[1,2,3,4], Goh NSL[1,2,4], Miller B[4,5], Glaspole I[4,5], Holland AE[2,4,6], McDonald CF[1,2,3]

A Pilot Randomised Controlled Trial of Ambulatory Oxygen versus Air via Portable Concentrator in Fibrotic Interstitial Lung Disease

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6. La Trobe University, Melbourne, Vic., Australia.

Aim
Ambulatory oxygen therapy (AOT) is a common but costly treatment for patients with interstitial lung disease (ILD). The lack of evidence in this area leads to inconsistent clinical guideline recommendations and inequitable access to AOT in this population. This study aimed to examine the feasibility of conducting a randomised double-blinded sham-controlled trial of AOT in patients with ILD who experience dyspnoea and exertional desaturation.

Methods
Participants without significant resting hypoxaemia who desaturated to <90% on 6-minute walk test were randomised to 3-months supplemental oxygen or air delivered via portable concentrators, with assessments performed at baseline and weeks 4, 12 and 18. The feasibility of recruitment and blinding were evaluated. Potential efficacy outcomes assessed included exercise capacity, symptoms, health-related quality of life, physical activity and device use.

Results
Of 194 patients invited to participate, 30 were randomised [mean age 72 (SD 8) years, FVC 71 (SD 14) % predicted, DLCO 42 (SD 12) % predicted, 11 idiopathic pulmonary fibrosis, 22 males] and 24 completed the study. The recruitment rate was 2.1/month, with the enrolment to randomisation ratio of 1.1:1. Blinding was successful [Bang's Blinding Index: Oxygen group = 0 (95% CI: -0.40, 0.40); sham group = 0 (-0.42, 0.42)]. Efficacy outcome completion rates were good at ≥ 80%, except for physical activity diary (53%). In comparison to the sham group, the oxygen group had a significantly smaller deterioration in the St George's Respiratory Questionnaire symptom domain score ($p = 0.03$), and shorter duration of moderate and vigorous activities ($p = 0.008$) at week 12.

Conclusion
This pilot trial confirmed feasibility and provided key information to inform the design of future trials. Changes in efficacy outcomes warrant further evaluation in a definitive randomised controlled trial, in order to clarify the therapeutic potential of AOT in patients with ILD.

Lee E[1,2], Perini M,[1,2,] Makalic E[3], Oniscu G[4], Starkey G[1,2], Wang BZ[1,2], Christophi C[1,2], Jones R[1,2], Fink M[1, 2]

Variables impacting on the outcomes after liver transplantation for hepatocellular cancer

1. Department of Surgery, Austin Hospital, Heidelberg, Vic., Australia;
2. University of Melbourne;
3. Melbourne School of Population and Global Health, University of Melbourne
4. Transplant surgery, Royal Infirmary of Edinburgh, Scotland, UK

Aim
Liver transplantation is a potentially curative treatment for hepatocellular cancer (HCC). However liver grafts are a limited resource. It is important to identify variables that may affect the outcomes of transplantation for HCC, which is the aim of this study.

Methods
Demographic and clinical data was collected from a prospective database of all patients transplanted by the Victorian Liver Transplant Unit from 1/1/2001 to 31/12/2018. Overall survival, graft survival and HCC recurrence outcome data were collected. Recipient, donor and tumour variables were analysed with univariable analysis, with variables with a p-value <0.1 chosen for multivariable Cox regression model.

Results
267 patients underwent liver transplantation for HCC. Graft survival (defined as time to either graft failure or patient death) was 73.8%, and overall survival was 79%. HCC recurrence occurred in 9.4% of patients. For graft survival, recipient body mass index (BMI) (HR 0.932, CI 0.884-0.0983, p=0.01), and donor BMI ((HR 1.051, CI 1.006-1.097, p=0.026) were significant variables on multivariable analysis. For overall survival, recipient age at transplant (HR 1.072, CI 1.017-1.130, p=0.01), recipient BMI (HR 0.915, CI 0.855-0.978, p=0.009) and Model for End-Stage Liver Disease score with serum sodium (MELD-Na) (HR 1.053, CI 1.013-1.095, p=0.009) were significant on multivariable analysis. There were no variables identified on multivariable analysis that significantly increased risk of HCC recurrence.

Conclusion
None of the variables considered were shown to independently increase the risk of HCC recurrence, including maximum AFP level. Recipient and donor BMI independently increased the risk of graft failure, whereas increasing recipient age, BMI and MELD-Na score increased mortality risk post-transplantation.

Edward Stanley[1], Bridget Hill[2], Mary Galea[3], Natasha van Zyl[1-2]

Neurophysiological Assessment for Prediction of Outcomes in Upper Limb Nerve Transfer Surgery in Tetraplegia

1. *Department of Plastic and Reconstructive Surgery, Austin Health*
2. *Upper Limb Program, Victorian Spinal Cord Service*
3. *Department of Medicine, The University of Melbourne*

Objectives

To determine predictors of outcomes using neurophysiological assessment in traumatic tetraplegics undergoing nerve transfer surgery (NTS) to regain movement in the upper limb.

Methods

A retrospective study investigated relationships between neurophysiological assessment and strength (Medical Research Council grade [MRC]) at 2-years following NTS.

Correlations with regression models were made between MRC and:
(1) motor level of spinal injury at rehabilitation (mean 2 months post injury);
(2) motor level of spinal injury pre-operatively (mean 9 months post commencing rehabilitation);
(3) fibrillations in donor and recipient muscles on pre-operative electromyography (EMG);
(4) recruitment of motor unit action potentials in muscles innervated by donor and recipient nerves on pre-operative EMG;
(5) energy required to stimulate muscle contraction using an intra-operative nerve stimulator applied to donor and recipient nerves;
(6) range of movement (ROM) of the joint following contraction of the donor and recipient muscles as above.

Results

160 nerve transfers were performed in 38 patients (C4-7). As the motor level of injury from time of injury improved, MRC grade increased (coef. 1.4,p=0.008). As the energy required to stimulate the donor nerve increased, MRC grade decreased (coef. -0.425,p=0.007). As the ROM increased upon stimulation of the recipient nerve, the MRC grade increased (coef. 0.808,p=0.001). There is no statistically significant correlation between motor level pre-operatively, fibrillations, motor recruitment and MRC grade.

Summary

The data demonstrates that C4 tetraplegics appear to have poorer outcomes and the potential predictors of strength are the energy required to stimulate donor nerves and the ROM upon recipient nerve stimulation.

Cox DRA [1,2,3], Goh SK [1,2], Wong BKL [3,4], Testro A [5], Christophi C [1,2], Muralidharan V [1,2], Dobrovic A [1,3,4].

Comparison of two techniques for cell-free DNA detection of hepatocellular injury following liver transplantation.

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2. *HPB & Transplant Unit, Department of Surgery, Austin Hospital, Melbourne, Australia.*
3. *Translational Genomics and Epigenomics Laboratory, Olivia Newton-John Cancer Research Institute, Melbourne Australia.*
4. *School of Cancer Medicine, La Trobe University, Melbourne, Australia*
5. *Liver Transplant Unit, Department of Gastroenterology & Hepatology, Austin Hospital, Melbourne, Australia.*

Graft-derived cell-free DNA (gdcfDNA) quantification is a developing tool for monitoring organ health following transplantation. Acute cellular rejection, sepsis and ischaemia following liver transplantation increase rates of graft cell death leading to elevated circulating levels of gdcfDNA. Until recently, gdcfDNA quantification assays have largely relied on donor and recipient genetic chimerism to differentiate gdcfDNA from 'background' cfDNA. [1, 2] Our group has previously developed a probe-free droplet digital PCR assay to quantify gdcfDNA based on the identification of small deletion/insertion polymorphisms to distinguish donor-derived cfDNA from that of the recipient. [3]

DNA methylation conforms to specific patterns depending on the tissue of origin and therefore forms another promising target to differentiate gdcfDNA from 'background' cfDNA. [4] Here we describe the development of a methylation-specific, droplet digital PCR, gdcfDNA quantification assay. This assay is based on the use of tissue-specific (hepatocyte) DNA methylation patterns to discriminate gdcfDNA from background cfDNA. We compare the performance of this methylation-specific assay with our previous polymorphism-dependent quantification technique and discuss the relative benefits of each approach.

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Katrina Walsh[1], Dora L Vallejo-Ardila[1], Theodora Fifis[1], Rita Paolini[1], George Kastrappis[1], Georgina Riddiough[1], Marcos Perini[1], and Christopher Christophi[1].

Title of abstract. Manipulating MDSC associated with tumours by agents that modulate angiogenesis and lymphogenesis.

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Aim
To investigate immune infiltration into the liver and tumour in captopril or SAR131675 treated mouse model of CRC liver metastasis, focusing on macrophages and Myeloid Derived Suppressor Cells (MDSC).
Colorectal cancer (CRC) is the third most frequently diagnosed cancer in Australia and ranks second of those causing of death, with liver metastasis being the predominant cause. Apart from a small group amenable to surgery, the majority of patients with CRC liver metastasis are treated with systemic palliative chemotherapy. This highlights an urgent need for new treatment modalities for liver metastases. Published and preliminary studies by this lab identified two different treatments that significantly reduced tumour burden in a mouse model of CRC liver metastases. The first treatment targets the renin angiotensin system (RAS) using the ACE inhibitor captopril and the second specifically targets the lymphatic receptor VEGFR3 by the drug SAR131675. Emerging evidence indicates that both RAS and VEGRF3 inhibition effect the tumour inflammatory environment and the infiltrating MDSC which render it immunosuppressive.

Methods
Murine CRC liver metastasis model developed over 21 days, treatment groups separated into captopril (IP) or SAR131675 (oral) and saline treated controls. Livers and tumours examined using immunohistochemistry and FACs methodologies.

Results
While no significant changes were observed in the tumour, in the liver the relative proportions of MDSC populations and their expression of PD-L1 significantly changed in response to both treatments. While both treatments effected MDSC populations differently, commonalities were that $Ly6C^{lo}F4/80^{-}$ $PD\text{-}L1^{+}$ populations decreased significantly while the proportion of $Ly6C^{lo}F4/80^{+}PD\text{-}L1^{+}$ increased.

Conclusion
Treatments altered the capacity of specific MDSC populations to infiltrate and respond to tumour and thus modulate MDSC anti-tumour immune suppression.

		Cardiology
Wed1	Claire Mahon	Quantifying post-procedural management of the vascular access site following Transcatheter Aortic Valve Implantation to assess association with length of hospital stay: a clinical audit.
Wed2	Georgie Meehan	This abstract is not included at the request of the author
Wed3	Georgie Meehan	This abstract is not included at the request of the author
Wed4	Georgie Meehan	This abstract is not included at the request of the author
Wed5	Georgie Meehan	This abstract is not included at the request of the author
Wed6	Georgie Meehan	This abstract is not included at the request of the author
Wed7	James Theuerle	Retinal Microvascular Dysfunction Predicts Major Adverse Cardiovascular Events in Patients with Atherosclerotic Risk Factors and Coronary Artery Disease
Wed8	Lorelle Martin et al	Differences in characteristics, performance targets and outcomes for men and women with STEMI in a large tertiary Australian hospital.
Wed9	Meor Azraai, Meor Ahmad	This abstract is not included at the request of the author
Wed10	Mohammad Omair	Impact of Single-Vessel vs. Multi-Vessel Coronary Artery Disease on Long-Term Mortality in Patients with Diabetes Mellitus Undergoing PCI
Wed11	Phelia Kunniardy	Inpatient Coronary Angiography is Associated with Reduced Mortality in Patients aged >85 years with Non-ST-Elevation Myocardial Infarction
Wed12	Phelia Kunniardy	Management of NSTEMI in elderly patients: What we do we know about Conservative VS Invasive Management in the elderly?
Wed13	Phelia Kunniardy	Long Term Outcomes in Patients aged >85 years presenting with Type II Myocardial Infarction (Type II MI)
Wed14	Phelia Kunniardy	Do Patients over 85 years who Present with NSTEMI and Admitted Under General Medical Units Need Cardiology Consultation?
Wed15	Phelia Kunniardy	Impact of admission to a Cardiology unit on Mortality in Patients aged >85 years Presenting with Non-ST-Elevation Myocardial Infarction (NSTEMI)
Wed16	Phelia Kunniardy	Is There a Gender Disparity in Characteristics and Outcomes for Patients Over 85 years Presenting with Non-ST-Elevation Myocardial Infarction (NSTEMI)?
Wed17	Sheila Patel	This abstract is not included at the request of the author
		Clinical Genetics
Wed18	Eloise Uebergang	Helping culturally diverse populations understand genomics: Recommendations for a clinical genomic testing resource.
		Critical care and Emergency Medicine
Wed19	Amelia Chiappazzo	This abstract is not included at the request of the author
Wed20	Ian Baldwin	Underwater Seal Drainage - Principles and Checklist Tool
Wed21	Ludi Brunorio	Limb restriction in Austin Health Intensive Care
Wed22	Bellomo Rinaldo	Haemodynamic Effect of Hartmann's Solution vs 4% Albumin Fluid Bolus Therapy After Cardiac Surgery
Wed23	Rinaldo Bellomo	A Pilot, Double-Blind, Randomized, Controlled Trial of High-dose Intravenous Vitamin C for Vasoplegia after Cardiac Surgery
Wed24	Yifan Xu	Comparison of the Australian and New Zealand Referral Criteria for Liver Transplant versus the King's College Criteria to Predict Mortality and Morbidity in Paracetamol Overdose

Wed25	Jennie Nguyen	Proportion of patients who transition to long-term opioid use following oxycodone initiation in the ED
Wed26	Simone Taylor	The cerebral-placental-uterine ratio as a novel predictor of late fetal growth restriction: a prospective cohort study
		Pharmacy
Wed27	Simone Taylor	A nine-year case-series: cefalexin hypersensitivity reactions; not so rare and not so benign
Wed28	Parnaz Aminian et al	An organisational approach to Australia's opioid epidemic
Wed29	Elizabeth Su	A systems-based approach to deprescribing PPIs
Wed30	Elizabeth Su et al	Keeping it cool! A systematic approach to cold chain management
Wed31	Daisy Pisasale	Evaluation of communication to General Practitioners when opioid-naïve post-surgical patients are discharged on opioids
Wed32	Gina McLachlan	The cost of pharmacovigilance: a time-and-motion study of an adverse drug reaction program
Wed33	Gina McLachlan	Euglycaemic diabetic ketoacidosis with SGLT2 inhibitors: is it more than just a perioperative problem?
Wed34	Jacinta Castello	Opioid use following total knee or hip arthroplasty- not always a case of oversupply
Wed35	Jacqueline Balassone	A collaborative approach between pharmacy and general medicine to improve flow and medical staff satisfaction.
Wed36	Jala Moushi	Evaluation of the safety of induction chemotherapy in obese patients with acute myeloid leukemia: a retrospective pilot study.
Wed37	Airley Broomfield	Can you trust adverse drug reaction recording? An audit of electronic medical records
		Musculoskeletal
Wed38	Bonnia Liu	Opioid Burden is Reduced in Lower Back Pain Inpatients admitted Under Rheumatology, but not General Medicine
		Neurosciences
Wed39	Aaron Warren	Targeting the thalamic centromedian nucleus for deep brain stimulation: visualisation, intraoperative neurophysiology, and fMRI connectivity
Wed40	Amy Schneider	Double somatic mosaicism in a child with Dravet syndrome
Wed41	Blake Nielsen	Basilar artery dolichoectasia and its components: Clinical risk factors and relations to cerebral small vessel disease
Wed42	Christopher C Rowe	In vivo Imaging of Brain Muscarinic Receptors with 18F-Flurobenzyl Dexetimide: First in Human Studies
Wed43	Karen Barclay	This abstract is not included at the request of the author
Wed44	Lilian Carvalho	Changes in head position and cerebral haemodynamics in ischaemic stroke: a systematic review
Wed45	Rosalind Hutchings	This abstract is not included at the request of the author
Wed46	Russell Nightscales	This abstract is not included at the request of the author
		Oncology
Wed47	Alexander McDonald	This abstract is not included at the request of the author
Wed48	Allison Barraclough	This abstract is not included at the request of the author
Wed49	Jessica Da Gama Duarte	This abstract is not included at the request of the author
Wed50	Luke Quigley	This abstract is not included at the request of the author
Wed51	Zakia Alam	FRA1 is required for BRAF V600E induced intestinal tumour progression

		Pathology
Wed52	Kerryn Ireland-Jenkin	This abstract is not included at the request of the author
		VAD
Wed53	Danielle Ko	"This is uncharted water for all of us": Challenges anticipated by hospital clinicians in relation to the legalisation of voluntary assisted dying in Victoria
Wed54	Danielle Ko	In Principle Support for Voluntary Assisted Dying does not Translate to Willingness to Participate
		Nursing
Wed55	Andrea Driscoll	State-wide mapping of NP models of practice throughout Victoria
		Obstetrics and Gynaecology
Wed56	Anita Stubbs	The effect of intimate partner violence and abuse on obstetric and perinatal outcomes.
		Women's or Public Health
Wed57	Anita Stubbs	This abstract is not included at the request of the author
		Physiotherapy
Wed58	Jannette Blennerhassett	Standing Tall: local protocol for an international implementation study
Wed59	Jannette Blennerhassett	Task related practice may improve hand function in people with Parkinson's Disease: A systematic review.
Wed60	Julie Bernhardt	AVERT Dose Trial Update 2019: Determining Optimal Early Rehabilitation after Stroke
		Psychiatry and Psychology
Wed61	Benjamin Dent	Neuropsychiatrists' understanding of conversion disorder: A survey of clinician attitudes
Wed62	Georgina Oliver	Exploring the role of NAC for treatment-resistant PTSD: a randomised controlled trial
		Respiratory and Sleep Medicine
Wed63	Marnie Graco	How much matters? Exploring the minimum important difference for sleepiness in spinal cord injury.
		Spinal Cord Injury Clinicians
Wed64	Emma Peleg	The Value of having Spinal Cord Researchers and Clinicians Connect and Collaborate on the Spinal Cord Research Hub (SCoRH)
		Tracheostomy Review and Management Service
Wed65	Jack Ross	Evaluation of a multimodal interdisciplinary tracheostomy educational model
		Anaesthesia
Wed66	Steven James Lindstrom	This abstract is not included at the request of the author
Wed67	Matthew Lee	Implementing a high efficiency, low cost approach to multidisciplinary operating room simulation.
		Endocrinology and Metabolism
Wed68	Ali Ghasem-Zadeh	Microstructural Decay in Spinal Cord Injury
Wed69	Ali Ghasem-Zadeh	Evaluation of bone microstructure of distal radius and distal tibia on human objects using phase-contrast synchrotron radiation computed tomography
Wed70	Ali Ghasem-Zadeh	Bone Fragility is Captured Independently by Measurement of Microstructural Deterioration, not Bone Mineral Density

Wed71	Elif Ekinci	This abstract is not included at the request of the author
Wed72	Rebecca Loveridge	The type 1 diabetes identification initiative: improving the care of inpatients with type 1 diabetes
Wed73	Shahrukh Javed	This abstract is not included at the request of the author
		General MedicineMET
Wed74	Piyumi Wijesundera	Frequency, associations, and outcomes of patients who receive Medical Emergency Team (MET) calls in the general medical population in a tertiary hospital in Melbourne
		Geriatrics
Wed75	Him Woon Emily Chua	Risk Factors for Falls In Ambulatory Older Adults in Residential Aged-Care: A Prospective Cohort Study
		Infectious Diseases
Wed76	Andrew Nolen	This abstract is not included at the request of the author
Wed77	Misha Devchand	Empowering haematology nurses to assess patient-reported antibiotic allergies: the implementation of a validated antibiotic allergy assessment tool (AAAT) - a pilot study
Wed78	Nixon Tan	Long term impacts of antibiotic allergy testing on patient perceptions and utilisation
Wed79	Zaal Meher-Homji	High prevalence of antibiotic allergies in Cladribine-treated hairy cell leukaemia patients- lessons for immunopathogenesis and prescribing
		Medical Imaging
Wed80	Aurora Poon	Arterial FDG uptake - what is normal?
Wed81	Christian Testa	Initial experience in the clinical utilisation of brain amyloid PET imaging
Wed82	Emma Harding	Impact of the bone scan in a complicated Meningococcal patient
Wed83	Harris Panopoulos	Solid target production of Ga-68 utilizing induction based thermal diffusion.
Wed84	Jessica Traczyk	Titration of 99mTechnetium- Macroaggregated Albumim Doses in Lung Ventilation/Perfusion Imaging and its Effect on Dose Reduction
Wed85	Julia Dal Santo	SPECT/CT quantification versus planar quantification of 99mTc-MAA shunt study for SIR-spheres Workup
Wed86	Kane Nicholls	Rapid virtually automated technique for renal corticomedullary segmentation from volumetric arterial phase imaging: Initial experience
Wed87	Luke Bromley	Role of Breast Ultrasound in Breast Cancer Surveillance; Incremental Cancers found at what cost?
Wed88	Michael Nguyen	Artificial intelligence vs Human Intelligence - Quotient analysis on lung VQ scan for diagnosis of pulmonary embolism
Wed89	Michelle Foo	This abstract is not included at the request of the author
Wed90	Michelle Foo	Women in Interventional Radiology - Insights into Australia's Gender Gap
Wed91	Michelle Foo	Junior doctors' awareness about careers and practice in interventional radiology
Wed92	Michelle Foo	Australian Surgical and medical trainees' Perspective on Interventional Radiology Education
Wed93	Michelle Foo	This abstract is not included at the request of the author
Wed94	Sze Ting Lee	Assessment of clinical risk factors which may be predictive of disease detection on 68Ga-PSMA PET/CT scans

		Gastroenterology
Wed95	Penelope Hey	Reduced upper limb lean mass is associated with increased risk of early post-transplant sepsis and hospital length of stay in male liver transplant recipients.
Wed96	Ryma Terbah	The efficacy, safety and tolerability of outpatient continuous terlipressin infusion in patients awaiting liver transplant.
Wed97	Josephine A Grace	Community-based "One Stop Shop" Model of Care for Hepatitis C Treatment

Mahon C [1], Stevens, M[1], Martin L[1], Naismith C [1], Farouque O [1,2,] Horrigan M [1,2].

Quantifying post-procedural management of the vascular access site following Transcatheter Aortic Valve Implantation to assess association with length of hospital stay: a clinical audit.

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2. School of Medicine, University of Melbourne, Vic, Australia

Background and Aims. Transcatheter aortic valve implantation (TAVI) is the guideline recommended standard of care for patients deemed inoperable or at high risk for surgical management of aortic stenosis.[1] In this frail patient cohort, shorter Length Of Stay (LOS) correlates with better outcomes.[2] Large lumen catheters required for delivery of transcatheter aortic valves via the femoral artery increase procedural risk.[3] Standardized definitions of major bleeding and vascular complications may fail to capture minor persistent bleeding that requires manual vascular compression. [4] Minor bleeding delays early ambulation increases LOS and requires additional resources. We have designed a system to retrospectively quantify post procedural management of vascular access sites to determine the incidence of minor persistent bleeding following TAVI and its effect on LOS among TAVI patients.

Methods: A chart review of 47 patients who have undergone TAVI between July 2018 and June 2019 capturing clinical and procedural variables including demographics, haemoglobin and platelet levels, anti-coagulation status and renal function at baseline. Procedural characteristics include sheath size, number of suture vascular closure devices deployed, procedure time, procedural anticoagulation and blood pressure during and after procedures. Post-procedural access site management will be assessed as follows: 1) number of episodes of manual compression required during post-procedural care for management of persistent bleeding, 2) total manual compression required per case, 3) the need for alternative strategies required to achieve haemostasis, and 4) time to ambulation post procedure. Hospital LOS will be determined from medical records.

Conclusion: The data obtained will quantify the incidence of minor persistent bleeding after TAVI and provide a baseline assessment of human and other resources required. Data forthcoming will form the basis of ongoing improvements in clinical care in this vulnerable patient cohort.

References

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4. Toggweiler S, Leipsic J, Binder RK, et al. Management of vascular access in transcatheter aortic valve replacement: part 2: Vascular complications. *JACC Cardiovascular interventions* 2013; 6: 767-776. 2013/08/24. DOI: 10.1016/j.jcin.2013.05.004.

ABSTRACT

Background: Coronary endothelial dysfunction is a clinically silent precursor to the development of symptomatic atherosclerosis. Dynamic retinal vessel analysis (DVA) is a direct and non-invasive method for assessing retinal microvascular function. We sought to determine whether retinal endothelial dysfunction is a predictor of long-term major adverse cardiovascular events (MACE).

Methods: In a single centre prospective observational study, two hundred and sixty-eight patients with both coronary disease and atherosclerotic risk factors underwent static and dynamic retinal vascular assessment. Microvascular dysfunction was quantified by measuring retinal arteriolar and venular dilatation in response to flicker light stimulation. Patients were assessed for MACE over a median period of 8.7 years.

Results: Flicker light-induced retinal arteriolar dilatation (FI-RAD) emerged as an independent predictor of MACE and all-cause mortality. A dose-response relationship was observed in Kaplan-Meier analysis, where the lowest FI-RAD responses were associated with the highest rates of MACE. Uni- and multivariate odds ratios for MACE and all-cause mortality, per standard deviation decrease in FI-RAD, were 1.75 (1.28, 2.40) and 2.21 (1.14, 4.28), respectively. Flicker light-induced retinal venular dilatation was lower, but not statistically significant, in patients with MACE (3.6 ± 2.0 vs 4.0 ± 1.8%; $p = 0.14$).

Conclusions: For the first time, our results demonstrate that FI-RAD is a strong and independent predictor of MACE and all-cause mortality in patients with coronary artery disease or cardiovascular risk factors. DVA is a novel technique that provides additional benefit over traditional risk factors in stratifying patients at risk of cardiovascular disease.

Martin L[1,2], Murphy M[1,2], Farouque O[2,3], Clark D[2,3], Edvardsson D[1], Lewis V[1].

Differences in characteristics, performance targets and outcomes for men and women with STEMI in a large tertiary Australian hospital.

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2. Department of Cardiology, Austin Hospital, Heidelberg, Vic., Australia;
3. School of Medicine, University of Melbourne, Vic, Australia

Aims: A recent gender comparison of STEMI management in a large Australian dataset from 41 hospitals found women experienced disparity in care and outcomes[1]. We aimed to establish whether these disparities in outcomes occurred in our STEMI dataset at a tertiary hospital in Melbourne.

Methods: We analysed a prospective all-comer cohort of 922 STEMI patients receiving percutaneous coronary intervention at a single site. Univariate analyses compared characteristics, specific time points of care and outcomes between men and women. Cox proportion hazard modelling determined predictors of 365-day mortality, controlling for age and comorbid status.

Results: Women treated for STEMI were older (70±13 vs 62±12 years, p<0.001); more likely to present 8am-6pm Monday-Friday (48% vs 37%, p<0.01); via regular ambulance (42% vs 24%, p<0.001); with atypical symptoms (23% vs 11%, p<0.001); have a TIMI risk score >5 on admission (43% vs 22%, p<0.001) and fail the 90 minute performance target (36% vs 20%, p<0.001). Differences in specific hospital time points of care between women and men did not reach statistical significance; Door-ECG (7 vs 6 min, p=0.19); Door-Cath Lab (37 vs 30 min, p=0.07); Cath Lab-Device (32 vs 30min, p=0.05) respectively. Women had a higher 365-day mortality rate (15% vs 7%, p<0.01). However, multivariate survival analysis controlling for age and TIMI risk score demonstrated gender was not a predictor of 365-day mortality (HR 1.4, 95%CI 0.78-2.6; p=0.26)

Conclusion: STEMI management at particular time points was similar for men and women. Multivariate regression modelling demonstrated gender was not a predictor of 365-day mortality. Analysis using propensity score matching on a larger sample size could further examine the influence of gender.

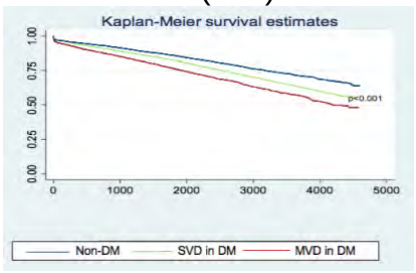
References

1. Khan E, Brieger D, Amerena J, et al. Differences in management and outcomes for men and women with ST-elevation myocardial infarction. Med J Aust. 2018; 209: 118-23.

Impact of Single-Vessel vs. Multi-Vessel Coronary Artery Disease on Long-Term Mortality in Patients with Diabetes Mellitus Undergoing PCI

Background: Long-term outcomes of percutaneous coronary intervention (PCI) for multi-vessel disease (MVD) with diabetes mellitus (DM) are inferior to coronary artery bypass grafting (CABG), but the outcomes of PCI in diabetics with single vessel disease (SVD) are less well known. We aimed to assess the long-term mortality of patients with DM with SVD compared to MVD undergoing PCI.

Methods: We included 8,795 consecutive patients with DM undergoing PCI from 34,784 patients in the Melbourne Interventional Group registry (2005-2018). Patients were stratified based on whether they had SVD or MVD. Long-term mortality was assessed via linkage with the National Death Index (NDI).



Results: 6,138 (70%) of DM patients had MVD. Compared to SVD, MVD were older (67 ±11 vs 64 ±10 years), with higher rates of hypertension, insulin dependence, prior PCI, renal impairment, left ventricular ejection fraction <45%, cardiogenic shock and out-of-hospital cardiac arrest (all p<0.001). Patients with MVD had significantly higher rates of stent thrombosis, unplanned CABG and major bleeding with lower procedural success and 30-day major adverse cardiac events (5.5% vs 2.6%, p<0.001). Long-term mortality (mean 5.4 ±3 years) was significantly higher in MVD (28% vs 17%, p<0.001). Cox proportional hazard modelling found MVD as an independent predictor of long-term mortality (HR 1.37, 95% CI 1.2-1.5, p<0.001).

Conclusion: Patients with DM and SVD undergoing PCI had a lower long-term mortality compared to MVD. However, the mortality beyond 5 years in SVD increases, mandating aggressive risk factor control and close clinical follow-up.

Inpatient Coronary Angiography is Associated with Reduced Mortality in Patients aged >85 years with Non-ST-Elevation Myocardial Infarction

Background

Guidelines recommend early coronary angiography (CA) in patients presenting with non-ST-elevation myocardial infarction (NSTEMI), irrespective of age. However, elderly patients are less likely to be treated according to these guidelines. Clinicians often take a more cautious approach with elderly patients due to their perceived high risk due to their age and multiple comorbidities. Moreover, whether this strategy is associated with improved survival in patients aged ≥ 85 years remains uncertain as these patients tend to be under-represented in studies. In this single centre retrospective study, we assessed the safety and efficacy of invasive VS conservative management of NSTEMI in patients aged ≥85 years.

Methods

1052 consecutive patients aged ≥ 85 years presenting with NSTEMI into Austin Hospital between 2008-2018 were included. Patients were stratified depending on whether they underwent invasive CA (invasive management) or medical treatment without CA (conservative management). The primary outcome was all-cause mortality as determined by review of medical records. We also looked at complications including in-hospital bleeding and in-hospital strokes.

Results

Of the 1052 patients included, only 99 (9.4%) patients underwent CA. The mean age was 89 ± 3 years and 43.6% were male. Those undergoing CA were more likely to be younger, male, more likely to be in independent living, without underlying mobility or cognitive issues (all $p<0.01$). Overall, 495 (47%) deaths occurred over a mean follow-up of 1.3 years. Undergoing CA was associated with lower mortality on univariate Cox regression (HR, 0.26; 95% CI, 0.17-0.41; $p<0.001$) with early divergence between the groups. After adjusting for age, gender, diabetes, prior MI, AF, living status, cognitive function and mobility, undergoing CA was strongly associated with improved survival (HR, 0.47; 95% CI, 0.26-0.85; $p=0.01$).

Conclusion

In this cohort of elderly patients presenting with NSTEMI, invasive management was shown to be an independent predictor of long-term survival. Given the high mortality associated with NSTEMI in this population, consideration should be given to early coronary angiography with a view to revascularisation.

Management of NSTEMI in elderly patients: What we do we know about Conservative VS Invasive Management in the elderly?

Background

Studies have found that elderly patients are less likely to undergo evidence-based management and coronary angiography compared to younger patients. Given that older patients are more likely have multiple-comorbidities, they are often underrepresented in trials and studies. Hence, there is a lack of applicability and evidence in this population group.

Methods

Computerised literature searches from MEDLINE and EMBASE were used to identify studies evaluating the impact of management on outcomes of elderly patients (≥75 years) with NSTEMI. Pre-specified outcomes assessed included primary outcome (major adverse cardiovascular events MACE), mortality rate and risk of major bleeding. Intervention and effect on specified outcomes were assessed.

Results

We reviewed 5 randomised controlled trials (RCTs) and 2 observational studies comparing medical therapy (conservative) VS angiography with revascularisation if indicated (invasive) treatment in elderly populations with NSTEMI. 6 out of 7 of the studies showed that invasive treatment had improved primary outcomes. In terms of mortality rate, the 5 RCTs showed no statistical difference between the 2 groups while the 2 observational studies showed reduced mortality rates with patients who had invasive treatment. While the rates of major bleeding were generally low in both groups, 4 of the 7 studies still showed an increase risk in the invasive group.

Conclusion

Invasive treatment of NSTEMI in the elderly has generally been shown to improve primary outcomes of patients. However, this may come at the expense of an increased risk of major bleeding. Hence, further studies are necessary to fully evaluate the risk VS benefits.

Long Term Outcomes in Patients aged >85 years presenting with Type II Myocardial Infarction (Type II MI)

Introduction: There is a paucity of data regarding the presentation, management and the long-term outcomes of very elderly patients who suffer from a type II myocardial infarction.

Methods: A single-centre retrospective analysis of 956 consecutive patients aged >85 years presenting with NSTEMI between 2010-2018 was undertaken. Patients were stratified by type I vs Type II MI as defined by the 4th Universal Definition of MI. The primary outcome was all-cause long-term mortality ascertained by review of electronic medical records.

Results: Mean age of the cohort was 89±3 years and 43.8% were male. Of the 956 patients included, 477 (50%) suffered a type II MI. The predominant presentations of patients presenting with type II MI included delirium (34.3%), sepsis (18.4%), non-cardiac surgery (8.5%) and bleeding/anaemia (6.7%). Those with Type II MI were less likely to undergo invasive coronary angiography (2.5 vs 17.0%, p<0.001) and less likely to be prescribed aspirin (77 vs 84%) although rates of statin use were higher (78 vs 69%, p<0.001). In-hospital mortality was significantly higher in those with type II MI (21.1 vs 13.5%, p=0.002). Over a mean follow-up of 1.3 years, 444 patients died (46.4%). Despite higher in-hospital mortality, on multivariable Cox-regression, Type II MI was not significantly associated with higher long-term mortality (adjusted HR 1.1 95%CI 0.8-1.2, p=ns).

Conclusion: Type II MI is common in elderly patients and confers a high risk of in-hospital mortality. At present, there is a lack of evidence to risk stratify and guide treatment in this population.

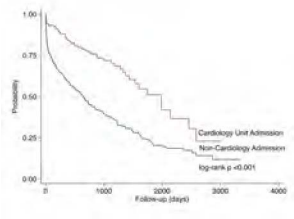
Do Patients over 85 years who Present with NSTEMI and Admitted Under General Medical Units Need Cardiology Consultation?

Introduction: Elderly patients presenting with Non-ST-elevation Myocardial Infarction (NSTEMI) are often admitted under a General Medical Unit rather than a Cardiology Unit. The impact of obtaining a cardiology consultation is unknown.

Methods: A single centre retrospective analysis of 763 consecutive patients aged >85 years who presented with a NSTEMI between 2010-2018 was undertaken. Patients were stratified according to whether a cardiology consultation was undertaken. Clinical characteristics, presentation and outcomes were collected through medical records review. The primary outcome was in-hospital mortality.

Results: Of the 763 patients included, only 274 (35%) had a cardiology consultation. Those receiving a cardiology consultation were more likely to be male, younger and without cognitive or mobility issues (all $p<0.001$). Guideline-directed medical therapy (GDMT) with aspirin, statin and beta-blockers was also more likely on patients who had cardiology consultation ($p<0.001$). On multivariable logistic regression, after adjusting for age, gender, mobility status and cognitive impairment, a cardiology consult was associated with improved in-hospital mortality (OR 0.56, 95%CI 0.36-0.88, $p=0.01$). However, when the same model was adjusted for GDMT, the association was no longer significant (OR 0.65 95%CI 0.41-1.03, $p=0.07$).

Conclusion: Very elderly patients presenting with NSTEMI and admitted under a general medicine unit less often received a cardiology consult. Cardiology input was associated with higher uptake of GDMT and improved outcome. Cardiology input should be sought in the management of very elderly patients with NSTEMI.

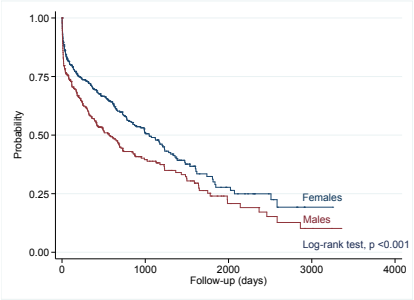

Cardiology Unit Admission
Non-Cardiology Admission
log-rank p <0.001

Is There a Gender Disparity in Characteristics and Outcomes for Patients Over 85 years Presenting with Non-ST-Elevation Myocardial Infarction (NSTEMI)?

Introduction: There is extensive research highlighting gender differences in the clinical presentation and outcomes of those presenting with acute coronary syndromes. Whether this is relevant to patients aged >85 years remains uncertain.

Methods: A retrospective analysis of 956 consecutive patients aged >85 years presenting with NSTEMI between 2010-2018 was undertaken. Patients were stratified by gender. The primary outcome was all-cause long-term mortality as determined by review of electronic medical records.

Results: Of the 956 patients included, 537 (56%) were female. Males were more likely to be smokers and have a history of myocardial infarction (both p<0.01) but there was no significant difference in the prevalence of diabetes, hypertension or dyslipidaemia between the groups. Males were more likely to undergo invasive coronary angiography (CA) during hospitalization (13.8% vs 6.5%, p<0.001) and had higher mortality 52.5% vs females 41.7%, (unadjusted HR 1.4, 95% CI 1.1-1.7, p<0.001). On Cox-proportional hazard modelling, after adjusting for age, prior MI, cognitive impairment, AF and invasive CA; male gender was the strongest predictor for long term mortality in this population (adjusted HR 1.7; 95%CI 1.4-2.1, p<0.001).



Conclusion: In this cohort of elderly patients presenting with NSTEMI, women had a lower rate of death despite men receiving more invasive management. This gender discrepancy favouring women is unique to the elderly population.

Uebergang E, [1,2], de Silva M,[2,3,4,5] Best S, [3,4,6] Finlay K [3,4,5,7]

Helping culturally diverse populations understand genomics: Recommendations for a clinical genomic testing resource.

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4. Murdoch Children's Research Institute, Parkville, Vic., Australia;
5. Victorian Clinical Genetics Services, Parkville, Vic., Australia;
6. Australian Institute of Health and Innovation, Macquarie University, NSW., Australia;
7. Genetic Support Network of Victoria, Parkville, Vic., Australia;

Aim
As genomic testing is increasingly incorporated into routine healthcare, it is crucial that educational resources meet the needs of patients from culturally and linguistically diverse (CALD) backgrounds, who may face greater challenges in comprehending health information that is not presented in their first language. The aim of the study was to evaluate recently developed genomic resources from the perspective of the CALD community and make recommendations for future research and for the development of a clinical genomic testing resource to assist patients from CALD backgrounds.

Methods
The exploratory, sequential, mixed methods research design employed a survey followed by face-to-face interviews. The survey was completed by healthcare interpreters (n=18) from two hospitals in Melbourne during March 2019. Views were sought about the utility of genomic resources and interpreter satisfaction with patient understanding. Descriptive data analysis provided themes for the interviews with individuals from CALD backgrounds (n=4) held during June 2019 to evaluate genomic testing resources.

Results
Survey results suggest that interpreters were somewhat satisfied (n=6) with patient understanding, however concern was raised over cultural differences regarding consent and testing. Interpreters encouraged the use of simplified explanations and easy to read resources with engaging graphics. Interview results indicate that understanding of genomic concepts by individuals from CALD backgrounds was limited. Recommendations were consistent with previous research and included additional visual content, further explanation of genomic terms and testing outcomes, and minimal jargon.

Conclusion
Developing educational resources on genomic testing for patients from CALD backgrounds can be challenging as genomic testing is not common in other cultures and there is a lack of widely accepted genomic lexicons in other languages. It is therefore essential that CALD communities have a strong voice in the development of a genomic resource to help individuals better understand genomic testing and its implications.

Rita Panagiotaropoulos., Dr. Matthew Ng, *Prof Ian Baldwin

*Austin Health, Dept. Of Thoracic and Cardiac Surgery, *Dept of Intensive Care and Clinical Education Unit.*

Underwater Seal Drainage - Principles and Checklist Tool

Aim.

Under Water Seal Drains (UWSD) are managed by nurses and doctors in acute care locations. These devices drain air and fluid from the chest.

A large deficit was noted in the documentation and fundamental understanding around the care of these drains outside of the Thoracic and Cardiac surgical wards and Intensive Care. This led to delays in removal of drains and subsequent patient discharge, and increased the potential risk of morbidity associated with leaving the drains in situ longer.

We designed an 'UWSD Principles and Checklist Tool' using a picture and checklist style document. Intended for immediate reference , is colorful and an educational tool for nurses, doctors, and allied health. A supplement to Austin policy documents.

Method:

The tool was provided to 35 bedsides where the UWSD was in use during ICU care. Feedback and suggestions were welcomed as free hand notes and more (write over/ include text and picture feedback / ideas/ request clarity) , with the view to finesse the document and transform into a final bedside resource.

A return envelope for the ICU Educator office mail was provided for anonymity. All three investigators independently reviewed the returned tool documents using an agreed classification alignment for frequency.

Results: 20 were returned complete with feedback.

Presentation /colours/ layout	7
Pics / schematics	9
Extra content to add	13
Excess content to remove	2
Clarification/ wording:	14
Feedback text	14

Conclusion:
The frequency classification feedback reflects need for more but clearer content. The colour and picture use rated highly.
Our plan is to roll out the revised version to all with UWSD in use. We also plan to design a Smart phone App for UWSD as a result of this project and using some of this learning.

Brunorio L, Baldwin I, Peck L, Eastwood G, Young H.

Limb restriction in Austin Health intensive care

Intensive Care Unit of Austin Health, Heidelberg, Vic., Australia

Aim

This study aims to identify the incidence and classification for limb restrictions in patients admitted to the Austin Intensive Care Unit (ICU). This is part of a quality improvement project with the principal objective to improve the early and sustained identification of limb caution and restricted use in critically ill patients.

Methods

From April to June 2019, 100 patients admitted to the ICU were evaluated for limb restrictions and associated demographics. The data was collected within 24 hours of admission. Clinical notes and the initial Care Plan were screened for mention of 'limb alert' and medical devices in use with limbs.

Results

All patients had at least one medical device in their limbs with PIVC and arterial line being the most common devices with 49% and 36%, respectively.

Twenty-three per cent of the patients were found to have limb restrictions but none of them had any kind of 'limb alert' warning/advice in use. The most common reasons for limb restriction were peripheral vessel (arterial and venous) removal for CABG (70%), PICC (10%), orthopaedic procedures (6%), femoral arterial sheath post PCI, IABP, post femoral artery clot removal, foot haematoma/cellulitis, lower limb wounds all 3%.

Conclusion

Patients admitted to the ICU have limb restrictions which have not been well identified and communicated to clinicians. Moreover, these patients in ICU will have medical devices attached or in their limbs and makes the inappropriate use of their restricted limbs more likely when unconscious and or sedated.

PIVC – Peripheral Intra-venous Catheter

CABG - Coronary Artery Bypass Graft

PICC – Peripheral Intravenous Central venous Catheter

IABP – Intra Aortic Balloon Pump

PCI – Percutaneous Coronary Implant

Yanase F[1,2], Bitker L[1], Cutuli SL[1], Wilson A[1], Eastwood GM[1], Bellomo R[1].

HAEMODYNAMIC EFFECT OF HARTMANN'S SOLUTION VS 4% ALBUMIN FLUID BOLUS THERAPY AFTER CARDIAC SURGERY

1. Austin Hospital ICU, Heidelberg, Vic., Australia;
2. Monash University School of Public Health and Preventive Medicine

Aim
The hemodynamic effect of the administration of Hartmann's solution (Compound Sodium Lactate [CSL]) compared with 4% albumin fluid bolus therapy (FBT) after cardiac surgery is unknown. The aim of this study is to evaluate hemodynamic changes following a single fluid bolus of either CSL or 4% albumin after cardiac surgery

Methods
We performed a single-centre prospective observational study of adult cardiac surgery patients admitted to the ICU. Patients received a single bolus of 500 mL of either CLS (n=25) or 4% albumin (n=25). We assessed cardiac index (CI) and mean arterial pressure (MAP) at baseline, 0, 15 and 30 minutes after FBT. The decision to give FBT was that of the treating clinician. Ventilation and intravenous drugs were kept unchanged during the observation period.

Results
We studied 50 patients. There were no baseline differences for sedative drug dose or catecholamine use. The primary indication for FBT was mostly hypotension in the two groups (60% the CSL group and 80% in the albumin group). A cardiac index (CI) response, defined as a 15% increase from baseline, was observed in 44% of CSL patients and 48% of albumin patients. The CI value was almost same at 0 minutes after FBT (2.5 [2.3; 2.7] in the CSL group and 2.4 [2.2; 2.7] in the albumin group); however, the CI was statistically lower in CSL patients than in albumin patients at 30 minutes after FBT (2.3 [1.9; 2.7] and 2.5 [2.1; 2.8], respectively). There was no difference in MAP response between the two groups.

Conclusion
A 500 ml fluid bolus of CSL or 4% albumin had an equivalent immediate effect on CI. However, after 30 minutes the effect was greater with 4% albumin. The effect of blood pressure was similar.

Yanase F[1,2], Bltker L[1,3], Hessels L[1,4], Osawa E[1], Naorungroj T[1,5], Cutuli SL[1], Young PJ[6], Ritzema J[6], Hill G[6], Hunt A[6], Eastwood GM[1], Hilton A[1], Bellomo R[1,2].

A Pilot, Double-Blind, Randomized, Controlled Trial of High-dose Intravenous Vitamin C for Vasoplegia after Cardiac Surgery

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Aim

The hemodynamic effect of high dose vitamin C in patients with vasoplegic shock after cardiac surgery has not been studied. The aim of this study is to conducted a pilot feasibility and physiological efficacy study of the intravenous administration of high dose vitamin C in patients with vasoplegic shock after cardiac surgery.

Methods

We randomly assigned cardiac surgery patients with vasoplegic shock to receive high dose intravenous vitamin C (1,500 mg every 6 hours) or placebo. The primary efficacy outcome was time from randomisation to vasoplegic shock resolution. Secondary efficacy outcomes included total dose of norepinephrine in the first 2 days after randomisation, ICU length of stay, ICU mortality, and in-hospital mortality.

Results

We studied 50 patients (25 patients in both arms) from November 2017 to October 2018. The mean ± standard deviation (SD) time to vasoplegic shock resolution was 27.0 ± 16.5 hours in the vitamin C group vs 34.7 ± 41.1 hours in the placebo group (P=0.40). The median dose of norepinephrine in the first two ICU days was 64.9 µg/kg (23.5 to 236.5) and 47.4 µg/kg (21.4 to 265.9) in the vitamin C and placebo group, respectively (P=0.75). The median duration of ICU admission was similar in the two groups (1.4 days [0.5 to 2.5] in the vitamin C group and 1.5 days [0.5 to 3.3] in the placebo group; P=0.36). Only one patient (vitamin C group) died.

Conclusion

In this pilot study of cardiac surgery patients with postoperative vasoplegic shock, blinded high dose vitamin C infusion was feasible and appeared safe but did not achieve faster shock resolution than placebo.

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Comparison of the Australian Referral Criteria for Liver Transplant Versus the King's College Criteria for Mortality and Morbidity in Paracetamol Overdose

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Aim
Paracetamol overdose is common and can lead to fulminant hepatic failure. In cases that are not improving with standard medical therapy, some patients may require liver transplant. The King's College criteria (KCC) is the most widely used survival predicting model, but it is limited by its low sensitivity. The Australia and New Zealand (ANZ) referral criteria incorporates additional markers that has not been extensively studied. The focus of this study was to compare the ANZ referral criteria versus the KCC for predicting mortality and morbidity in paracetamol overdose.

Methods
This study involves a retrospective analysis of 983 patients presenting to the Austin Hospital between January 2010 to March 2019 with paracetamol overdose requiring treatment with N-acetylcysteine. The primary outcome was death or transplant. Sensitivity and specificity, along with associated ROC curves were determined for both models. Binary logistic regression was performed on both criteria, subsequent backward stepwise elimination was applied.

Results
A total of 481 cases were identified who met inclusion criteria. 18 cases (3.7%) met the composite endpoint of death or transplant. The ANZ criteria has a higher sensitivity (100%, 95%CI 81.5,100), but lower specificity (88.3%, 95%CI 85,91.1) than the KCC. The ROC AUC for the KCC is 0.868 (95% CI: 0.760, 0.977), the ROC AUC for the ANZ referral criteria is 0.627 (95% CI: 0.547, 0.707). Cohen's Kappa was calculated to be 0.449, showing moderate agreement between the two criteria. On logistic regression after backward stepwise elimination, the final regression model for the KCC included 3 variables: serum creatinine >300mmol/L, pH <7.3 and high-grade encephalopathy. The final model for the ANZ criteria included serum creatinine >200mmol/L, pH <7.3 and systolic hypotension.

Conclusions
The ANZ referral criteria compared to the KCC was more sensitive for the outcome of mortality and transplant. This is important for screening patients that may become unstable and difficult to transfer at a later stage of their admission. Further development on the ANZ referral criteria should consider a combination of the 3 variables: serum creatinine, persistent acidosis and systolic hypotension as higher risk predictors.

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Proportion of patients who transition to long-term opioid use following oxycodone initiation in the ED

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Background

Opioid initiation in the emergency department (ED) may contribute to long-term opioid use in initially opioid-naïve patients. A proportion of individuals treated with long-term prescription opioids will use the opioids in a non-medical manner, which carries the risk of dependence and subsequent use of non-prescription opioids including heroin.

Aim

To estimate the trajectory of patients discharged from ED with a prescription for oxycodone immediate release (IR) that transition to long-term use, and of those patients that transition to long-term use, the proportion that potentially transition to injectable heroin use.

Method

We estimated the number of patients who may become long-term opioid users following ED oxycodone IR initiation (variable LO) as modelled by the equation: $LO = A \times B \times C \times D$, where variable A = number of patients with a script for oxycodone IR on discharge from a tertiary referral ED; B = estimation of incidence of opioid-naïve patients; C = estimation of the proportion of discharge scripts filled; and D = estimation of incidence of long-term opioid use at 1 year.

To estimate the proportion of long-term opioid users (variable LO) who may transition to injectable heroin use (variable H), we subsequently derived a second equation, $H = LO \times E \times F$, where variable E = estimation of proportion of patients who develop an opioid use disorder; and F = estimation of the proportion that transition to injectable heroin use.

Each variable was derived from a combination of local and published data.

Results

There were 87,551 ED presentations with 4,856 individual oxycodone IR prescriptions prescribed from 1st January to 31st December 2018. Using our initial equation, we estimated that 330 patients may become long-term opioid users at 1 year following their initial ED presentations.

Using our second equation, we estimated that of those 330 patients, 1.7 patients may potentially transition to injectable heroin use.

Conclusion

Initial opioid exposure in the ED may be a segue to unintentional long-term opioid use.

Elmi H,[1] Pisasale D,[1] Taylor S,[1] Kebire O,[2] Abbott L[2]

Ketamine in the emergency department: identifying a dose strength to minimise medication errors and diversion.

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Aim
Ketamine is commercially available in a 200mg in 2 ml vial. This study was undertaken in response to a series of medication errors associated with administration of very small doses of ketamine in the emergency department (ED). The study aimed to describe ketamine prescribing patterns, including the most commonly used incremental doses.

Methods
A multicentre retrospective audit was undertaken of patients who presented to two mixed adult/paediatric EDs (a metropolitan and a regional hospital) in July 2016 - June 2017 and received one or more doses of ketamine. Electronic databases were utilized to extract relevant patient data using an explicit data collection tool.

Results
Ketamine was administered to 252 patients (483 doses). The indication was procedural sedation (167 patients, 66.3%), non-opioid analgesia (71 patients, 28.2%) and rapid sequence intubation (14 patients, 5.6 %). The most common incremental dose was ≤ 20 mg (269 doses, 55.7%), followed by 21-50mg (135 doses, 28.0 %). Overall, 132 (52.4%) patients required a single dose only, while 193 (76.6%) patients required no more than two doses.

Conclusion
Ketamine was primarily used for procedural sedation, non-opioid analgesia and occasionally intubation. Over half of incremental ketamine doses documented were 20mg or less, suggesting that 20mg in 1 mL may be an appropriate dose form, particularly for paediatric patients, to reduce the risk of medication errors. Similar studies in additional EDs would help to inform the appropriate magnitude of a smaller ketamine dose-form.

Keith C[1], Ear L,[1] Taylor S[1]

A nine-year case-series: cefalexin hypersensitivity reactions – not so rare and not so benign

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Aim
Although some older antibiotics have well known class adverse effects, professionals can become complacent – both around hypersensitivity risks (particularly for non-penicillins) and regarding the necessity for thorough documentation and follow-up. We anecdotally noticed a trend around emergency department (ED) presentations due to cefalexin hypersensitivity. Published data regarding specific cefalexin allergy events is sparse. This study aimed to describe the nature of cefalexin-related hypersensitivity reactions reported to a tertiary hospital Adverse Drug Reaction (ADR) committee.

Methods
Patients with an ADR potentially due to cefalexin, between 2010 – 2019 were identified from the hospital ADR database. Patient demographics, ADR details and follow-up were extracted from the database. An explicit electronic medical record review was also undertaken.

Results
Overall, 66 patients were identified (49 females; 6.1% < 18 years, 16.7% > 80 years). In 15 (22.7%) cases, a second potential medication was also implicated. The ED or short stay unit provided 41 (62.1%) reports. For 51 (77.3%) cases, the reaction occurred in the community, whilst the remainder occurred in hospital. Anaphylaxis, angioedema and rash were identified in 16 (24.2%), 8 (12.1%) and 39 (59.1%) cases, respectively. Single cases of neutropenia, leukocytoclastic vasculitis and acute interstitial nephritis were reported. Four reactions were deemed to be certain and 33 (50.0%) were probable; 24 (36.4%) were deemed to be severe and 30 (45.5%) were of moderate severity.

Conclusion
ADRs to cefalexin often occur in the absence of other potential exposures, and can be severe. Cases commonly present via the ED and may benefit from formal allergy testing and recommendations, particularly in patients with chronic medical conditions who may require frequent antibiotic courses.

Aminian P, Su E, Liew D, Lalic S, Wilsdon T, Liu B, Jammali-Blasi A, Frauman A, Garrett K

An organisational approach to Australia's opioid epidemic

Aim

Inappropriate use of prescription opioids has led to a new epidemic in Australia. Studies suggest that about 10% of opioid-naïve patients receiving opioids on discharge from hospital become long-term users.[1] In response to this growing public health issue, our Medicines Optimisation Service (a joint Pharmacy and Clinical Pharmacology initiative) has developed a framework for collaborative opioid stewardship.

Method

Each stage of the patient journey through our health service was critically analysed, including outpatient, inpatient and community care. This enabled identification of potential barriers to optimal opioid management and engagement with clinicians who are currently leading initiatives and research to improve opioid management. Through extensive collaboration with physicians, physiotherapists, nurses, community carers and pharmacists, we developed a working action plan that highlights our hospital's existing services and initiatives, depicts opportunities for improvement, and provides a framework for measuring the effectiveness of interventions. We then convened a hospital-wide Opioid Roundtable to provide a forum for clinicians and advocates to connect and discuss current successes and challenges in appropriate opioid use, and to derive consensus on our shared aspirations and possible pathways forward.

Results

Our approach to opioid stewardship has culminated in an Opioid Management Consensus and Action Plan, a document outlining our aspirations for optimal opioid management and highlighting priority actions for the coming year. This consensus document will guide the formation of working parties to take action in priority areas including improving communication at transition of care, prescriber and patient education, and identifying patients at risk of opioid misuse.

Conclusion

Our opioid stewardship framework allows for replicability by other institutions and could be a powerful tool in helping organisations to achieve goals in providing optimal opioid care.

Reference

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Su E, Wilsdon T, Liew D, Yu C, Ting A, Kalogianis M, Le D, Nguyen S, Balassone J, Lalic S, Aminian P, Liu B, Jammali-Blasi A, Leung C

A systems-based approach to deprescribing PPIs

Aim

It is recommended that proton pump inhibitors (PPIs) are regularly reviewed and reduced to the lowest effective dose or stopped if no longer required. Barriers to achieving this in hospital include: clinician knowledge of appropriate indications and duration; lack of systems to guide deprescribing and monitoring; and discharge summary documentation to facilitate ongoing care. We used a systems-based approach to address barriers to PPI deprescribing in hospital.

Method

A hospital PPI deprescribing guideline was published in June 2018. In March 2019, further actions were implemented:

- Educational posters to promote guideline recommendations
- Electronic inpatient orders (within Cerner) to help clinicians identify indications for deprescribing PPIs and chart appropriate step-down doses or alternative treatments
- Cerner discharge orders to facilitate documenting PPI deprescribing and monitoring plans on prescriptions and discharge summaries.

Results

Retrospective audits of PPI prescribing for acute inpatients on 30/4/18, 31/7/18, 31/10/18, 31/1/19, and 30/4/19 were conducted. On average, 200 inpatients were charted PPIs on each date; 84% could have been considered for deprescribing according to the guideline (due to potentially inappropriate indication or dose). At 30/4/18 (pre-guideline), there were 31 deprescribing attempts from 161 potential opportunities (19.3%); at 31/7/18, 31/10/18 and 31/1/19 (post-guideline), deprescribing attempts were 45/174 (25.9%), 38/167 (22.8%) and 35/165 (21.2%). At 30/4/19 (post-implementation of Cerner deprescribing orders), deprescribing attempts were 43/174 (24.7%). Statistical comparisons between pre- and postintervention dates using the chi-squared test did not identify differences ($p>0.05$).

A review of discharge summaries found 8 discharge summaries documenting PPI deprescribing from 1/3/18-28/2/19 (12 months pre-Cerner orders). From 1/3/1931/5/19 (3 months post-Cerner orders), there were 64 discharge summaries documenting PPI deprescribing.

Conclusion

A guideline and Cerner deprescribing orders were not effective in significantly increasing the number of PPI deprescribing attempts on acute wards. However, use of Cerner orders improved documentation of PPI deprescribing in discharge summaries.

Su E, Aminian P, Liew D, McGrath A, Tanner F

Keeping it cool! A systematic approach to cold chain management

Aim

It is essential to have effective processes to ensure that refrigerated medicines are maintained between 2-8°C to preserve their safety and efficacy. Processes are also required to investigate and take action in the event of a cold chain breach.

Our organisation has critically analysed the transport of temperature-sensitive medicines around the hospital to identify and address areas of cold chain breach risk. We have also developed a management process to investigate and raise staff awareness of cold chain breach events.

Method

After identifying areas of cold chain breach risk, the following interventions were implemented:

- New store system of unpacking cold chain deliveries into fridges within 30 minutes of arrival
- Standardised cooler box packing procedures
- Changed pharmacy dispensing workflows to improve labelling and storage of temperature-sensitive medicines
- Improved labelling of refrigerated medicines in After Hours area
- Calibrated cooler box to maintain 2-8°C during courier transport within the hospital
- Temperature-monitored vaccine cooler box in outpatient clinics

A cold chain breach management process was implemented to provide clear guidance in the event of a breach. This involved:

- Setting up an electronic record to document cold chain breach events. This sends an email alert to pharmacy staff to raise awareness of cold chain breach risks and triggers investigation and follow up.
- Developing cold chain breach stickers to identify medicines with temperature excursions and adjusted expiry dates.

Results

Interventions to address cold chain breach risks have minimised the time that refrigerated medicines may be exposed to temperatures outside 2-8°C. Since its implementation, our cold chain breach management process has identified 10 cold chain breach events, leading to raised staff awareness of risks and prompting preventative actions.

Conclusion

Our model for identifying and documenting cold chain breach events allows for systematic investigation and risk minimisation, and may be replicated by other institutions.

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Evaluation of communication to General Practitioners when opioid-naïve post-surgical patients are discharged on opioids

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Aim
The opioid crisis has seen increased focus on minimising opioid quantities supplied to surgical patients on discharge. Research is limited regarding how hospitals communicate post-operative opioid prescribing information to General Practitioners (GPs) responsible for ongoing care. The aim of this study was to evaluate communication to GPs when opioids are prescribed for opioid-naïve post-surgical patients.

Methods
This study comprised two components: an evaluation of hospital discharge summaries, and a GP survey. A retrospective audit of discharge summaries for opioid-naïve surgical patients supplied with an opioid on discharge in January 2018 was conducted. Summaries were evaluated for accuracy relating to name, strength, dose and quantity of opioids supplied and presence of an opioid management plan (OMP). A GP survey was distributed electronically by two Primary Health Networks and mailed to GPs of patients in the discharge summary evaluation. The survey sought opinions regarding: quantities of opioids supplied, adequacy of communication about opioids prescribed in discharge summaries, challenges experienced in managing these patients and suggestions for improvement.

Results
Discharge summaries for 285 patients given an opioid upon discharge were reviewed. 27 (9.5%) patients had no summary completed. Of the remaining 258, 214 (83.0%) summaries accurately listed the opioid(s), whilst 33 (12.8%) contained an OMP. In the 57 GP surveys completed, 41 (71.9%) GPs stated they rarely or never receive an OMP and 34 (59.7%) were dissatisfied or very dissatisfied with information provided about opioid supply and management. Responses were mixed regarding quantity of opioids supplied, with 22 (38.6%) stating the quantity was usually appropriate. Qualitative responses highlighted difficulties GPs experience managing these patients, differing patient expectations regarding treatment duration and the need to improve communication at transition.

Conclusion
When opioids are commenced in surgical patients, communication between hospitals and GPs is poor. Future interventions should focus on strategies to improve this.

McLachlan G [1], Keith C [1], Wood C [1]

The cost of pharmacovigilance: a time-and-motion study of an adverse drug reaction program

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Aim:

Austin Health has a well-established pharmacovigilance program with a multidisciplinary committee that meets every two weeks to review adverse drug reactions (ADRs) reported at our health service. The pharmacovigilance program is managed by medicines information pharmacists, who review each patient's reaction, complete an ADR form, and present to the committee. We organise follow up, including communication to patient and general practitioner, electronic prescribing system alerts, and reporting to Therapeutic Goods Administration (TGA). It is estimated that our health service reports, on average, about 15% of the ADRs received by the TGA from hospitals annually.

The pharmacovigilance program is highly valued, but the demanding scale of work involved has not been quantified in the literature. We decided to undertake a time-and-motion study of the tasks involved in handling an ADR report from the time of initial report to finalisation.

Methods:

Pharmacists working in medicines information recorded the time spent processing ADRs, including write-up, database entry, development of the meeting agenda, updating the database following the meeting and communication to the patient, general practitioner and TGA. This data was collated in an Excel spreadsheet for analysis. The data was collected for a two-month period, spanning four committee meetings and 54 adverse drug reaction reports.

Results:

The average time taken to handle an ADR from start to finish was 71 minutes. With 337 reports in 2018, this extrapolates to 399 hours or 16% of the medicines information office time, with an annual labour cost of just over $20,000.

Conclusion:

We know there are advantages to having a rich ADR database with more than 2,500 reports, including medication safety benefits at an individual and macro level, and the ability to identify, report, and publish on noted trends. However, a structured pharmacovigilance program is time and resource intensive.

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Euglycaemic diabetic ketoacidosis with SGLT2 inhibitors: is it more than just a perioperative problem?

Objective: Sodium-glucose co-transporter 2 (SGLT2) inhibitors, including dapagliflozin, empagliflozin and ertugliflozin, are established second line agents for treatment of type 2 diabetes, with potential benefits of weight loss and cardiac/renal protection. However, there are increasing reports of rare side effects, including ketoacidosis, genital infection and necrosis. We describe our experience with euglycaemic diabetic ketoacidosis to highlight the vital role pharmacists can play in monitoring for and preventing this rare side effect.

Clinical Features: We report a case series of 13 events of diabetic ketoacidosis documented by our adverse drug reaction (ADR) committee; of which only three were associated with the perioperative period. Ten cases were assessed as *severe* by our ADR committee, usually warranting an ICU admission. Eleven cases were assessed as *probably* due to the SGLT2 inhibitor. Upon presentation eleven cases had a blood sugar concentration of <13 mmol/L, hence were classified as euglycaemic diabetic ketoacidosis. Other potential contributing factors included concurrent illness, poor oral intake, low carbohydrate diet, and weaning insulin doses.

Literature review: Euglycaemic ketoacidosis is well described with SGLT2 inhibitors, though reports and warnings are mostly associated with the perioperative period.

Pharmacist interventions, case progress and outcomes: Pharmacists were involved in the identification of most cases reported to our ADR committee. The majority of patients recovered from the reaction and were changed to other diabetes medicines. Clinical documentation (including reporting to the Therapeutic Goods Administration) and electronic prescribing system safety alerts were undertaken. Pharmacists are involved in updating local hospital guidelines and education.

Conclusions: Euglycaemic ketoacidosis can occur in patients who are acutely unwell or have poor oral intake. Pharmacists play a vital role in monitoring and preventing this rare but serious side effect. When a patient is admitted on SGLT2 inhibitors we should think ‘Is my patient eating and drinking normally?’

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Opioid use following total knee or hip arthroplasty- not always a case of oversupply

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Aim
Effective pain management following joint arthroplasty is essential for optimal participation in rehabilitation. However, this needs to be balanced with potential risks associated with opioid use and community opioid exposure. The aim of this study was to evaluate opioid use and appropriateness of supply on discharge following total knee arthroplasty (TKA) or total hip arthroplasty (THA).

Methods
A prospective observational study was undertaken at an Australian 980-bed major metropolitan health service. Patient telephone interviews were conducted 3-weeks after hospital discharge to evaluate analgesic use and management, and functional outcomes. The primary endpoint was the number of opioid pills remaining 3-weeks post-discharge, with one opioid pill considered equivalent to 5mg oxycodone. Secondary endpoints included:

· Factors associated with opioid use 3-weeks post-discharge;

· Opioid use in patients with poor functional outcomes;

· Proportion of opioid naïve patients who became chronic opioid users.

Results
140 patients were included, and 137 were supplied opioids on discharge. At 3-weeks post-discharge, the median number of opioid pills remaining was 0 (IQR 0-8). There were 77 (56.2%) patients still taking opioids; surgery type, opioid use prior to admission and the number of “as required” doses used 24 hours prior to discharge, were independent predictors of opioid continuation. Patients with poor functional outcomes were supplied with more opioids on discharge, often not satisfied with the quantity supplied and were more likely to be taking opioids 3-weeks post-discharge. There were 5/93 (5.3%) pre-operatively opioid naïve patients who developed chronic opioid usage.

Conclusion
More than half of patients undergoing TKA or THA were still using opioids at 3-weeks post-discharge. Most patients were not supplied with excessive quantities at discharge. Future research should focus on identifying patients at risk of prolonged opioid use and improving the transition of these patients into the community.

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A collaborative approach between pharmacy and general medicine to improve flow and medical staff satisfaction.

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Aim
Health services are under pressure to accommodate increasing numbers of emergency department presentations, which can contribute to prescribing errors and medication discrepancies. The aim of this study was to evaluate the effect of an integrated pharmacy service provided to the general medical units on patient flow and medical staff satisfaction.

Method
Four week pre- and post-intervention study involving general medical units at a major metropolitan hospital in Australia. During the intervention period, an integrated clinical pharmacy service, which included attending medical ward rounds and assisting in the preparation of discharge prescriptions, was provided to medical units. The primary endpoint was the median time (minutes) past 9am that patients were discharged from the ward. Secondary outcomes included the proportion of prescriptions requiring an amendment and medical staff satisfaction with the service.

Results
There were 87 and 84 patients discharged from the medical units pre- and post- intervention. During the intervention period, pharmacists prepared 79% of prescriptions which reduced the proportion requiring an amendment from 65% to 17% ($p<0.01$). Patients were discharged 77 minutes earlier during the post-intervention period (median 380 vs. 303 minutes past 9am, $p=0.03$). Medical staff felt the integrated clinical pharmacy service improved patient flow, improved workflow and allowed for greater opportunities to learn and therefore should be incorporated into standard practice.

Conclusion
An integrated clinical pharmacy service with proactive pharmacist intervention within the general medical units improved patient flow by decreasing the proportion of prescriptions requiring an amendment and reducing the time taken to discharge patients from the ward. Additionally, this study improved medical staff satisfaction and demonstrated that an inter-professional collaboration can provide unique learning opportunities to medical staff.

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Evaluation of the safety of induction chemotherapy in obese patients with acute myeloid leukemia: a retrospective pilot study.

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Background
Standard practice is to dose chemotherapy according to patients' body surface area (BSA). Controversy exists regarding dosing of obese patients with acute myeloid leukemia (AML), particularly whether giving the full dose according to their BSA increases the risk of toxicity that may increase the length of hospital stay.

Aim
This study aimed to compare toxicity and length of stay in obese and non-obese patients treated for AML with induction chemotherapy using the 7+3 protocol (cytarabine and idarubicin) at a full dose according to their BSA.

Methods
This was a retrospective observational study of patients treated for AML at Austin Health between 2009-2019, with their first cycle of 7+3 induction chemotherapy. Patients with modifications to their induction doses due to renal, hepatic or cardiac disease were excluded. Patients were stratified into obese (BMI $\geq$30) and non-obese (BMI<30) groups. Baseline demographics, treatment progress and adverse events were extracted from electronic medical records.

Results
Over the decade, 54 patients received the cytarabine and idarubicin 7+3 induction regimen; 18 (33.3%) were obese and 36 (66.7%) were non-obese. Ocular toxicity occurred at approximately one-week post dose administration in both groups but was more prevalent in the obese group (27.8% versus 13.9%, p=0.39). Acute cardiotoxicity was noted in 61.1% and 58.3% of non-obese and obese patients, respectively at a median of 4 days post dose. The median (interquartile range) length of stay was 28 (26–33) and 29 (27–34) days for non-obese and obese patients, respectively.

Conclusion
This pilot study has shown that obese patients with AML being treated with 7+3 induction chemotherapy have similar risk of cardiotoxicity and duration of hospital stay. Obese patients may have a greater prevalence of ocular toxicity, but this needs further investigation in larger, multi-centre studies.

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Can you trust adverse drug reaction recording? An audit of electronic medical records

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Background
Electronic medical records (EMR) enable recording of adverse drug reaction (ADR) information in a structured manner, and reduce the need for repeated documentation upon each new episode of care. However, inaccuracies in ADR documentation can endure. Assigning an 'allergy' label to a patient incorrectly has been shown to have a negative impact on the provision of optimal pharmacotherapy and patient outcomes.

Aim
To determine the completeness of ADR documentation (drug, reaction and severity) and the accuracy of classification of patients' ADRs as allergy versus intolerance in the EMR.

Methods
A cross-sectional audit was undertaken at a major tertiary hospital across three days spaced over three weeks. The EMR of patients admitted to four wards (surgical, medical, oncology/haematology and aged care) were reviewed to collect data on patient demographics and ADR documentation: drug, reaction, severity and ADR-type (allergy or intolerance). Based on the reaction described, ADRs were classified by an investigator as likely to be an allergy or intolerance, and this was compared to the ADR-type recorded in the EMR.

Results
There were 264 patients included in the study, and 102 (38.6%) had at least one ADR documented. Of the 210 recorded ADRs, 63 (30.0%) did not detail the associated reaction, and 90 (42.9%) did not specify severity. Only 105 (50.0%) ADRs had drug, reaction and severity documented and were considered complete. Of the 147 ADRs that specified a reaction, 97 (66.0%) were judged to correctly match the classification of the ADR-type (allergy versus intolerance) determined by the investigator.

Conclusions
ADR documentation in the EMR was found to be poor, with a high proportion missing key data including reaction and severity. Where it could be evaluated, the ADR-type was frequently classified inaccurately. This identifies a need to improve current processes for documentation and review of ADRs in the EMR.

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Opioid Burden is Reduced in Lower Back Pain Inpatients admitted Under Rheumatology, but not General Medicine

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Aim:

To explore the trajectory and determinants of inpatient opioid use for patients admitted for lower back pain. Low back pain commonly require admission and is a strong indication for prescription of opioid-based analgesia, with a significant economic and health burden to Australian adults.

Methods:

Patients with a diagnosis of non-specific low back pain admitted under General Medicine and Rheumatology, between July 2012 and July 2018, were selected from the health-care system electronic database. We collected daily “oral morphine equivalents” (OMEs), average daily pain scores and demographic data. A time-series mixed-effects model was used to examine the time-dependent trajectory of daily OMEs and its relationship with patient and unit factors.

Results:

294 inpatient admissions were analysed. In the mixed-effects model, average daily OME was found to be 13.3mg higher in rheumatology patients (95% CI 4.1 – 22.3). Average daily reduction in OME was 1mg/day (95% CI 0.6 – 1.4) greater in the rheumatology cohort, or a reduction of 7mg/day by the end of an average 7-day admission. Higher pain scores ($p < 0.01$) and longer length of stay ($p < 0.01$) were also found to be correlated with greater average daily OME. The uncorrected analysis revealed no reduction in OME by the end of hospitalisation ($p = 0.28$).

Conclusion:

Our study demonstrates no average reduction in opioid use amongst patients admitted for lower back pain, however unit differences in this trajectory warrants investigation of the possible role of different therapeutic practices in reducing opioid burden.

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Targeting the thalamic centromedian nucleus for deep brain stimulation: visualisation, intraoperative neurophysiology, and fMRI connectivity

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Aim

Deep brain stimulation (DBS) of the thalamic centromedian nucleus (CM) is an emerging therapy for drug-resistant epilepsies, including Lennox-Gastaut syndrome (LGS). Previous DBS trials used stereotactic atlases to target CM, potentially failing to accommodate inter-patient variability in thalamic anatomy. We aimed to improve targeting by (i) developing a structural MRI approach for patient-specific CM visualisation, (ii) identifying the CM's neurophysiological signatures, and (iii) mapping the CM's connectivity with functional MRI (fMRI).

Methods

Nineteen patients with LGS (mean age=28 years) underwent pre-surgical 3T MRI using Magnetisation-Prepared-2-Rapid-Gradient-Echoes (MP2RAGE) and resting-state fMRI sequences; 16 patients proceeded to CM-DBS implantation (Medtronic 3389) and intraoperative microelectrode recordings. CM visualisation was achieved by processing MP2RAGE scans using a Sobel image filter. Linear mixed-effects analysis compared two microelectrode features (spike firing rate, background noise) between the ventrolateral, CM, and parafasicular thalamic nuclei. Resting-state fMRI connectivity was explored using implanted DBS electrode positions as regions-of-interest; areas of significant fMRI connectivity were summarised by calculating spatial overlap with a meta-analytic database of intrinsic connectivity networks[1].

Results

CM was visualisable on Sobel-filtered MP2RAGE scans. At the group-level, microelectrode recordings revealed that reduced spike firing and background noise distinguished CM from the ventrolateral nucleus; however, inspection of individual patient data showed some variability, with 20-25% of microelectrode trajectories deviating from the group-level trends. CM-DBS fMRI connectivity was maximal with networks supporting interoceptive, motor/visuospatial, cerebellar, and auditory/motor speech processing[1]. In contrast, connectivity was less apparent with default-mode, frontoparietal, and visual networks[1].

Conclusion

Accurate targeting of CM is achievable using structural MRI at clinically available field strength (3T). Intraoperative neurophysiology may assist with additional localisation of CM in some cases; however, further characterisation of individual patient variability is warranted. Therapeutic effects of CM-DBS may be mediated via modulation of distributed subcortical and cortical networks with which CM stimulation sites show strong functional connectivity.

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259/300 words

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Double somatic mosaicism in a child with Dravet syndrome

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Aim: Dravet syndrome, the prototypic infantile-onset developmental and epileptic encephalopathy, occurs secondary to *de novo* pathogenic variants in *SCN1A* in over 80% of cases. We aimed to determine whether post-zygotic mosaic variants could be the cause in individuals with molecularly unsolved Dravet syndrome.

Methods: We performed sequencing of *SCN1A, SCN2A, SCN8A, HCN1, GABRA1, GABRG2, STXBP1* and *PCDH19* at a depth of 200X using single-molecule molecular inversion probes in 20 individuals with Dravet or Dravet-like syndrome.

Results: We identified an individual who was mosaic for two different pathogenic variants at the same *SCN1A* nucleotide position: chr2:g.166848363A>G, p.(Phe1808Leu) and chr2:g.166848363A>C, p.(Phe1808Val). The *SCN1A* variants were present in blood at allele frequencies of 8.3% and 6.9% respectively, which is well below the level of detection by standard targeted and Sanger sequencing technologies. Both variants were detected at varying allele frequencies (0.6%-39.7%) in DNA derived from hair follicles and skin fibroblasts.

This 12-year-old girl presented at 6 months with a brief febrile generalized tonic-clonic seizure (GTCS) and developed hemiclonic, focal motor, focal impaired awareness facial clonic seizures and status epilepticus. Development was normal until two years when language delay, attention deficit hyperactivity disorder and autism spectrum disorder were diagnosed.

Conclusion: We identified a patient with Dravet syndrome due to double somatic mosaic variants in *SCN1A*. That neither variant is limited to a single germ layer strongly suggests that the mutations occurred prior to gastrulation and that these variants should be present in brain, another ectodermal tissue. Double somatic mosaicism has not been reported in Dravet syndrome and only rarely recognized in human disease.

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Basilar artery dolichoectasia and its components: Clinical risk factors and relations to cerebral small vessel disease

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Background: Basilar artery dolichoectasia (BADE) is an anatomically-defined and poorly understood arteriopathy, characterised by dilation and elongation. BADE has been previously associated with conventional vascular risk factors and markers of cerebral small vessel disease. However, limited data exist for such associations with the fundamental components of BADE (ectasia, midline deviation, elevated bifurcation). Thus, this study aimed to define BADE and its components in a large patient dataset, and to explore their associations with patient characteristics and markers of cerebral small vessel disease: small vessel stroke and white matter hyperintensity volume (WMHv).

Methods: This study retrospectively included 441 patients (median age 63 years [interquartile range 51-76], 62.6% male) from the Magnetic Resonance Imaging and Genetics Interface Exploration (MRI-GENIE) repository, an international imaging and genomic database of ischemic stroke patients. Using MRI, BADE was defined as basilar artery ectasia, plus either deviation from the midline at mid-pons or bifurcation above the suprasellar cistern. Logistic and quantile regression models were applied, with multivariate adjustment for markers of cerebral small vessel disease.

Results: BADE was observed in 5.1% of patients (19/439); basilar artery ectasia in 5.2% (23/439); deviation in 43.8% (192/438); elevation in 21.7% (81/374). No associations were found between BADE, nor ectasia, and clinical characteristics. Deviation was associated with older age (P=0.048) and male sex (P=0.008). Elevation was associated with increased age (P=0.016), hypertension (P=0.035) and a non-smoking history (P=0.023). Neither BADE, nor its components, were associated with small vessel stroke or WMHv.

Conclusion: No basilar parameters were associated with markers of cerebral small vessel disease. However, the components of BADE appear to have different clinical risk factor profiles. This suggests that it may be important for future research on BADE to separately consider its distinct arterial components. This study provides a robust methodology for planned further investigations in the large MRI-GENIE dataset.

In vivo Imaging of Brain Muscarinic Receptors with ^{18}F-Flurobenzyl Dexetimide: First in Human Studies

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Background: Muscarinic receptors are involved in neurodegenerative disease such as Alzheimer's and Parkinson's diseases, as well as in psychiatric conditions such as schizophrenia and depression. We performed a first in human study with ^{18}F-Flurobenzyl-Dexetimide (FDEX) to measure levels of muscarinic receptors (mAChR) in the brain of healthy control subjects.

Methods: Ten healthy participants (29.4±4.3 yo, 50%F) were enrolled in the study. Four participants underwent dynamic brain scanning for 240 min, while the other 6 underwent brain scans at 120 and 160-min post injection (mpi) of 200 MBq of FDEX and serial whole-body PET scans to determine tracer dosimetry. Gjedde-Patlak graphical analysis was applied to determine the influx constant (Ki), and tissue ratios (SUVR) at 120 and 160 mpi were calculated for all participants in the frontal, hippocampus and putamen regions, using the cerebellar cortex as reference region.

Results: No adverse events related to the study drug were observed or reported by the subjects following the FDEX scan. Tracer showed good entry into the brain (~4.2% ID at 5 min) and displayed irreversible kinetics during the scanning period (Fig 1). Tracer uptake was higher in the putamen –K_i 0.42±0.04; SUVR120 3.23±0.24 and SUVR160 3.75±0.27–, followed by frontal –K_i 0.27±0.01; SUVR120 2.61±0.26 and SUVR160 2.95±0.27–, and hippocampus –K_i 0.25±0.02; SUVR120 2.03±0.17 and SUVR160 2.30±0.17–.

Conclusion: FDEX uptake in the brain showed little variance across subjects, suggesting FDEX might be a useful and robust tool to detect variations in muscarinic receptors in the brain.

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Changes in head position and cerebral haemodynamics in ischaemic stroke: a systematic review

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Background
Cerebral blood flow (CBF) early post-ischaemic stroke is highly dynamic. The effects of upright postures (sitting and standing) on the cerebral circulation, particularly in patients at higher risk for neurological deterioration, such as those with persistent vessel occlusions, are still not fully understood.

Aims
To investigate the effects of head positioning on CBF parameters assessed by imaging techniques at any time post-ischaemic stroke.

Methods
The following databases were searched: Medline, Embase, CINAHL and Cochrane Library. Two independent reviewers screened studies for eligibility and assessed risk-of-bias. Data were extracted by one author using predesigned spreadsheets and checked by another author. Data were synthesised by imaging method and time post-stroke.

Results
Nineteen studies, 2 RCTs, 17 prospective cohorts, were included (476 patients, mean age 62.9). Imaging methods included transcranial Doppler, CT, near infrared and diffuse correlation spectroscopy. Outcomes reported were: CBF, CBF velocity and cerebral oxygenation. Head-of-bed angles ranged from -15° to 80°. Two studies included active sitting, and one study included active standing. Protocols were performed <7 days of symptoms in thirteen studies. In seven studies, high-grade stenosis or occlusions status were stated. Fifteen cohort studies and one RCT showed changes in the stroke hemisphere CBF parameters (increase when flattening or decrease when elevating the head-ofbed angle). 2 cohorts and 1 RCT showed no difference.

Conclusion
Few studies assess the effects of upright postures on CBF parameters in acute ischaemic stroke. Understanding how sitting and standing affects cerebral haemodynamics in those with and without vessel occlusions could inform clinical practice.

FRA1 is required for *BRAF V600E* induced intestinal tumour progression

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Mutations in *BRAF* (*BRAF V600E*) occurs in ~10% of colorectal cancers (CRCs) and drives constitutive activation of the ERK pathway. The downstream effectors of this pathway which control transcription of pro-malignant genes is poorly understood. In preliminary studies we found that the transcription factor FRA1 is highly expressed in *BRAF* mutant CRC cell lines. Moreover, studies using CRC cell lines and xenograft models showed that FRA1 directly regulates genes important for epithelial-mesenchymal plasticity and metastasis. However, the role of FRA1 in CRC development and progression has not been studied *in vivo*. The purpose of this study therefore was to investigate the role of FRA1 in colon cancer progression in *Braf* mutant mice.

Intestinal specific *Braf*^{mut} mice were crossed with intestinal specific FRA1 knock out mice (FRA1^{IKO}) to generate *Braf*^{mut}/FRA1^{IKO} mice. The mice were aged from 10 days to 12 months. The small intestinal and colonic epithelial tissue was analysed for changes in morphology, differentiation status and MAPK signalling. Tumour samples were also collected from mice aged for up to 12 months and analysed for tumour number, size, invasiveness, gross histological differences and differentiation status.

Both *Braf*^{mut} and *Braf*^{mut}/FRA1^{IKO} mice developed a serrated morphology and marked hyperplasia in the normal small intestine and colonic epithelium. The percentage of mice which developed adenomas was higher in *Braf*^{mut} (86%) compared to *Braf*^{mut}/FRA1^{IKO} (75%) mice at 10 months. In addition, the tumour burden was significantly higher in *Braf*^{mut} mice compared to *Braf*^{mut}/FRA1^{IKO} mice (*P= 0.0038*). These results indicate that FRA1 is essential for the pro-tumorigenic action of mutant *Braf* driven ERK signalling in CRC. Molecular analysis of tumour tissue from these mice is currently underway to determine the underlying mechanisms for these effects.

“This is uncharted water for all of us”: Challenges anticipated by hospital clinicians in relation to the legalisation of voluntary assisted dying in Victoria

Danielle Ko, Barbara Hayes Marcus Sellars, Bridget Pratt, Anastasia Hutchinson Mark Tacey, Karen Detering, Cade Shadbolt, and Rosalind McDougall.

Background: Voluntary assisted dying became legal in Victoria on 19 June 2019, under the Voluntary Assisted Dying Act 2017. However there has been little Victorian data to inform implementation.

Objective: To identify the challenges anticipated by clinical staff in two Melbourne health services in relation to the legalisation of voluntary assisted dying in Victoria.

Methods: A qualitative approach was used to investigate perceived challenges for clinicians. Data was collected after the law had passed but prior to the start date for voluntary assisted dying in Victoria. This work is part of a larger mixed methods anonymous online survey about Victorian clinicians’ views on voluntary assisted dying. Five open-ended questions were included in order to gather text data from a large number of clinicians in diverse roles. Participants included medical, nursing and allied health staff. The data was analysed thematically using qualitative description.

Results: 1086 staff provided responses to one or more qualitative questions: 774 from service 1 and 312 from service 2. Clinicians anticipated a range of challenges. These included burdens for staff: emotional toll, workload, and increased conflict with colleagues, patients and families. Challenges regarding organisational culture, the logistics of delivering voluntary assisted dying under the specific Victorian law, and how voluntary assisted dying would fit within the hospital’s overall work were also raised.

Conclusions: The legalisation of voluntary assisted dying is anticipated to create a range of challenges for all types of clinicians in the hospital setting. Clinicians identified challenges both at the individual and system levels.

IN PRINCIPLE SUPPORT FOR VOLUNTARY ASSISTED DYING DOES NOT TRANSLATE TO WILLINGNESS TO PARTICIPATE

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IN PRINCIPLE SUPPORT FOR VOLUNTARY ASSISTED DYING DOES NOT TRANSLATE TO WILLINGNESS TO PARTICIPATE

Abstract

Background: Victoria's *Voluntary Assisted Dying Act 2017 (Vic)* was passed in November 2017 and came into effect on 19 June 2019.

Aim: To explore the views of clinical staff on voluntary assisted dying (VAD) in seven Victorian healthcare institutions prior to VAD legislation becoming operational in June 2019.

Method: An anonymous mixed methods online survey of Victorian clinical staff conducted across seven Victorian healthcare institutions (five metropolitan tertiary referral centers, one large metropolitan health care service and one rural healthcare service) between November 2018 to February 2019. Main outcome measures were demographic and practice characteristics; support for VAD legislation; willingness to participate in VAD related activities.

Results: 5160 clinical staff completed the survey (12.8% response rate) including 619 medical specialists. 73% (3769/5160) indicated support for VAD legalisation, 12.1% (623/5160) opposed and 13.8% (712/5160) were unsure. Support was higher amongst non-medical (nursing 78.8% (2241/2845), allied health and other clinical staff 76.5% (896/1171)) than medical staff (medical specialists 50.7% 314/619 and junior doctors (60.6% 318/525).

38.2% (228/597) of medical specialist respondents indicated they were willing to participate in VAD as the Consulting Practitioner to provide an eligibility assessment, 21.4% (127/593) as the Coordinating practitioner and prescribe the VAD medication, and 15.7% (93/594) as the Coordinating practitioner and prescribe and administer the VAD medication. For those specialties likely to be involved in VAD assessments, absolute numbers of clinicians willing to participate in various VAD related activities were low.

Conclusions: There were high levels of support for Victoria's legalization of VAD, with support highest amongst nursing and allied health and lowest among medical staff. However, support for VAD did not necessarily translate to willingness to participate in VAD related activities, with only a small number of specialists in the highly impacted fields indicating they would participate in VAD related activities.

State-wide mapping of NP models of practice throughout Victoria

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Background

There has been significant investment into the development and integration of Nurse Practitioner (NP) models of care across a variety of organisational settings. As the number of NPs increases, the diversity of their clinical model and location of practice varies. It is essential from a policy and planning perspective that NP roles and organisational contexts and locations are mapped throughout Victoria. This study will provide up-to-date information about these roles throughout Victoria.

Aim

The aim of the study was to determine the organisational context and location of NP and NP candidates (NPcs) employed in Victoria.

Methods

An online survey about NP workplace and model of care was sent to 339 NPs and NPcs throughout Victoria.

Results

The survey was completed by 163 NPs and 19 NPcs. The majority of participants were female (74%) and working in a NP role for an average of 4.62±3.61 years. They have been a registered nurse for an average of 23.77±8.76 years. The majority of NP/cs reported working in a hospital environment (56%). Of the NP/cs working in a hospital environment, 17% (33) were working with a metropolitan hospital, 3.7% (7) within a District hospital, and 13.1% (25) within a Regional hospital. Of the NPs working in the hospital system only 0.5% (1) was working in a private hospital. Other areas of NP practice were: community nursing 13% (25), Aged Care Facilities 8.3% (16) and Community Health Centres 7.9% (15).

Conclusion

This study has identified gaps in service provision that is important to inform future directions of NPs. Findings from this study will inform state-wide workforce planning and funding by describing the organisational context and practice patterns of NPs throughout Victoria.

The effect of intimate partner violence and abuse on obstetric and perinatal outcomes: a review of the literature.

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BACKGROUND

Intimate partner violence and abuse (IPVA) has long been connected to poor physical and mental health outcomes, and pregnancy has been identified as a time of heightened risk for both onset of IPVA, and escalation of existing abuse. This review aims to identify the effect of IPVA on perinatal and obstetric outcomes.

METHODS

A literature search was conducted through SCOPUS, PubMed and grey literature, from 2002 through 2018, resulting in an initial pool of 1,070 articles. The research was diverse in nature, incorporating developing and developed countries and a wide range of racial and cultural demographics. To be included review, the documented abuse must have occurred within the woman's current marriage, in the past year, or during the indexed pregnancy. After the application of inclusion criteria, 52 full-text articles were analysed, with a further 20 being excluded, resulting in a collection of 32 articles for review.

RESULTS

A multitude of perinatal and obstetric outcomes were covered in the literature, including preterm delivery, low-birth weight, intrauterine growth restriction, foetal or neonatal death, obstetric complications, and mental health ramifications for pregnant or recently delivered women. The majority of literature concluded that IPVA increased the odds of these outcomes, with only a few failing to find an association.

CONCLUSION

This review highlights the magnitude of the effect of IPVA on perinatal and obstetric outcomes, and has significant implications for the care of women affected by this kind of abuse. It also demonstrates a need for healthcare providers, particularly midwives and obstetricians, to be able to recognise IPVA so as to best tailor care for their patients.

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StandingTall (an engaging, home-based, fall prevention exercise program delivered using technology) implementation and evaluation: local protocol for an international implementation study

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Aim
Falls in older Australians are a major public health issue. Exercise is the single most effective strategy to reduce falls.[1] Performing 3 or more hours/week of moderate to high challenge balance exercise can reduce rate of falls (measured over 6-12months) by 39%.[2] sDespite strong evidence that falls can be prevented, the uptake and long-term adherence of fall prevention programs remains suboptimal, which is a challenge for older people and the public health system.

StandingTall is a tailored, progressive and engaging self-management program that employs mobile technology to deliver home-based exercises for older people. *StandingTall* was easy-to-use, well-accepted and achieved high adherence levels in a recent randomised controlled trial involving 500 people.[3] This project is part of an international collaboration supported by an NHMRC partnership grant and Austin Health is a project partner. The primary aim is to accelerate and evaluate the implementation of *StandingTall*.

Methods
Austin Health aims to enlist 100 community-living people over 60 years of age who can mobilise unaided at home. Participants will be recruited via Austin Health healthcare networks. An implementation officer will establish referral pathways and support the local clinicians to use *StandingTall* in clinical practice. Implementation will be evaluated using a mixed methods approach. The analyses will determine factors within the clinical and healthcare networks that facilitate uptake and build capacity for sustainability. Uptake and enablers for the participants who use Standing Tall will be evaluated using web-based analytics, consumer-feedback surveys and focus groups.

Results and Conclusion
We will describe the study protocol and highlight *StandingTall's* features. Recruitment and data collection will begin soon.

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Proud, E.[1], Blennerhassett, J.[2], Miller, K.J.[1,3], Tan, J.[4], Morris, M.E.[5,6], McGinley, J.[1]

Title of abstract

Task related practice may improve hand function in people with Parkinson's Disease: A systematic review.

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Aim

To explore the effectiveness of interventions directed to improve hand function in people with Parkinson's disease.

Methods

Systematic review using PRISMA guidelines. We searched databases (PubMed, MEDLINE Ovid, PEDro, CINAHL, Cochrane Database), and hand searched selected articles and systematic reviews. The inclusion criteria were 1) participants with Parkinson's disease; 2) intervention involving active movement or exercise; 3) intervention targeting upper limb function; 4) included measure of upper limb activity or participation; and 5) English full text. Case reports were excluded.

Results

The search yielded six randomised and two non-randomised studies that included 369 participants with mild to moderate severity of Parkinson's disease. The studies varied in methodological quality. Interventions included task-related training (seven studies) or resistance exercise (one study), which delivered interventions mainly in the home setting for durations ranging from two to 24 weeks. Four studies focused specifically on handwriting. Hand function outcomes included manual dexterity tests such as the 9-Hole Peg Test; handwriting parameters; and self-reported questionnaires. The task-related based intervention delivered significant improvement in dexterity or handwriting (five studies, n = 236). A meta-analysis of four randomised trials found a small positive post-intervention effect for manual dexterity (SMD = 0.89; 95%CIs 1.64, 0.14).

Conclusion

Interventions incorporating task-related training may improve hand dexterity and writing in people with mild to moderate severity of Parkinson's disease. Further investigations are needed to establish optimal training methods, and characteristics of people who may benefit from task-related training.

AVERT DOSE TRIAL UPDATE 2019: DETERMINING OPTIMAL EARLY REHABILITATION AFTER STROKE

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Background and Aims

Our AVERT trial, a large international RCT of early rehabilitation provided evidence that early high intensity training interferes with stroke recovery (The Lancet, 2015), and that most patients may be responsive to therapy if the right dose is provided. (Neurology 2016). The aim of AVERT DOSE is to define the optimal early training regimens for people with mild and moderate ischaemic stroke.

Method

Multi-Arm, Multi-Stage, Covariate-Adjusted, Response-Adaptive, randomised trial in two specified stroke severity strata (Mild: NIHSS 0-7; Moderate: NIHSS 8-16). Patients are randomised to one of four mobility training regimens in each strata (including a pre-specified reference group), and the intervention is delivered for up to 14 days. Inclusion criteria: Ischaemic stroke within 48 hours, ≥18 years. Exclusion criteria: Severe stroke, medically unwell, no evident mobility problems. We will recruit >2500 patients from seven countries. Primary Outcome: Identification of the intervention regimen that results in fewer disabled patients (mRS 0-2) at 3 months post-stroke. Blinded assessments will occur at 3 and 6 months. An adaptive sample size re-estimation provides 80% power to detect a 10% absolute treatment effect or larger compared to the pre-specified reference group, with a significance threshold of p=0.025 per stratum. Analyses will be intention-to-treat. (ACTRN12619000557134)

Results

Australian National Mutual Acceptance HREC approval for Australia has been received. Australian site approvals have been gained for St John of God Hospital WA, with nine submissions under review. Ethics have been submitted in New Zealand, Malaysia and Ireland. First site initiation will be in August 2019. Site selections are ongoing, with international collaborations planned for New Zealand, Singapore, UK, India, Taiwan and Brazil. The REDCap online trial database has been finalised.

Conclusion

AVERT DOSE will provide information about the dose and timing of early rehabilitation after ischaemic stroke onset. The results will be generalisable globally.

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Neuropsychiatrists' understanding of conversion disorder: A survey of clinician attitudes

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Aim
Conversion disorder is at the intersection of neurology and psychiatry, with the lack of neurobiological pathology and adoption of a psychosocial model indicating the important role of psychiatrists in the diagnostic and therapeutic processes. Neuropsychiatry is a type of psychiatry which combines neurological and psychological aspects of illness in care. This study aimed to assess neuropsychiatrists' attitudes and understanding of conversion disorder.

Methods
An online survey of all members of the Section of Neuropsychiatry in the Royal Australian and New Zealand College of Psychiatrists, and the Faculty of Neuropsychiatry in the Royal College of Psychiatrists. Statistical analysis included descriptive statistics and chi squared test for association.

Results
52 Australian and 131 UK based members completed the survey. They were split on whether a sufficient model was available for conversion disorder, with significant variation in the number of models and terms used in practice, however, respondents frequently adopted more psychological models. Most did not believe that there will be a time when this is understood neurologically (54%). The issue of feigning split respondents, with most seeing this as overlapping conversion disorder. While it was deemed important to delineate the two, in practice this was generally poorly done. Psychiatrists generally believed they play an essential role in both the diagnosis (63%) and the management (67%) of conversion disorder.

Conclusion
Psychiatrists use psychosocial models for conversion disorder although there is no commonly accepted model due to its complex nature, with this still frequently being associated with feigning. They believe both neurologists and psychiatrists have a beneficial role to play, contrary to changes in the diagnostic classification seen in DSM-V and ICD-11.

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Exploring the role of NAC for treatment-resistant PTSD: a randomised controlled trial

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Aim

The chronic and debilitating nature of PTSD is well established. Although therapies within the current treatment guidelines provide relief for many patients, several experience an inadequate response. In addition, common comorbidities, including depression and substance abuse, may further hinder response to therapy and increase the impact of PTSD. With so many patients left 'treatment-resistant' new, or additional therapies are urgently needed.

A burgeoning body of evidence highlights elevated levels of inflammation and the occurrence of aberrant oxidative stress in patients with PTSD. Further, preliminary MRS neuroimaging studies reveal abnormal glutamatergic neurotransmission. Treatments which modulate these pathways are plausible candidates for ameliorating PTSD – thus, the amino acid N-acetylcysteine (NAC) appears indicated. NAC has been explored as a potential treatment for a wide array of psychiatric conditions, however, only one trial has been published to date for PTSD. This study revealed encouraging, albeit preliminary results and warranted a larger scale trial to further explore NAC's treatment effects in PTSD.

Method

We are currently conducting a randomised, placebo-controlled trial with NAC for individuals with treatment-resistant PTSD, recruiting participants at the Heidelberg Repatriation Hospital and The Melbourne Clinic Professorial Unit.

Results

Although the trial is ongoing, and results still blinded, we will outline the study design, current progress and challenges with recruitment.

Conclusion

Results from this trial will shed further light on the potential therapeutic effects of NAC for individuals with treatment-resistant PTSD.

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How much matters? Exploring the minimum important difference for sleepiness in spinal cord injury.

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Introduction: Obstructive sleep apnoea (OSA) is highly prevalent and poorly recognized in people with spinal cord injury. Efficacy of continuous positive airway pressure (CPAP) therapy for people with tetraplegia and OSA has recently been investigated in a multicentre trial (the COSAQ trial). The CPAP group experienced significantly greater improvements in subjective daytime sleepiness, as measured by the Karolinska Sleepiness Scale (KSS), a 10 point scale measuring state sleepiness. However the Minimal Important Difference (MID) has never been formally established for the KSS in any population.

Aim: This exploratory study aimed to investigate the MID for the KSS in people with acute tetraplegia who had undergone CPAP treatment for OSA.

Methods: This study involved secondary analysis of data from the COSAQ trial, using KSS scores collected in the CPAP group at baseline and three months. Distribution and anchor-based methods were used to determine the MID of the KSS. For the distribution-based method, the effect size was calculated to estimate the MID. For the anchor-based method, sensitivity and specificity were calculated for KSS change scores to discriminate between participants who improved on a global utility scale (Assessment of Quality of Life, AQoL) by the published MID (0.06) versus those who did not. A receiver operating characteristics (ROC) curve was plotted and the MID was the cut-off point with the best balance of sensitivity and specificity.

Results: The mean change in KSS in those randomised to the CPAP group (n=73) was 1.4 (SD=2.7). The distribution method identified a MID of 0.6 points. The mean improvement in KSS score was larger in those who improved on the AQoL vs those who did not (improved mean (SD) vs not improved mean (SD), p=0.06). The optimal cut-point for the KSS on ROC curve analysis was 1, however sensitivity and specificity at this cut-point was 28% and 87% respectively (area under the curve of 0.59, 95% CI=0.46-0.72).

Conclusion:

Exploratory analysis of existing data suggests that the MID for the KSS may lie between 0.5 and 1. Future studies should consider using an anchor that is specific to the changes that people with tetraplegia experience with CPAP therapy, to increase the precision of the MID estimate for this frequently used outcome measure in spinal cord injury research.

The Value of having Spinal Cord Researchers and Clinicians Connect and Collaborate on the Spinal Cord Research Hub (SCoRH)

Peleg E[1], Hendry K[1], Brown DJ[1]

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Introduction

Research is paramount to the continued progress of academic and scientific research. In spinal cord injury (SCI) research (as with other specialty areas) it is vital that strong investigation continues to be explored, achieving compelling outcomes that can be translated ultimately, into clinical practice. The impact of merging opportunities and transparency between the researcher and the clinician ensures research is conducted with minimal duplication, maximum clarity and clear support across the field of SCI research.

Method

In 2018, the Spinal Research Institute (SRI) launched the Spinal Cord Research Hub (SCoRH), an online platform facilitating collaboration among international SCI researchers. SCoRH is taking steps to overcome barriers to research collaboration, by providing tools to: build global research networks, increase the number and size of multi-centre trials, and reduce duplication of research efforts.

The SCoRH platform organically began to attract registered members that were in the clinician role. This clear interest from broader SCI research positions, led to SCoRH officially launching to include clinicians in 2019. Both these groups are now working collaboratively on SCoRH.

Results

In the first year since launch, SCoRH has connected over 120 spinal cord researchers and clinicians across 21 countries from a wide range of professional disciplines.

Active groups have formed on the platform, which comprise local and international membership. A broad range of motivators are behind the formation of the groups such as a specific project topics, region or country, profession, or research interest area.

Conclusion

SCoRH is addressing research barriers to facilitate collaboration that will assist researchers undertaking local pilot studies, to build study numbers and establish multi-centre trials in order to achieve statistically valid outcomes. The clarity and cooperation of researchers and clinicians is vital to the success of future SCI research.

Title: Evaluation of a multimodal interdisciplinary tracheostomy educational model

Authors: **Christine Knee Chong,**[1,2] Jack Ross,[1,2,3] Charissa Zaga,[1,2,4] Caroline Chao,[1,2,3] Jon Graham,[5] Tanis Cameron[1,2,4]

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[2] *Global Tracheostomy Collaborative (GTC) Member*
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Background and Aims:

The TRAMS model of education provision has evolved since its inception in 2002 to become extensive, multimodal and interdisciplinary. This model consists of training for all medical airway/respiratory specialists, nurses, speech pathologists and physiotherapists and includes tracheostomy basics, emergency management, policies and procedures.

There are four sensory learning modalities that have been identified for learning information namely visual, aural, read/write and kinesthetic.[1,2] The aim of this project was to evaluate the effectiveness of a multimodal workshop platform provided by TRAMS as part of an extensive program of interdisciplinary education.
Tracheostomy basics, including emergency management are taught using a variety of formats including pre-workshop e-learning (*visual & read/write*), simulation (*kinesthetic*), lectures (visual & *aural*) and hands on practical sessions (*visual, aural, read/write & kinesthetic*).

Method:

Evaluation surveys completed by attendees at the TRAMS yearly interdisciplinary workshops (capped at 65 attendees) from 2010 to 2018 have been collated and analysed. Respondents scored their knowledge and confidence pre and post workshop participation in the various workstations (which have included tracheostomy tube types, one-way valves, emergency management, suctioning, humidification, oxygen therapy and stoma care). Respondents were also asked to rate the overall workshop effectiveness from 0 (poor) to 5 (excellent). Evaluations of the workshop informed future workshop content, structure and delivery methods.

Results:

A total of 462 workshop attendees submitted responses to the survey with a 92% completion rate. All members of the multidisciplinary team including nurses, speech pathologists, physiotherapists and physicians were represented. Over the nine-year period, there was a mean improvement in respondent tracheostomy confidence and knowledge of between 25 to 36%. Additionally, the majority of the respondents rated the overall workshop as excellent.

Conclusion:

Adult learners have individual learning styles[3]. Survey evaluation of our TRAMS workshop, a component of our extensive multimodal interdisciplinary tracheostomy education model covering all four sensory learning modalities, has been shown to be valuable in improving knowledge and confidence in tracheostomy care.

Disclosures: Nothing to declare

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Implementing a high efficiency, low cost approach to multidisciplinary operating room simulation.

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Origin: [1] Austin Health, Melbourne, Australia [2] University of Melbourne, Melbourne, Australia

Introduction/background:
Multidisciplinary training programs have been implemented to improve communication and team dynamics in the operating theatre. Current programs tend to run over half or full days, involve high fidelity scenarios and use off-site simulation laboratories. These programs can be resource-intensive, with organisational and financial costs impeding their conduct and attendance.

Aim/objectives:
To describe the implementation of a high efficiency, low cost approach to multidisciplinary operating room training. This program uses frequent, short duration, in-situ simulations to promote teamwork training and culture change with negligible clinical service, rostering and financial impact.

Discussion:
The program runs fortnightly for 40 minutes. Scenarios require a coordinated team response such that the solution cannot be achieved by one discipline alone. Fortnightly conduct enables large volumes of staff to participate. Disruptions to clinical services and rostering are obviated by the program's in-situ conduct and short duration, which permit attendance by staff who are rostered to work. Simulation equipment is loaned from our institution's simulation centre at no cost.

Between November 2017 and November 2018, there were 22 sessions and 153 participants. On quality assurance surveys, participants indicated that the program was professionally run, relevant to patient care, and should be recommended to their colleagues. Participants self reported that the program would lead to behaviour change and that it improved their confidence in managing crises Future directions are to evaluate the program's effectiveness by assessing self-reported behaviour change on survey and interview at 3 months.

Microstructural Decay in Spinal Cord Injury

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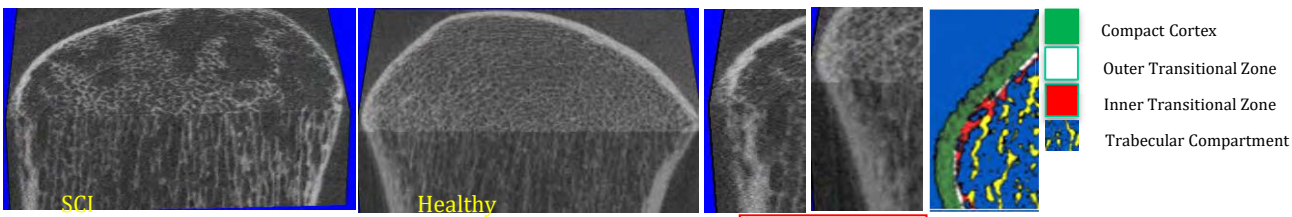
Introduction Spinal cord injury (SCI) causes rapid bone loss due to a reduction in bone formation at the basic cellular unit (BMU) level and increased rate of bone remodelling at the surface level, changes that result in microstructural deterioration and increased fracture risk. There is lack of information concerning the effects of paralysis on bone microstructure. We hypothesised that SCI individuals have i) a severe trabecular bone microstructural deterioration ii) higher cortical porosity in comparison to controls.

Methods and Methods We studied 31 men with chronic complete SCI (age 43.5 14.2 yrs, duration of paralysis of 1.7-22 yrs), and 90 age and sex-matched healthy ambulatory controls, recruited at Austin Health, University of Melbourne. Images of the non-dominant distal tibia were obtained using high-resolution quantitative computed tomography (HR-pQCT, Scanco, 82 micron isotropic voxel size). Manufacturer's and StrAx1.0 (StraxCorp, Melbourne, Australia) software were used to quantify trabecular and cor ical (ompartments indices.

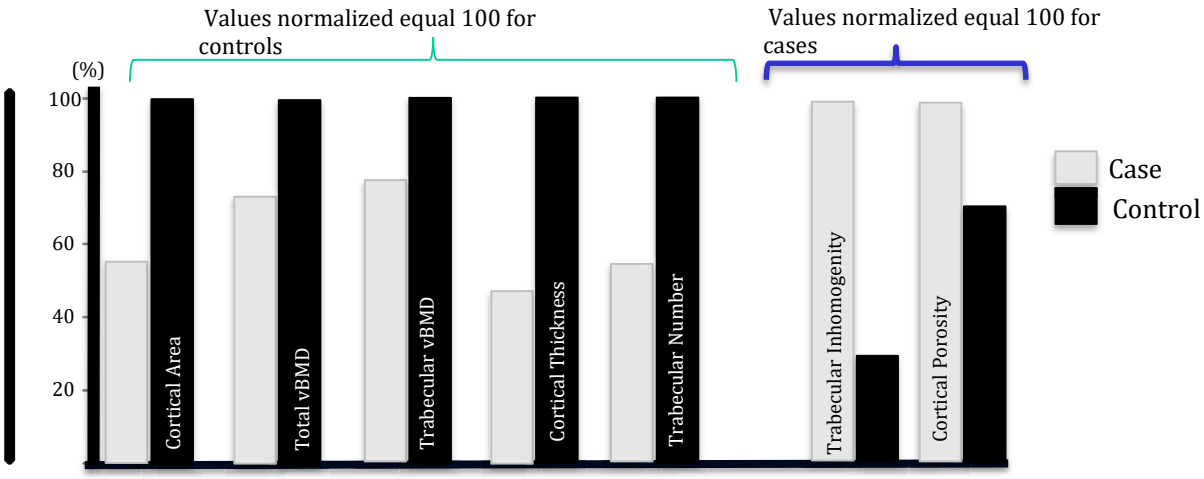


Thinner cortex , higher cortical porosity and fewer trabeculae and higher trabecular bone pattern inhomogeneity on the spinal cords injury patient.

Cortical Porosity

Segmentation by StrAx

Results Compared with controls, SCI cases had 2.3, 1.8, 1.7 and 2.5 SD higher porosity in the total cortex, compact cortex, inner and outer transitional zones and 1.7SD lower matrix mineralisation density. Total and cortical vBMD were reduced by 2.4 and 1.7 SD, respectively (all $p<0.01$).
Trabecular bone volume fraction was 2.4 SD lower in cases due to1.4 SD lower number of trabeculae and 6 SD higher separation. Trabecular bone surface and connectivity density were decreased by 0.9 and 1.4 SD, respectively (all $p<0.01$).



Conclusion We infer that spinal paralysis produces profound and rapid loss of cortical and trabecular bone suggesting antiresorptive therapy should be commenced at the time of presentation.

Evaluation of bone microstructure of distal radius and distal tibia on human objects using phase-contrast synchrotron radiation computed tomography

Ali Ghasem-Zadeh[1], Rachel Davey[2], Michele Clarke[2], Cat Shore-Lorenti[3], Simon Murray[4], Duncan Butler[5], Chris Hall[5], Peter R Ebeling[3], Jeffrey Zajac[2] Ego Seeman[1]

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Introduction

There are challenges in accurately determining cortical porosity using High Resolution peripheral Quantitative Computed Tomography (HR-pQCT) due to issues in image resolution, segmentation, beam hardening associated with poly-energic photons and blurred interface edges produced by larger point spread function. These issues are critical because porosity reduces bending strength disproportionate to the bone loss producing it so that errors in quantification underestimate fracture risk and fail to identify persons at risk of fragility fracture (Zebaze et al 2010).

During radiation transmission of x-ray photons, regardless of the attenuation, photons undergo small phase shifts, which can be converted into changes in amplitude, and observed as in images with different contrast. Australian Synchrotron Radiation provides computed tomographic images, 9.6-micron voxel size, using monochromatic and parallel x-ray photons. We hypothesised that HR-pQCT images used to measure cortical porosity produced by Haversian canal cross-sections and small pores produced by osteocytic lacunae would be quantifiable despite the relatively lower resolution of the HR-pQCT images. We compared the bone microstructural indices using Synchrotron Radiation photon attenuation and phase contrast-based computed tomography images versus images obtained using HR-pQCT.

Methods

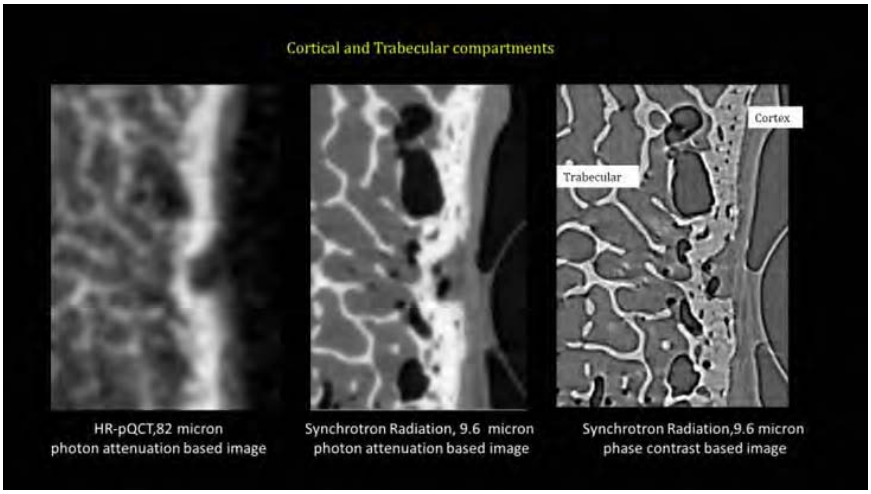
Thirty-two post-mortem human radii and tibiae, fresh and dry specimens, were imaged at the Australian Synchrotron Radiation-Imaging and Medical Beamline (IMBL), using 60kV monochromatic x-ray based tomography. Silicon amorphous detectors with voxel sizes of 9.6 and 14.6 microns have been used to create x-ray photons attenuation and phase-contrast based tomographic images.

Results

Preliminary comparison of axial images has shown higher visibility for small pores and Harversian canals in the phase contrast-based images.

Conclusion

We infer that accuracy of distal radial and distal tibial cortical porosity using HR-pQCT can be validated using synchrotron imaging as a referent gold standard.



Bone Fragility is Captured Independently by Measurement of Microstructural Deterioration, not Bone Mineral Density.

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Advancing age and menopause are accompanied by rapid unbalanced remodelling. Less bone is deposited than removed by each remodelling event resulting in a net loss of bone which reduces bone volume and deteriorates the microstructure of the remaining diminished bone volume. Both changes increase bone fragility. The bone mineral density (BMD) measurement captures reduced bone volume, not microstructural deterioration. Fracture risk increases as BMD decreases but >70% of the population burden of fractures arises among women with modest deficits in BMD categorised as osteopenia. These women remain unidentified by the BMD T-score threshold of –2.5 SD for 'osteoporosis'. As microstructural deterioration reduces resistance to bending disproportionate to the bone loss producing it, we hypothesized that women with recent non-vertebral fracture can be distinguished from those without fractures by measuring microstructural deterioration.

We measured microstructure of the distal radius using high-resolution peripheral quantitative computed tomography (HR-pQCT) and femoral neck BMD by DXA in 75 women aged 55 years, range 40-70, with recent non-vertebral fracture and 101 age-matched controls. We expressed the coexisting increment in cortical porosity and decrement in trabecular density relative to premenopausal mean values as a Structural Fragility Score (SFS).[1] Estimated failure load (FL) obtained using micro finite element analysis, was the value when 2% of elements exceed a strain of 0.007 under uniaxial compression applied with 1% apparent strain (Faim 8.0, Canada).

Women with fractures had a 0.5 standard deviations (SD) higher cortical porosity, 0.4 SD lower trabecular vBMD ,0.6 SD higher SFS and 0.5 SD lower estimated FL compared to controls (all $p<0.01$). In univariate logistic regression analyses, the odds ratios (95% CI) for fracture were 1.35 (0.99-1.84, $p=0.059$) per SD lower BMD, 1.92 (1.37-2.69, $p<0.001$) per SD higher SFS and 2.04 (1.43-2.90, $p<0.001$) per SD lower estimated FL. In multivariable analysis, the association with fracture was lost for BMD after accounting for SFS, remained with SFS after accounting for BMD, remained with estimated FL after accounting for BMD. We infer that fragility fractures are more likely to be a consequence of microstructural and bone strength deterioration than low BMD.

Title

The type 1 diabetes identification initiative: improving the care of inpatients with type 1 diabetes

Authors

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Abstract Text:

Background

Specialist care may improve outcomes for inpatients with diabetes. However, research specific to type 1 diabetes (T1D) is lacking. We aimed to investigate whether automatic alerts from the Electronic Medical Record (EMR) enable prompt review of inpatients with T1D by a specialist diabetes team.

Methods

The type 1 diabetes identification ("T1DI" or "tidy") initiative was established to improve identification and review of inpatients with T1D by a specialist diabetes team. A specific T1DI code was entered into the EMR of patients with T1D. On subsequent admission, the specialist diabetes team received an automatic message and generated an inpatient list. "T1DI" admissions of more than one-day were analysed over a one-year period (1st January-31st December 2018). The control group was T1D inpatient admissions as coded by health information services following discharge. Analysis was performed for patients admitted to units other than endocrinology to investigate review. Data was analysed using Chi2 (categorical), Wilcoxon rank sum (continuous) and random effects logistic or negative binomial regression models.

Results

There were 196 admissions of adults with T1D over the study period (T1DI n=93, control n=103). The median age was 49 (IQR 33-64) years; 53% were females. There were 136 admissions to units other than endocrinology. Specialist diabetes team review was more common in the T1DI cohort compared to the control group (endocrinology adjusted OR 10.27, CI 2.26-46.55, P=0.003; diabetes education adjusted OR 7.22, CI 2.73-19.10, P<0.001). Prompt review (no later than day two of admission) by endocrinology was more likely in T1DI inpatients (adjusted OR 2.77, CI 1.15-6.65, P=0.023).

Conclusions

The T1DI initiative was associated with improvements in occurrence and timing of specialist diabetes team review for inpatients with T1D. This initiative could be implemented in other hospitals with EMR systems, enabling more effective identification and management of T1D in the inpatient setting.

Presentation Title

Frequency, associations, and outcomes of patients who receive Medical Emergency Team (MET) calls in the general medical population in a tertiary hospital in Melbourne.

Aims

The MET has operated from year 2000 at Austin Health. Existing literature examining characteristics and outcomes of general medical patients subject to MET calls is limited. This study aims to compare the baseline characteristics of medical patients who do and don't receive MET calls and explore the frequency, predictors, and outcomes following MET calls in this population.

Methods

Retrospective audit of all patients admitted under general medicine via the Emergency Department to Austin Hospital over 4 years from January 2015 to December 2018. Primary outcomes include disposition post MET call, Intensive care unit admission rate, discharge disposition, length of hospital stay (LOS), risk of re-admission within 28 days and in-patient all-cause mortality.

Results

15263 patients were admitted under General Medicine during this period. 1880 (12%) patients experienced ≥ 1 MET calls. 13383 (88%) patients did not receive any MET calls. Compared with those who did not have a MET call, there was no difference in median age (82 (72,87) vs 83 (73,88) years p=0.48) or gender (males 46% vs 47% p=0.31).
MET call population had higher median Charlson comorbidity index (5 (4,7) vs 3 (2,5) p<0.0001), longer median LOS (9 (5,16) vs 4 (2,7) days p<0.001) and higher in-hospital all-cause mortality (28.2% vs 5.54% p<0.0001) but not higher risk of re-admission within 28 days (13% vs 12% p=0.11). MET call triggers included tachypnoea (22.4%), tachycardia (19.9%), hypotension (17.1%), hypoxia (12.1%), altered conscious state (10.96%), concerned (6.6%) and other (10.9%). Only 3.2% were admitted to ICU following MET calls in this population.

Conclusion

MET calls in this population were predominantly related to cardiorespiratory instability and associated with higher comorbidity burden, increased LOS and inpatient all-cause mortality but not age, gender or risk of re-admission. This data can help inform assessment of appropriate goals of care.

Risk Factors for Falls In Ambulatory Older Adults in Residential Aged-Care: A Prospective Cohort Study

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[2] Department of Endocrinology - University of Melbourne / Austin Health, Melbourne, Victoria, Australia
Supervisor: Dr Sandra Iuliano

Introduction: Falls are common in older adults (≥65 years) with falls rates for those in residential aged-care being five times than of community-dweller, likely due to residents having multiple risk factors for falls such as history of falls, numerous co-morbidities and polypharmacy (≥9 medications). Given the high propensity for falls in this group, we aimed to identify which risk factors are most strongly associated with falls, hypothesising that history of falls, taking 2+ medications known to increase fall risk e.g. psychotropics, and cognitive impairment have the strongest association with falls.

Methods: In this 12-months prospective study, falls were recorded from mandatory incident reports for 597 residents aged ≥65 years (mean age 85.9±6.7 years, 77.7% women) from 60 residential aged-care facilities. At baseline, participants underwent assessment for mobility (gait speed test), knee, ankle and hip strength (Nicholas Manual Muscle Tester), body composition (DXA), and vitamin D status (serum 25(OH)D levels). Number and type of medications, medical conditions and history of falls were recorded. Student's t-test was performed to evaluate the differences between fallers vs. non-fallers. Shared frailty Cox regression model was used to calculate hazard ratios (95% confidence intervals) for each fall risk factor. Analyses were adjusted for relevant covariates.

Results: One thousand and seventy-six falls were recorded and 326 residents (54.6% of cohort; 95% CI 50.5%-59.7%) fell at least once, with an incidence rate of 896 falls per 1,000 person-years at risk. Fallers had significantly slower gait speed (0.67±0.67m/s vs 0.86±0.49m/s, p=0.001), greater proportion of residents with cognitive impairment (59.7% vs 40.3%, p=0.017) and history of falls (69.2% vs 30.8%, p=0.0019). In the Cox-regression model, hazard ratio (HR) for gait speed <0.7m/s and history of falls was 1.82 (95% CI 1.06-3.14; p=0.031) and 2.47 (95% CI 1.22-5.0; p=0.012) respectively. Although HR for cognitive impairment was not significant, being female without cognitive impairment, was associated with fewer falls with HR of 0.15 (95% CI 0.032-0.74; p=0.019).

Conclusions: In residential aged care, appropriate assessments documenting falls history prior to admission, and periodic assessments of residents for decline in gait speed and cognitive status may help identify those likely to fall and enable allocation of falls prevention resources to be targeted to residents at highest risk for falls.

Empowering haematology nurses to assess patient-reported antibiotic allergies: the implementation of a validated antibiotic allergy assessment tool (AAAT) – a pilot study

Authors
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Aim
To evaluate the impact of a nurse-completed antibiotic allergy assessment tool [AAAT[1]] at point-of-care on a haematology ward (7S).

Methods
Prior to implementation of the AAAT, an education package, comprising of two 20 minute face-face education sessions (5/3/19 and 8/3/19), was delivered to haematology nurses. The haematology ward implemented the AAAT on the 01/04/19 and nurses were encouraged to integrate the AAAT into their routine admission procedure. The results following this intervention were audited from 01/04/19 to 11/07/19. Completeness of allergy documentation pre/post allergy assessment and referral of low risk antibiotic allergies to the antibiotic allergy service was collected for adult patients (≥18 years) admitted to the ward (7S) with a reported antibiotic allergy. An independent AMS pharmacist evaluated the accuracy of the antibiotic allergy assessments by reviewing blinded nursecompleted AAATs.

Results
29 patients (with 31 antibiotic allergy labels [AALs]) were included in the 3month audit. During this period a total of 75.2% (22/29) patients had an allergy assessment undertaken by nurses using the AAAT. Prior to antibiotic allergy assessment 72.7% (16/22) of allergies assessed were associated with complete documentation (substance, reaction type and severity). Post antibiotic allergy assessment, 100% (22/22) had complete documentation. 31.8% (7/22) of these resulted in a change in documentation from a previously “unknown” severity or reaction. There were 63.6% (14/22) assessed as no/low risk, of which 85.7% (12/14) were referred to the antibiotic allergy team for inpatient allergy testing. Of those referred to the allergy clinic 25% (3/12) had their antibiotic allergy directly delabelled. Of the antibiotic allergy assessments completed by nurses, 90.1% (20/22) were concordant with the assessment of the independent AMS pharmacist.

Conclusion
This audit shows that haematology nurses can be empowered to accurately assess antibiotic allergies using a validated tool and that completion of this assessment positively impacts antibiotic allergy documentation and referral for allergy testing.

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Long term impacts of antibiotic allergy testing on patient perceptions and antibiotic utilisation

Authors: Tan N[1,2], Holmes NE[1], Chua KY[1], Stewardson AJ[3], Trubiano JA[1,4,5]

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Aims: Define the long-term impacts of antibiotic allergy testing (AAT) on patient allergy perception and antibiotic utilisation.

Methods: Patients were identified from a prospective antibiotic allergy testing (AAT) database as having completed testing during a 15-month period beginning January 2017. Patients were contacted for a follow up survey at least 12 months post-AAT. Of those contacted, baseline demographics, antibiotic allergy label (AAL) history, age-adjusted Charlson comorbidity index, infection history, antibiotic de-labelling (≥ 1 AAL removed following AAT) and antibiotic usage for 12 months prior to testing (pre-AAT) and 12 months following testing (post-AAT) were recorded for each patient.

Results. From the follow-up survey of 112 patients post-AAT, 95.2% (59/62) of patients with complete AAL removal expressed willingness to use “de-labelled” antibiotics and 91.9% (57/62) were adherent to allergy label modification. Comparing antibiotic utilisation 12-months pre-AAT vs 12-months post-AAT, AAT was associated with a significant increase in preferred antibiotic therapy (adjusted odds ratio [aOR] 3.29, 95 % confidence interval (CI) 1.57-6.90) and reduction in restricted antibiotic utilisation (aOR 0.42, 95% CI 0.19-0.93).

Conclusions. An Antimicrobial Stewardship (AMS)-led AAT program was safe and effective in the long term in the promotion of preferred and narrow-spectrum antibiotic usage, and favourable patient perception towards the AAT testing results was identified. This study further supports the routine incorporation of AAT into AMS programs, confirming safety and durability of testing impacts on patients as well as increasing preferred antibiotic utilisation.

High prevalence of antibiotic allergies in Cladribine-treated hairy cell leukaemia patients- lessons for immunopathogenesis and prescribing

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Introduction
Antibiotic allergy labels (AALs) are reported in up to 1 in 4 patients with haematological malignancies. However, the relationship between AAL prevalence, haematological malignancy and chemotherapeutic agent is ill defined. We sought to determine the prevalence of AALs in Cladribine-treated hairy cell leukaemia (HCL) patients and impact on prescribing.

Methods
A multicentre matched retrospective case-control study was performed of Cladribine-treated HCL patients (cases), non-HCL Cladribine-treated controls (control-1) and chronic lymphocytic leukaemia/follicular lymphoma fludarabine-treated controls (control-2) at Austin Health and Peter MacCallum Cancer Centre (VIC, Australia) between 1998-2018. Data was collected on patient demographics and clinical, infection, chemotherapy and allergy history.

Results
Forty-three cases, 14 control-1 and 80 control-2 patients were identified. The prevalence of AALs in Cladribine-treated HCL patients was 60.47%, compared with control-1 (14.29%, p=0.0046) and control-2 patients (25%, p=0.0002). AAL prevalence remained higher if examining only those patients that received antibiotics (cases: 68.75% vs control-1: 0% [p=0.0013] vs control-2: 27.03% [p=0.0007]). The predominant phenotype was maculopapular exanthema (92.31%). The drugs implicated in AAL causality in Cladribine-treated HCL patients included beta-lactams (80.77%), trimethoprim-sulfamethoxazole (57.69%) and allopurinol (69.23%) with a median latency period of 2, 12 and 13 days to rash onset respectively. Alternative (non-preferred) antimicrobials for febrile neutropenia were prescribed in 57.14% of cladribine-treated HCL patients with AAL.

Conclusion
Cladribine-treated HCL patients demonstrate high rates of AALs impacting beta-lactam utilization, potentially the result of immune dysregulation. This is one of the first studies to demonstrate that the host, underling haematological disease and chemotherapeutic impact prevalence of antibiotic allergy.

Arterial FDG uptake - what is normal?

Background: ^{18}F-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography (PET) is recognised as a useful tool in the diagnosis of large vessel vasculitis (LVV). There is, however, no diagnostic criteria for normal or abnormal arterial ^{18}F-FDG uptake on ^{18}F-FDG PET scans. Vascular ^{18}F-FDG uptake is often seen on PET studies of patients with no clinical symptoms of LVV.

Aim: To assess the ^{18}F-FDG uptake of large vessels in patients undergoing ^{18}F-FDG PET scan who have no symptoms of LVV.

Method: 35 adult patients undergoing ^{18}F-FDG PET study for oncological staging/restaging were randomly selected in December 2018. Demographics of the patients, uptake time, and fasting blood sugar (BSL) were recorded. Regions of interests were drawn around the thoracic and abdominal aorta, carotid, subclavian, axillary, external iliac and femoral arteries. Maximum and mean standardized uptake value (SUV_{max} and SUV_{mean}) were measured in each artery. Vascular scores (VS) were obtained (whereby 0 = uptake ≤ mediastinum; 1 = uptake <liver; 2 = uptake similar to liver; and 3 = uptake >liver). The sum of these scores provided the total vascular score (TVS). SUV_{mean} of the liver and blood pool were measured as reference.

Results: All patients have at least mild uptake in the larger arteries with mean TVS range of 2-13 (mean±SD 5.06±2.52). No patient had an individual vascular score >2. There is no difference in TVS between patients who were treatment naive or had prior therapy. The uptake time, BSL have minimal variations in this group.

Conclusion: Whilst there is mild FDG uptake in large vessels of patients without LVV, the VS and TVS in this small group of asymptomatic patients appear to be within the recommended “normal” range(VS<2) by the joint EANM/SNMMI/PET interest group[1]. A larger population is needed including patients with high BSL and longer uptake time to assess if the recommendation applies.

Initial experience in the clinical utilisation of brain amyloid PET imaging

Background

^{18}F-Fluorodeoxyglucose (FDG) PET scanning has proven clinical value in the investigation and differential diagnosis of Alzheimer's disease (AD) and Fronto-Temporal dementia (FTD). More recently, imaging agents specific for the identification of beta-amyloid plaques, a feature of AD but not FTD, have been developed that increase the differential diagnostic confidence. One such compound for brain amyloid imaging is 2-[2-^{18}F-fluoro-6-(methylamino)-3-pyridinyl]-1-benzofuran-5-ol (^{18}F-NAV4694). ^{18}F-NAV4694 was first used in our department in ethics approved clinical trials in 2011, and we have since performed approximately 1665 ^{18}F-NAV4694 scans across 20 different trials. In July 2018, ^{18}F-NAV4694 PET scans became part of the clinical service we offer for dementia patients.

Aims

To demonstrate, via a case study, the role of ^{18}F-NAV4694 PET scans in differentiating Alzheimer's Disease and Fronto-Temporal Dementia.

Methods

A 56-year-old male with progressive amnestic mild cognitive impairment (MCI) and a positive family history for AD was referred to Austin Health for a brain amyloid PET scan. Following the intravenous administration of 209MBq of ^{18}F-NAV4694, and a 50-minute uptake period, an emission PET scan (4x5 minute frame mode acquisition) was performed on a Philips Ingenuity TF 128 PET/CT scanner. A low dose CT scan (120 kVp, 30 mAs) was also performed for purposes of attenuation correction and anatomic correlation.

Results

A high degree of binding of tracer was evident in multiple areas, indicating a significant amyloid burden in the frontal, posterior cingulate, lateral parietal and lateral temporal cortices, as well in the striatum, highly suggestive of AD.

Conclusion

Cases such as these demonstrate the value of brain amyloid imaging in patients with clinical suspicion and risk factors for AD, and can facilitate earlier intervention and management, resulting in improved quality of life. Although in its infancy, the clinical provision of these scans within our practice has proven to be of great benefit to our referrers and patients alike.

Impact of the bone scan in a complicated Meningococcal patient

Authors: Emma Harding, Jessica Welch, Christian Testa, Kunthi Pathmaraj, Sze Ting Lee, Andrew Scott

Abstract

Background

Neisseria Meningitidis is a Gram-negative bacterium present in the nasopharynx of 5 – 15% of the population, and in rare cases can present as meningococcal disease. In Australia, 383 cases of invasive meningococcal disease were reported in 2017.

Clinical history

34 year old male experiencing mild viral symptoms for three weeks suddenly deteriorated and collapsed. Provisional diagnosis was severe septic shock of unclear focus, with initial investigations failing to detect the cause. Meningococcaemia was diagnosed via blood cultures. On clinical examination, the Patient's right hand and both feet appeared black.

A Bone scan was requested to assess perfusion and possible osteomyelitis of the right thumb.

Method

A standard 3 phase bone scintigraphy protocol was performed on a GE Discovery 670 DR SPECT/CT scanner. Flow images and blood pool images of the hands and whole-body images were acquired. Delayed imaging included a whole-body scan, static of the hands and SPECT/CT of the feet.

Results

Absent perfusion and tracer uptake in the right 1st metacarpal, right thumb, entire left foot (except for marginal uptake in the left navicular), 1st and 5th phalanges of the right foot.

Discussion

Negligible perfusion or bone uptake to the right thumb and, unexpectedly, to bilateral feet, was identified and confirmed on SPECT/CT imaging, consistent with peripheral ischemic injury. The patient proceeded to surgery for right thumb amputation.

A second bone scan was performed 12 weeks later, to assess viability of the distal limbs prior to a planned bilateral Below Knee Amputation (BKA).

Imaging demonstrated absent blood flow, blood pool and osteoblastic activity in the distal right foot and mid to distal left foot, unchanged from the previous scan.

The patient proceeded to surgery for bilateral BKA.

Conclusion

The bone scan significantly changed this patient's management by revealing the severity of the ischaemia to the distal limbs and confirming necrosis prior to the right thumb and bilateral below knee amputations.

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Solid Target Production of ^{68}Ga Utilizing Induction Based Thermal Diffusion.

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Aim

^{68}Ga plays an important role in Positron Emission Tomography (PET) diagnostic imaging agents such as ^{68}Ga-PSMA, commonly used for staging prostate cancer. The gold standard for obtaining ^{68}Ga is from the elution of expensive ^{68}Ge/^{68}Ga generators. As medical cyclotrons are becoming more common in hospitals, work is underway to develop high yield cyclotron based production methods for ^{68}Ga [1]. We aim to introduce a cost effective and simple way of producing ^{68}Ga utilizing pressed ^{68}Zn powder and induction based thermal processing.

Method

Enriched zinc metal powder (99.26% ^{68}Zn) is pressed into a cavity in high purity silver disks. The target disks are then loaded into a cyclotron for proton irradiation to undergo the ^{68}Z(p,n)^{68}Ga reaction.
Post irradiation, target disks are heated to >300°C using an induction coil to induce thermal diffusion of the produced ^{68}Ga from the remaining unreacted zinc metal. An automated method of target disk processing was developed using an in-house built radiosynthesis module.

Results

Preliminary low beam current irradiations have been conducted on the targets, showing no loss of target material during irradiation. Gamma-ray spectroscopy was performed to confirm the presence of ^{68}Ga but also confirmed the presence of small amounts of the radio-contaminates, ^{66}Ga, ^{67}Ga.
This confirms that ^{68}Ga can be safely produced on medical cyclotrons using pressed zinc powder, but the presence of contaminates will need to be addressed.

Conclusion

While preliminary testing has confirmed low yield production of ^{68}Ga, further tests are currently being undertaken to understand the effectiveness of the thermal diffusion technique. Work is also being undertaken to reduce radio-contaminates and achieve higher target yields.

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TITRATION OF ^{99m}TECHNETIUM- MACROAGGREGATED ALBUMIM DOSES IN LUNG VENTILATION/PERFUSION IMAGING AND ITS EFFECT ON DOSE REDUCTION

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Background: Standardised doses of ^{99m}Tc-Macroaggregated Albumin (^{99m}Tc-MAA) have long been implemented in lung perfusion imaging. However with advancements in gamma camera technology, ^{99m}Tc-MAA dose reduction is achievable whilst maintaining image quality and diagnostic accuracy.

In order to ensure diagnostic accuracy of ^{99m}Tc-MAA perfusion studies:

1. ^{99m}Tc-MAA activity must be significantly higher than the ventilation agent activity to override ventilation information, and

2. A sufficient quantity of particles must be present to provide homogenous diffusion through the lung capillaries.

SNMMI guidelines recommend injecting 200,000-700,000 particles of ^{99m}Tc-MAA per perfusion scan, with a minimum 100,000 particles required for diagnostic imaging. The Australian Diagnostic Reference Level (DRL) for perfusion imaging is 220MBq.

^{99m}Tc-MAA dose titration has been implemented at our institution to reduce patient radiation dose. Current Ventilation/Perfusion (V/Q) procedure requires the count rate (kc/s) of administered ^{99m}Tc-MAA be at minimum four times greater than the ^{99m}Tc-Technegas ventilation count rate of 1.0-1.5kc/s.

Aim: To demonstrate compliance with SNMMI guidelines and current DRL recommendations when utilising dose titration techniques for ^{99m}Tc-MAA perfusion scans.

Method: A retrospective review of patients presenting for VQ studies from January-June 2018 who received titrated ^{99m}Tc-MAA doses was performed. Administered dose information was recorded and corrected for residual activity and decay. ^{99m}Tc-MAA kit particle numbers, kit activity and reconstitution time were also recorded. Pregnant, paediatric and patients where nonstandard imaging was undertaken or where data could not be verified were excluded.

Results: A total of 377 patients were reviewed. Mean injected activity and number of injected particles of ^{99m}Tc-MAA were calculated. The median ^{99m}Tc-MAA administered dose was 138MBq (range=69-238MBq), 45.2% below the current Australian DRL (220MBq). Mean administered particle number was 335,087 (range=137,158-693,377), with all dose administrations adhering to SNMMI particle recommendations.

Conclusion: ^{99m}Tc-MAA dose titration is a viable and desirable technique for overall dose reduction to patients whilst still providing diagnostically accurate imaging.

SPECT/CT quantification versus planar quantification of ^{99m}Tc-MAA shunt study for SIR-spheres® Workup

Julia Dal Santo[1], Bridget Chappell[1], Kunthi Pathmaraj[1] , Sze Ting Lee[1,2,3], Aurora M. T. Poon[1,2], Andrew M. Scott[1,2,3]

Background:
^{90}Y- SIR-spheres®radioembolisation is a recognized treatment of liver cancer. Radioembolisation involves intra-arterial injection of ^{90}Y- SIR-spheres® into tumours via the hepatic artery performed under angiogram guidance. To minimize potential harmful side effects, eg. Radiation pneumonitis caused by ^{90}Y- SIR-spheres® shunting to lungs and gastrointestinal tract during the radioembolisation process, a pretreatment ^{99m}Tc-MAA shunt study is required to assess shunting and tumour uptake. Current practice requires the percentage lung shunt be calculated from planar imaging, however, implementation of software to quantify shunting from SPECT/CT may allow for more accurate assessment of lung shunt and therapeutic dose optimization.

Aim:
To quantify and compare the percentage of ^{99m}Tc-MAA lung shunting calculated from planar and SPECT/CT imaging in patients being worked up for ^{90}Y- SIR-spheres® radioembolisation.

Method:
A pilot study of patients with hepatic malignancies undergoing imaging workup for ^{90}Y-SIRspheres radioembolisation was performed. Planar and SPECT/CT imaging of Liver and lungs was performed on a GE Discovery 670 system. ^{99m}TcMAA injected dose, patient demographics and histopathology were collected. Percentage lung shunt was calculated using regions of interest drawn over the lungs, liver and tumour and the lung shunt calculated by equation(lung shunt%=geometric mean lung counts/[geometric mean liver counts + geometric mean lung counts]*100) and GE Q.Volumetrix software for planar and SPECT/CT imaging respectively. Statistical analysis was performed.

Results:
Twenty patients were reviewed, the percentage lung shunt was calculated and analyzed. Using planar analysis, the percentage lung shunt ranged from 2.5-38% (mean ±SD=11.61% ± 7.22). Using SPECT/CT analysis, the percentage lung shunt ranged from 1.41-13.3% (mean ±SD=3.54% ± 2.64); indicating a lower calculated lung shunt using SPECT/CT analysis.

Conclusion:
Quantification of lung shunting calculated from SPECT/CT was lower when compared with planar imaging for patients undergoing workup for ^{90}Y- SIR-spheres®radioembolisation, which may allow for better dose optimization. However, given the pilot study's small size, further investigation is needed to validate this technique for clinical practice.

Rapid virtually automated technique for renal corticomedullary segmentation from volumetric arterial phase imaging: Initial experience

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INTRODUCTION:

Accurate, reproducible and efficient corticomedullary segmentation is challenging but important for MR renography and monitoring of kidney disease[1-5]. The aim of our study was to assess the reproducibility and accuracy of a rapid virtually automated (VA) approach with minimal user-dependence. Manual segmentation was used as the gold standard.

METHODS:

The VA kidney segmentation algorithm from arterial phase volumetric images refines an earlier "blanket segmentation" algorithm[3]. It is designed for minimal (<5 sec) user interaction and is otherwise fully automatic.

7 healthy volunteers and 4 diabetic patients (8F, 3M, mean 53y, range 27-77y) were prospectively imaged at 3T (Skyra, Siemens). Dixon volume interpolated breath-hold examination was performed axially after a second injection of 5ml gadoteric acid (Dotarem), with a prior injection for DCE imaging: TR 3.97 ms, TE 1.26 (out of phase) and 2.49 (in phase) ms, FA 9°, FOV 400 x 325 x 320 mm, true voxel size 1.3 x 1.7 x 4.0 mm^3 interpolated to 1.3 x 1.3 x 2.0 mm^3, acceleration factor 4 (CAIPIRINHA), TA 14s.

Two raters (R1 and R2) performed VA segmentation **(Figure 1)** on the water-only arterial phase images, with R1 repeating all segmentations. Segmentation time per subject was recorded. An experienced abdominal radiologist performed gold standard (GS) manual segmentation in all subjects. Inter- and intra-rater agreement and concordance with GS of cortical (C), medullary (M) and whole kidney (WK) volumes were assessed with Lin's concordance correlation coefficients and reduced major axis regression[6].

RESULTS:

Segmentation was completed in 11/11 subjects (22 kidneys) in 78.6±7.0s for VA compared to 60-120min for manual segmentation per subject. Mean±SD GS volumes were: 95.01±14.15cm^3 for C, 49.53±11.34cm^3 for M and 144.53±24.31cm^3 for WK.

VA intra-rater agreement for C, M and WK was perfect (all 1.00), with excellent inter-rater (all ≥0.99) agreement. Concordance with GS was excellent for C (0.89), M (0.82) and WK (0.94)

Reduced major axis regression demonstrated mild overestimation of C (mean 5ml), underestimation of M (mean 3ml), and overestimation of WK (mean 2ml). Inclusion of portions of the contrast-filled collecting system in the cortical segmentation, large cysts (n=1 kidney) and paucity of perirenal fat (n=2 kidneys) contributed to discrepancies between VA and GS segmentation.

DISCUSSION/CONCLUSION:

We have demonstrated that a virtually automated technique is capable of rapid, accurate (within 7% of GS) and highly reproducible corticomedullary segmentation. A small fixed bias is present, with mild overestimation of cortical and underestimation of medullary volumes. Accuracy was impacted by segmentation of the contrast-filled collecting system, presence of large cysts and paucity of perirenal fat. Further work to refine the algorithm, including rejecting the collecting system, is underway. It has promising clinical potential for disease monitoring and as part of MR renography workflow.

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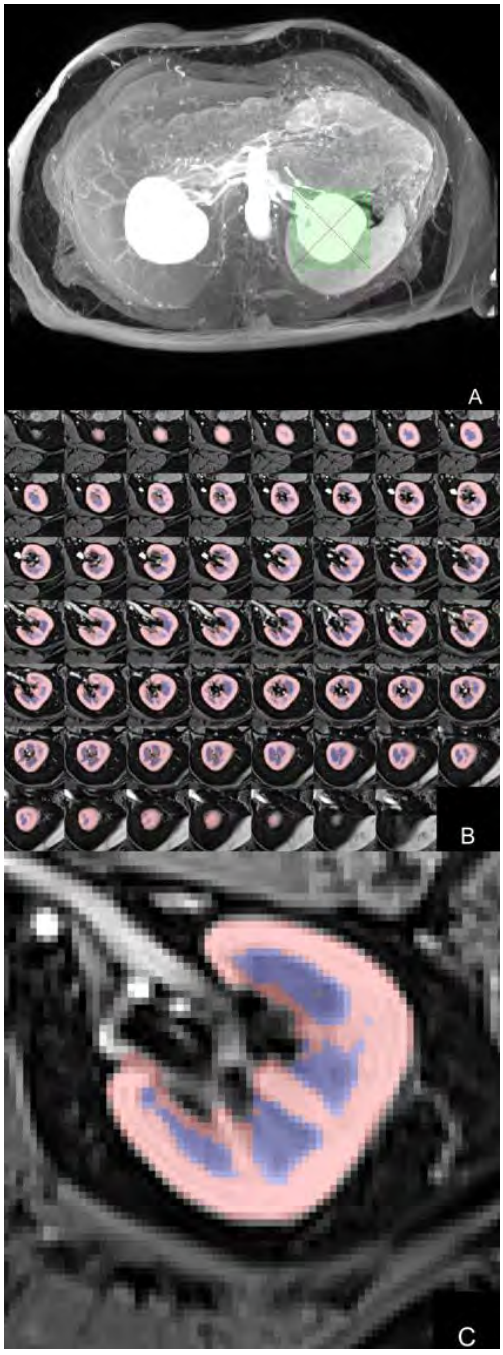

Figure 1. *VA segmentation of a representative kidney. A) bounding rectangle (green) drawn around kidney in MIP format, followed by a single mouse click, B) cropped image of left kidney demonstrating resulting corticomedullary segmentation with cortex highlighted pink and medulla blue, C) magnified image of a segmented mid-axial slice of left kidney.*

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Role of Breast Ultrasound in Breast Cancer Surveillance; Incremental Cancers found at what cost?

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Aim
To determine the diagnostic parameters and cost analysis of breast ultrasound in the context of breast cancer surveillance. Breast Ultrasound (US) in surveillance for breast cancer should be used when; age < 35, breast density > 50%, or mammographically occult primary breast cancer. Breast US is included in surveillance regardless of criteria at Austin Health. Evidence is limited in use of US for breast cancer surveillance.4

Methods
We retrospectively analysed 851 patients who underwent breast cancer surgery at Austin Health from July 2009 to December 2015. Clinicopathological and radiological data was obtained. 145 patients were excluded. Diagnostic parameters of US were determined and financial costs of US was determined using the Medicare Benefits Schedule. Survival outcomes were determined using the Logrank test.

Results
622 women underwent radiological surveillance, generating 2638 total rounds of surveillance and a median of 4.24 rounds per patient. 579 (93.1%) patients underwent mammography and breast US surveillance. 221 (38.2%) fit criteria for use of additional breast US. 177 abnormal imaging episodes occurred, leading to 17 screen detected-cases of locoregional recurrence. In negative mammography, US generated 107 abnormal images and found 9 cancers. US had a sensitivity of 90.0%, specificity of 95.8% and positive predictive value of 8.4%. US alone lead to 33 biopsy per 1000 US, and only 3.8 cancers per 1000 US. The average cost of detecting an additional cancer by US was $31,464 and $468 per patient included. Survival outcomes based on method of detection of recurrence were insignificant (p value = 0.942)

Conclusion
Breast US detected few recurrences that were mammographically occult. Breast US has a significantly low PPV in surveillance, leading to high biopsy rates and costs. A Review of current guidelines and stricter adherence to them may be suggested.

Artificial intelligence vs Human Intelligence - Quotient analysis on lung VQ scan for diagnosis of pulmonary embolism

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Background
Pulmonary embolism (PE) is a common indication for Ventilation/Perfusion (VQ) lung scans. Based on the clinical decision rule (CDR), PE can be diagnosed using VQ scans or CTPA, the latter exposing the patient to higher ionizing radiation. This study aimed to compare software alone analysis of 3D-SPECT VQ scans compared to scan interpretation by experienced nuclear medicine physicians.

Aim
To establish if the new Q.Lung Quotient functionality in the GE software Q.Volumetrix (Xeleris 4.0), can be independently used to diagnose PE on lung VQ SPECT scans.

Method
SPECT ventilation and perfusion were acquired on the GE Discovery 670 SPECT/CT scanner and analysed using the Quotient functionality within Q.Lung. The VQ SPECT +/- CT scans were reviewed by two nuclear medicine physicians independently and recorded as "reader results". Gold standard for diagnosis was clinical follow-up.

Results
Forty patients with VQ SPECT +/- CT scans were included in this study, consisting of 26 female, 14 males with age ranging from 22 to 90 and overall age mean of 54. 19 patients were reported to have positive VQ scans, of which 6/19 (31.5%) had Quotients ≤7% and deemed not to have PE. The CDR and clinical follow up showed that they were all clinically assessed and treated as PE. 21 patients had negative VQ scans for PE, of which 3/21 (14%) had Quotients which were >7%. However, 1 patient had vasculitis, 1 patient was not treated and still alive 2 months later, and 1 patient was treated as PE based on the CDR and clinical report (although the Quotient was only 8).

Conclusion
Using the Lung Quotient alone would have resulted in misdiagnosis of almost 1 in 4 patients, and therefore Q.Lung Quotient alone should not be used as the primary tool for diagnosing PE in VQ SPECT scans.

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Title:
Women in Interventional Radiology – Insights into Australia's Gender Gap

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Aim

Worldwide, women are grossly underrepresented in interventional radiology (IR).[1-7] This trend is consistent in Australia, where the latest Clinical Radiology Workforce Census identified no women practicing in IR or interventional neuroradiology.[8] Given that gender equality amongst healthcare professionals can lead to a safer workplace, more equitable access to healthcare, and better patient outcomes, it is important to identify and correct factors leading to this gender gap.[1,9] As such, we aim to compare exposure, knowledge, interest, and impressions of IR between male and female medical students and junior doctors.

Method

Multicentre prospective cross-sectional study using in-person and web-based distribution of a voluntary anonymous survey to junior doctors (interns and residents). 333 complete responses were received from 11 health services across two Australian states. Results were compared to those of our previous study, *Australian students' perspective on interventional radiology education: a prospective cross-institutional study* (ASPIRE), which employed an similar study design and survey completed by 236 medical students.[11]

Results

Complete responses were provided by 333 junior doctors (21.9% response rate). Females were consistently significantly less likely than males to consider a career in

IR, whether amongst medical students (24.8%vs41%,p=0.008) or junior doctors (13.1%vs29.7%,p<0.001). No other statistically significant gender disparities were identified, as both males and females reported: low levels of teaching and exposure to IR; strong belief in the importance of IR; suboptimal knowledge in IR; and poor awareness about careers in IR.

Conclusions
Australia's IR gender gap arises from as early as medical school, and cannot be attributed to gender inequalities in the exposure to or opportunities in IR. This suggests that preconceived stereotypes or sociocultural factors preliminarily deter females from pursuing this procedural, male-dominated subspecialty. Improvements in education, mentorship, advocacy and policy are necessary to achieving gender diversity, which will ultimately benefit the patients, clinicians, and practice of IR.

Word count: 300

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Foo M[1], Maingard J[2,3], Wang M[1], Lim R[4], Phan K[5], Kok HK[6], Chandra RV[2,7], Jhamb A[1,8], Lee MJ[9,10], Brooks M[1,8], Asadi H[1,2,11]

Title:
Junior doctors' awareness about careers and practice in interventional radiology

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11. *The Florey Institute of Neuroscience and Mental Health, Parkville VIC, Australia*

Aim:
Interventional radiology (IR) is a rapidly evolving subspecialty that has achieved strong uptake worldwide.[1] However, IR is a "fragile" workforce within Australia, due to the relatively small number of practicing interventional radiologists (IRs) and potential for critical undersupply as demand for IRs inevitably increases.[2-4] To sustain high quality research and practice in IR, it is important that trainee doctors are aware of IR as a career, as they may then be more likely to pursue IR.[4-7] Thus, our study aims to assess the current awareness of junior doctors about the training and job requirements in IR.

Method:
Multicentre prospective cross-sectional study using in-person and web-based distribution of a voluntary anonymous survey to interns and residents. Results were compared to that of our previous study (ASPIRE-1), which utilized a similar study design and survey amongst medical students.[8]

Results:
333 complete responses were received from 11 health services across two Australian states. Few doctors were aware of the subspecialty exams for IR (8.1%) and the certifying board for interventional neuroradiology (INR; 10.2%). The majority of respondents answered each of the IR test questions incorrectly. Pathways for subspecializing in IR and INR were identified correctly by 38.1% and 14.7% respectively. 39% of doctors knew if their hospital offers IR training, while 46.2% correctly stated if their hospital offers 24/7 IR services. When offered a choice of various services (consults, ward rounds, clinics, on-call), a mere 2.7% correctly identified what the practice of IR involves in their hospital.

Conclusion:
Junior doctors demonstrate poor awareness about the career and practice of IR, which may limit their ability to engage in the multidisciplinary care of IR patients and fulfil the demand for IRs and IR research.[6-7] Thus, through improved education and advocacy, we must raise awareness about IR amongst future clinicians.

Word count: 294

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Foo M[1], Maingard J[2,3], Wang M[1], Lim R[4], Phan K[5], Kok HK[6], Chandra RV[2,7], Jhamb A[1,8], Lee MJ[9,10], Brooks M[1,8], Asadi H[1,2,11]

Title:
Australian Surgical and medical trainees' Perspective on Interventional Radiology Education

1. *Interventional Radiology Service, Austin Health, Heidelberg VIC, Australia*
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7. *Faculty of Medicine, Nursing and Health Sciences, Monash University, Clayton VIC, Australia*
8. *Interventional Radiology Service, St Vincent's Hospital Melbourne, Fitzroy VIC, Australia*
9. *Department of Radiology, Beaumont Hospital, Dublin, Ireland*
10. *Royal College of Surgeons in Ireland, Dublin, Ireland*
11. *The Florey Institute of Neuroscience and Mental Health, Parkville VIC, Australia*

Aim:
Interventional radiology (IR) has undergone extraordinary development in recent decades, establishing an increasing essential role within therapeutic medicine.[1-5] However, teaching of IR has remained minimal, triggering the push from leaders in IR worldwide to encourage IR education within medical school.[5-10] In our previous study, *Australian students' perspective on interventional radiology education: A prospective cross-institutional study* (ASPIRE-1), few students reported adequate knowledge of IR yet many enjoyed learning IR and believed it should be part of their curriculum.[5] Noting these findings, our current study (ASPIRE-2) aims to evaluate the opinions of junior doctors about the means and timing of IR teaching, as to further guide implementation of an IR education within medical school, internship, or residency.

Method:
Multicentre prospective cross-sectional study using in-person and web-based distribution of a voluntary anonymous survey to junior doctors (interns and residents). 333 complete responses were received from 11 health services across two Australian states.

Results
Consistent with ASPIRE-1, few doctors believed they received insufficient teaching of IR in medical school (5.7%), with 44.7% reporting no exposure. 87.1% were interested in learning more about IR. When offered several means of learning IR, most candidates stated the following would be ideal: internship/resident curriculum (74.5%), medical school curriculum (55.6%) or watching IR procedures (50.8%). Most respondents had made a referral to IR before (73.9%), however, a minority believed they: had sufficient IR knowledge for their role (41.7%); felt confident referring to IR (48.9%) or had the knowledge to prepare a patient for an image-guided biopsy (33.0%)

Conclusion

ASPIRE-1 and ASPIRE-2 demonstrate that medical students and juniors doctors have strong interest and appreciation of IR but a significant unmet demand for IR teaching, which negatively impacts practice.[5] Therefore, the onus is on medical educators to improve IR teaching, helping optimise the multidisciplinary, holistic care of IR patients.

Word count: 299

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Assessment of clinical risk factors which may be predictive of disease detection on ^{68}Ga-PSMA PET/CT scans

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Background: ^{68}Ga PSMA PET/CT is being widely used by treating clinicians to restage patients with prostate cancer and stage patients with high risk prostate cancer. Whilst serum PSA levels have been shown to be predictive of a positive PSMA scan, there are other clinical factors specifically predicting nodal and metastatic disease which should also be taken into consideration.

Aims: To analyze the clinical factors which may predict the detection of regional, nodal and metastatic disease on ^{68}Ga-PSMA PET scan performed for staging and restaging.

Methods: All PSMA PET/CT scans performed for staging or restaging of prostate cancer in a 10 month period at Austin Health were included. The PSMA PET scan was classified for presence of PSMA-avid local disease, nodal disease and metastatic disease. Multivariate analysis, logistic regression and linear regression was performed against PSA levels, Gleason score, and prior treatment.

Results: There were 177 consecutive PSMA PET scans included, of which 22 were for staging and 155 for restaging. No statistically significant factors influenced local, nodal or metastatic disease on pre-treatment staging PSMA PET/CT. In the restaging scans, multivariate analysis showed that PSA level was the only positive predictor of a positive restaging scan ($p=0.03$), but the presence of nodal disease was associated with higher Gleason score ($p=0.016$) and PSA level ($p=0.035$). The presence of metastatic disease was also associated with a higher PSA ($p=0.008$), higher Gleason score ($p=0.05$) and previous radiotherapy ($p=0.005$).

Conclusion: PSA levels had a significant relationship with a positive restaging PSMA PET/CT scan, but not staging scans. Additionally, PSA was associated with the presence of nodal disease and metastatic disease. Gleason score and previous radiotherapy were found to be associated with the presence of metastatic disease.

Hey P[1,2], Hoermann R[2], Gow P[1,2], Hanrahan T[1], Testro AG[1,2], Chapman B[1,2], Sinclair M[1,2]

Reduced upper limb lean mass is associated with increased risk of early post-transplant sepsis and hospital length of stay in male liver transplant recipients.

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2. University of Melbourne, Australia

Aim: Sarcopenia has been associated with adverse clinical outcomes post-liver transplantation including increased mortality, sepsis and hospital length of stay. This study investigates the use of Dual energy x-ray absorptiometry (DEXA) body composition in predicting early post-transplant outcomes.

Methods: We retrospectively reviewed all adult liver transplant recipients who underwent pre-transplant DEXA imaging between 2002 and 2017. Endpoints included 90-day post-transplant mortality, sepsis, rejection (rejection activity index ≥4) and hospital length of stay (excluding deaths <24 post-transplant). Using logistic regression and Cox models, we describe the associations between gender-specific body composition measurements and post-transplant outcomes.

Results: Of 428 patients who underwent transplantation with available pre-transplant DEXA scans, 311 were male (72.6%). The median age was 54.0 years [IQR 47.2,59.2] and MELD score 15 [12,22]. At 90 days post-transplant, 14 patients (3.3%) had died, 78 (11.2%) had suffered major sepsis and 95 patients (22.2%) had had an episode of rejection. Upper limb lean mass was inversely associated with sepsis (HR 0.44, CI 0.205,0.945, p=0.035) in males but not females (HR 0.80, CI 0.14,4.69, p=0.80). Total lean mass, APLM and fat mass were not associated with 90-day sepsis post-transplant in either gender. There was a negative correlation between hospital length of stay and upper limb lean mass (τ_b=-.098, p=0.012) to day 90 post-transplant. In women, neither MELD nor body composition were associated with increased length of stay. Body composition parameters, MELD and age were not associated with 90 day mortality in either gender.

Conclusions: Sarcopenia is an independent and potentially modifiable predictor of sepsis and hospital length of stay within 90 days of liver transplantation in male patients. Despite an increase in these adverse outcomes related to sarcopenia, post-liver transplant mortality was low in this cohort, suggesting that prioritizing patients with sarcopenia for transplantation may be an appropriate strategy to minimize waitlist mortality.

The efficacy, safety and tolerability of outpatient continuous terlipressin infusion in patients awaiting liver transplant.

Terbah R[1], Chapman B[2,3], Gow P[1,3], Sinclair M[1,3], Angus P[1,3] and Testro A[1,3].
[1]Department of Gastroenterology and Liver Transplant Unit, Austin Health, Melbourne VIC, Australia
[2]Nutrition & Dietetics Department, Austin Health, Melbourne VIC, Australia
[3]The University of Melbourne, Parkville, Melbourne VIC, Australia

Background and aims: Terlipressin is a vasopressin analogue primarily used in the management of hepatorenal syndrome (HRS) and variceal haemorrhage, and is traditionally used as short-term therapy in the inpatient setting. Our centre offers continuous terlipressin infusion (CTI) as a bridge to transplantation in patients with hepatorenal syndrome or refractory ascites in both the inpatient and outpatient setting. This study describes the efficacy, safety and tolerability of outpatient CTI.

Method: Severity of liver disease (MELD), renal function (creatinine), frequency of paracentesis, dietary intake, functional muscle assessment (handgrip strength) and complications of therapy were prospectively recorded for all patients treated with outpatient CTI between May 2013 and April 2019 at our centre. Patients were followed up until transplant, death, cessation of CTI or a census date of April 30. Those who had an infusion duration of less than 2 weeks were excluded from nutritional analysis.

Results: Thirty-three patients met inclusion criteria (91% male, mean age 58.4 ±7.41 years). Twenty-six patients were included for nutritional analysis. Median duration of outpatient CTI was 49 days (range 1 – 467), with a total of 3122 patient days of outpatient CTI. The indications for treatment were HRS in 26 patients (79%) and refractory ascites in 7 (21%).

CTI resulted in a significant reduction in median creatinine (172.5μmol/L to 123μmol/L, $p<0.001$), median MELD (23 to 20, $p<0.001$), and Na-MELD (27 to 21, $p<0.001$). No significant change was noted in serum sodium or liver function. Handgrip strength increased by 23% from a median of 24.6kg to 30.3kg ($p=0.001$), and energy and protein intake increased from 55% to 86%, and 60 to 100% of estimated requirements, respectively (both $p<0.001$). The mean frequency of paracentesis decreased by 42% from 3.09 per 30 days prior to CTI to 1.80 per 30 days during CTI ($p<0.001$).

At the end of the study period, 24 (75%) patients had received a liver transplant, 2 patients died prior to transplant, and 3 patients remain on CTI. Four patients (12%) ceased CTI – 1 due to re-compensation of their liver disease, 1 underwent a TIPS procedure, and 2 were delisted due to alcohol recidivism. Twenty-eight patients (85%) were alive at last follow up. There were no cardiac or ischaemic complications observed, and no serious AEs to terlipressin reported. There was a total of 16 PICC-related complications and 11 patients required a total of 15 PICC changes.

There were 38 unplanned admissions, only 1 of which related directly to CTI (PICC line replacement). Other indications for admission were hepatic encephalopathy (n = 11), infection (n = 6), anaemia requiring blood transfusion (n = 4), symptomatic ascites (n = 3), hyperglycaemia (n = 3), vomiting (n = 2), musculoskeletal pain (n = 2), abdominal pain post paracentesis (n = 1), subdural haematoma following a fall (n = 1), malnutrition for the commencement of nasogastric feeding (n = 1), headache (n = 1), upper gastrointestinal bleeding (n = 1) and the emergence of terlipressin resistance in one patient who required renal replacement therapy.

Conclusion: CTI is associated with improved nutritional and muscle parameters, long-term maintenance of renal function, and significant reduction in ascites. CTI can be safely administered in the outpatient setting to successfully bridge patients with HRS and refractory ascites to liver transplantation, improving complications of end-stage cirrhosis and allowing patients to avoid prolonged inpatient hospitalisation.

Campfield SF [1] , Newman M [2], Grace JA [1,3]

Community-based "One Stop Shop" Model of Care for Hepatitis C Treatment

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2. Department of Pharmacy, Austin Health
3. University of Melbourne

Background and Aims
Hepatitis C (HCV) treatment uptake with Direct Acting Antivirals (DAA's) has decreased in Australia in the last 2 years. 43,000 Victorians are still living with chronic HCV despite attempts at increasing awareness and promoting screening of at-risk populations. We identified gaps in the provision of treatment in regional areas, and barriers in accessing care. Our aim was to address these barriers by establishing a multi-disciplinary remote treatment clinic and assess the success of this model of care.

Methods
The clinic was established within a GP superclinic, run by a Gastroenterologist, a Hepatitis C Clinical Nurse Consultant and an Integrated Specialist Pharmacist, and with access to fibroscan and pathology. Data was collected prospectively on treatment outcomes and pharmacist interventions. Responses to a patient survey were collected anonymously after 6 months.

Results
In the first 6 months, 28 new patient referrals were received. Of these, 24 have commenced DAAs, with 19 achieving sustained viral response (SVR) and 5 yet to complete. There were no treatment failures. All patients commenced on DAAs were counselled by the Clinical Pharmacist on the day of review. 10 patients (41%) required drug changes to ensure efficacy of treatment, and 5 patients (20%) were organised with a dosage administration aid. 83% of respondents to the survey stated a community-based clinic is very important to them and that it was easy to access. All felt they were treated respectfully without discrimination.

Conclusion
In conclusion, a regional "one-stop shop" model of care for HCV results is an efficient and popular model of care that results in high treatment success.

		Anaesthesia
Thurs1	Fiona Desmond	This abstract is not included at the request of the author
Thurs2	Lachlan Miles	Association between borderline anaemia and outcome in women undergoing abdominal surgery
Thurs3	Maleck Louis	Financial burden of postoperative complications following colonic resection: a systematic review
Thurs4	Maleck Louis	The hospital costs associated with postoperative complications following colonic resection surgery: a cohort study
		Cardiology
Thurs5	Benjamin Cailes	Inducible left ventricular outflow tract obstruction is associated with a higher incidence of perioperative cardiac arrest in liver transplantation
Thurs6	Benjamin Cailes	Existing models to assess perioperative cardiac risk demonstrate poor predictive validity in patients undergoing liver transplantation
Thurs7	Benjamin Cailes	Beta blocker use increases the risk of perioperative cardiac events in liver transplant patients
Thurs8	Benjamin Cailes	Hepatorenal syndrome in patients undergoing liver transplantation is an independent risk factor for perioperative cardiac complications
Thurs9	Georgie Meehan	This abstract is not included at the request of the author
Thurs10	Georgie Meehan	This abstract is not included at the request of the author
Thurs11	Karen Patching	AF-Express clinic in a tertiary, metropolitan hospital reduces Emergency Department re-admissions
Thurs12	Thalys Sampaio Rodrigues	This abstract is not included at the request of the author
		Neurosciences
Thurs13	Andrew Nunn	Trends in traumatic spinal cord injury in Victoria, Australia: 2007 to 2015
Thurs14	Andrew Nunn	A human sensory pathway connecting the foot to ipsilateral face that partially bypasses the spinal cord
Thurs15	David Vaughan	EEG-fMRI with causal modelling can identify the driving node in focal epilepsy networks
Thurs16	Fiona Gardiner	The genetic landscape of the developmental and epileptic encephalopathies
Thurs17	Laura Bird	This abstract is not included at the request of the author
Thurs18	Laura Bird	This abstract is not included at the request of the author
Thurs19	Marie Inder	Natural history studies in the developmental and epileptic encephalopathies: the future is in the past
Thurs20	Nicholas Crump	A Prospective Study of Patients with Chronic Inflammatory Demyelinating Polyneuropathy (CIDP): Identifying Ultrasonographic Features for Diagnosis and Prognosis
Thurs21	Rebekah Victoria Harris	This abstract is not included at the request of the author
Thurs22	Timothy Green	This abstract is not included at the request of the author
Thurs23	Warwick Park	Co-registration of Transcranial Doppler and Anatomical imaging
		Obstetrics and Gynaecology
Thurs24	Teresa MacDonald	The cerebral-placental-uterine ratio as a novel predictor of late fetal growth restriction: a prospective cohort study
Thurs25	Teresa MacDonald	Increasing fetal growth velocity increases the risk of shoulder dystocia among non-macrosomic foetuses

		Oncology
Thurs26	Adam Parslow	This abstract is not included at the request of the author
Thurs27	Alexandra Berlangieri	A Scoping Review of MRI Guided Breast Radiotherapy
Thurs28	Allison Barraclough	This abstract is not included at the request of the author
Thurs29	Annalisa Carli	DCLK1: a novel promoter of gastric cancer progression
Thurs30	Anne Huber	This abstract is not included at the request of the author
Thurs31	Antonin Serrano	Unravelling breast cancer heterogeneity using genetic barcoded patient-derived xenograft
Thurs32	Bridget Chappell	Incidence of metastatic disease in low risk Differentiated Thyroid Carcinoma patients
Thurs33	Candani Tutuka	This abstract is not included at the request of the author
Thurs34	Christian Wichmann	Automated radiosynthesis of [177Lu]Lu-PSMA-617 on the iPHASE MultiSyn module
Thurs35	Delphine Denoyer	New approach to identify and treat patients at risk of breast cancer brain metastasis
Thurs36	Hoang Kim Ngan Le	Characterising the role of IL-36G in the development of gastric cancer
Thurs37	Joshua Adalin	Phenotyping the immune microenvironment in early- and late-stage melanoma
Thurs38	Kellie Mouchemore	This abstract is not included at the request of the author
Thurs39	Lap Hing Chi	BMP4 Inhibits Breast Cancer Metastasis Independent of Tumour SMAD4
Thurs40	Lokman Pang	Investigating the role of GP130/STAT3 signalling in intestinal barrier function
Thurs41	Mariah Alorro	Selective Stat3 inhibition in the tumour microenvironment restricts gastrointestinal tumour growth
Thurs42	Rhynelle Dmello	Determining the effect of bazedoxifene in combination with chemotherapy on colon cancer cells
Thurs43	Riley Morrow	Therapeutically targeting Myc in gastric cancer
Thurs44	Ryan O'Keefe	Targeting Tuft cells and Innate Lymphoid Cells in Gastric Cancer
		Palliative Care
Thurs45	Georgina Whittaker	This abstract is not included at the request of the author
Thurs46	Hayley Hall	Seeing the Opportunity
Thurs47	Hilary Hodgson	Introducing Mindfulness as a Self-Care tool in the Palliative Care Unit (PCU)
Thurs48	Hilary Hodgson, Juli Moran, Helen Longton	What a difference more beds make!
Thurs49	Natalie Pejoski	This abstract is not included at the request of the author
		Parent/Infant
Thurs50	Alan Gemmill	Influence of an Early Stress-reduction Intervention for Very and Extremely Preterm Infants on Behavioural, Cognitive and Academic outcomes from 2 to 9 Years of Age
		Pathology
Thurs51	Elizabeth Grabsch	Simplification of Direct MALDI-TOF Identification from Positive Blood Culture Broth
Thurs52	Megan Sullivan	Benchmarking Blood Culture Turnaround Times at Austin Pathology
Thurs53	Patricia Szczurek	Automated Resistance Detection:Comparison of BD Phoenix to bioMérieux Vitek2 for Susceptibility Testing of Multi-drug Resistant Isolates

Thurs54	Patricia Szczurek	Automated Resistance Detection: Comparison of the expert systems of BD Phoenix and bioMérieux Vitek2 for Susceptibility Testing of Multi-drug Resistant Isolates
Thurs55	Sindhu Nagabhushan	A Comparative evaluation of Cepheid GeneXpert® and BD MAXTM Enteric Viral panel for the detection of Norovirus in faeces
		Pharmacy
Thurs56	Kyle Booth	Slow-release opioids post surgery: what messages are patients receiving?
Thurs57	Lucy Morison	Compliance with hospital guidelines for antipsychotic prescribing in the management of delirium: a retrospective audit
		Respiratory and Sleep Medicine
Thurs58	Elie Gottlieb	This abstract is not included at the request of the author
Thurs59	Krisha Saravanan	Measuring peak cough flow in the clinical setting: an evaluation of devices and interfaces
Thurs60	Luke McDonald	Pneumothorax in neuromuscular disease associated with lung volume recruitment and mechanical insufflation-exsufflation.
Thurs61	Nicole Sheers	Respiratory function and infections in people with motor neurone disease
Thurs62	Nicole Sheers	The physiological effects of a single session of lung volume recruitment in people with motor neurone disease
Thurs63	Sarah Retica et al	Benefit versus Burden of Regular Respiratory Physiotherapy in Neuromuscular Disease: A Follow-up Questionnaire.
Thurs64	Caroline Chao	Measuring adherence to long-term assisted ventilation
		Physiotherapy
Thurs65	Marisa Delahunt et al	This abstract is not included at the request of the author
		Psychiatry and Psychology
Thurs66	Carolina Restrepo	This abstract is not included at the request of the author
Thurs67	Yafit Hirshler	Social Support - A Protective Factor for Perinatal Depression?
		Psycho-Oncology, Supportive Care and Palliative Care
Thurs68	Gemma Skaczkowski	This abstract is not included at the request of the author
Thurs69	Gemma Skaczkowski	This abstract is not included at the request of the author
Thurs70	Gemma Skaczkowski	This abstract is not included at the request of the author
Thurs71	Gemma Skaczkowski	This abstract is not included at the request of the author
		Renal
Thurs72	Benjamin Lazarus	This abstract is not included at the request of the author
Thurs73	Elizabeth Brookes	This abstract is not included at the request of the author
Thurs74	Geoffrey Harley	The Role of Glycolysis in Progression of Renal Fibrosis
		Medical Imaging
Thurs75	Cameron Pain	Accurate measurements of dose calibrator gain settings with HPGe detector spectroscopy.
Thurs76	Kenneth Young	A high performance liquid chromatography quality control method for 4-[18F]Fluorobenzyl dexetimide (4-[18F]-FDEX)
Thurs77	Ruth Lim	This abstract is not included at the request of the author
		Choosing Wisely Initiative
Thurs78	Helen Baxter , Michele Gaca	Ask an Informationist - engaging with the evidence

		Clinical Haematology
Thurs79	Kate Manos	Clinical utility of next generation sequencing in AML: a real-world experience
Thurs80	Leya Nedumannil	Use of chest CT for refractory fevers in haematology patients on antifungal prophylaxis
Thurs81	Wendi Lin	Measurable residual disease detection by next generation sequencing in B-cell acute lymphoblastic leukaemia
		Critical Care and Emergency Medicine
Thurs82	Beth Palmer	Do parents make good decisions when bringing their child to the Emergency Department? Comparing GP and parent-referred paediatric emergency presentations.
Thurs83	Ian Baldwin	Nursing handover tools in the ICU; A practice survey.
		Endocrinology and Metabolism
Thurs84	Jeffrey Zajac	Patients with diabetes are at no greater risk for contrast induced nephropathy than those without diabetes
Thurs85	Rebecca Ho	This abstract is not included at the request of the author
		End-of-Life Care, Advance Care Planning
Thurs86	Nadia Moore	Doctors' perspectives on adhering to advance care directives when making medical decisions for patients: an Australian interview study
		Geriatrics
Thurs87	Olivia Reid	Are we overdosing older people with paracetamol in hospital?
Thurs88	Paul Yates	This abstract is not included at the request of the author
		Nutrition
Thurs89	Sandra Iuliano	This abstract is not included at the request of the author
		Hepatobiliary
Thurs90	Brooke Chapman	Reduced handgrip strength in liver transplant recipients is associated with poor outcomes after transplantation
Thurs91	Georgina Riddiough	Recurrence of colorectal liver metastases in the regenerating liver
		Surgery
Thurs92	Jennifer Xu	First do no harm"": significance of delays to surgery in patients with non-metastatic breast cancer
		Infectious Diseases
Thurs93	Paul Kinsella	This abstract is not included at the request of the author
Thurs94	Sharmila Khumra	Evaluation of the practice of intravenous to oral antimicrobial switch in hospitalised patients
		Gastroenterology
Thurs95	Lakmie Gunarathne	Therapeutic potential of targeting the protective arm of the renin-angiotensin system in cirrhotic and non-cirrhotic portal hypertension

Association between borderline anaemia and outcome in women undergoing abdominal surgery

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Introduction

Anaemia has been recognised as a risk factor for poor post-operative outcome across a variety of surgical specialties.[1] However, most evidence defines anaemia using the World Health Organization (WHO) definition, which is sex-based and unchanged since the 1950's.[2] The data used by the WHO to determine haemoglobin concentration [Hb] relatively underrepresents women and data on iron status was not fully available.[3] We hypothesised that women relative to women with a [Hb] $\geq$ 130 g/L, women with a [Hb] of 120 – 129 g/L would have worse post-operative outcomes.

Methods

We conducted a retrospective cohort study of all women who underwent elective major abdominal surgery at Austin Health between July 2013 and July 2018. Patients were stratified as anaemic, borderline anaemic and not anaemic according to pre-operative [Hb]. We collected data on baseline characteristics, preoperative laboratory results, and postoperative outcomes. Univariate statistical analysis between borderline anaemic and not anaemic groups was performed. Multivariate matched analysis corrected for procedure and comorbidities was also completed.

Results

Relative to the non-anaemic group, borderline anaemic women demonstrated a higher risk of complication (55 [16%] vs. 110 [11.4%]; p = 0.026), increased length of hospital stay (3.0 [1.1 – 6.2] days vs. 2.2 [1.0 – 5.0] days; p = 0.017) and reduced DAOH at day 30 (24.6 [8.5] vs. 25.6 [5.8]; p = 0.017) and day 90 (83.2 [11.0] vs. 84.1 [10.9]; p = 0.03). Following multivariate analysis, the previously demonstrated differences in outcomes reduced in magnitude, and statistical significance was lost. However, the difference in point prevalence for some of these metrics between the groups, particularly complication, means that type II error cannot be excluded.

Conclusion

In women undergoing major elective abdominal surgery, borderline anaemia may be associated with poorer outcomes than non-anaemia. However, concomitant comorbidity and procedure type are significant confounding factors. We conclude that the current recommendation that a [Hb] of 120 – 129 g/L is "adequate" for women presenting for abdominal surgery is not fit for purpose and in need of revision. There is a clear need for further studies better defining the relationship between procedure, comorbidities, sex and pre-operative [Hb].

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Louis M[1], Johnston SA[1], Churilov L[2], Ma R[3], Christophi C[4], Weinberg L[1,4]

Financial burden of postoperative complications following colonic resection: a systematic review

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Aim
Colonic resection is a common surgical procedure associated with a high rate of post-operative complications. The development of complications is expected to be a major contributor to hospital costs. This systematic review aims to outline the health costs of postoperative complications following colon resection surgery and to determine the association between complication severity, length of stay, 30-day readmission and mortality, and costs.

Methods
We searched the literature using the MEDLINE, EMBASE, Cochrane and EconLit databases from January 2010 to February 2019 to identify English studies containing an economic evaluation of postoperative complications following colonic resection in adult patients. Colon resection was defined as complete excision of any part of the large bowel (excluding rectum). Eligible study design included randomised and non-randomised controlled trials, comparative observational studies and conference abstracts. Risk of bias was assessed using validated assessment tools. Findings are reported as a narrative synthesis.

Results
Thirty-four articles met the eligibility criteria. Our findings demonstrate a substantial degree of heterogeneity in study design, methodology used to calculate cost and defining and reporting on complications. We found a high overall complication incidence with associated increased costs and resource utilisation following colonic resection surgery. Increasing complication severity and complication count were associated with increased resource use. Hospital readmissions are highlighted as a significant financial burden and postoperative complications are associated with greater incidence of hospital readmissions. Postoperative complications were found to result in increased hospital length of stay and mortality incidence. Limitations include few high-quality costing studies and substantial study heterogeneity preventing quantitative analysis of cost results.

Conclusion
Postoperative complications in colonic resection surgery appear to be associated with a significant financial burden. High quality, consistent, prospective economic studies are still needed to accurately evaluate the cost of complications arising from colonic resection surgery.

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The hospital costs associated with postoperative complications following colonic resection surgery: a cohort study

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Aim
Colonic resection is a common surgical procedure associated with a high rate of post-operative complications. Our aim is to estimate the in-hospital costs of complications and to identify perioperative variables associated with complication development following colon resection surgery.

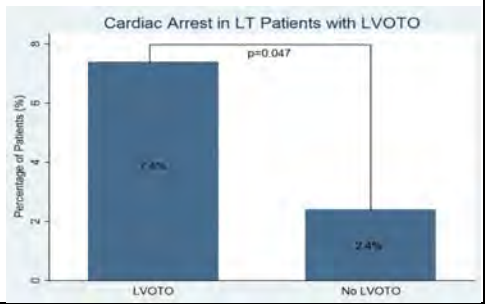
Methods
487 patients from 2013 to 2018 were included. Postoperative complications were defined as any deviation from the normal postoperative course and graded according to the Clavien-Dindo classification system. In-hospital cost of index admission, excluding preoperative costs, is reported in 2019 United States Dollars. Regression modelling was used to investigate the relationship of a priori selected perioperative variables and presence of complications.

Results
The overall complication prevalence was 69.6% (95%CI: 65.5% to 73.7%). Presence of complications was significantly associated with Charlson Comorbidity Index (Odds ratio per 1-point increase: 1.09; 95%CI:1.02 to 1.17), preoperative albumin levels (Odds ratio per 1-point increase: 0.94; 95%CI: 0.90 to 0.98) and open as compared to laparoscopic resection (Odds ratio: 2.41; 95%CI: 1.32 to 4.42). Median [interquartile range] cost of patients with postoperative complications was significantly increased as compared to patients without complications ($17,963 [13,533:25,178] vs $12,578 [10,196:16,140]; p<0.0001). Increasing complication count was associated with a significant increase in hospital costs (p≤0.013). Costs were significantly increased for all complication severity grades (p<0.0001) except for grade V complications that did not reach statistical significance (p=0.090). Patients with complications had an increased median hospital length of stay (8 [6:13] vs 5 [4:6] days; p<0.0001). No significant difference was identified in 30-day readmission rates between complicated (12.7%) and uncomplicated patients (11.5%); p=0.766.

Conclusion
Our study highlights postoperative complications as a key target for cost containment strategies. We demonstrate a high incidence of postoperative complications following colonic resection associated with an increase in hospital costs and hospital length of stay.

Inducible left ventricular outflow tract obstruction is associated with a higher incidence of perioperative cardiac arrest in liver transplantation

Background: Inducible left ventricular outflow tract obstruction (LVOTO) is often encountered in liver transplant (LT) candidates during cardiac workup. While the impact of LVOTO on adverse cardiovascular haemodynamics is well reported, it is unclear whether it predisposes to perioperative cardiovascular complications post LT.
Methods: Consecutive patients undergoing dobutamine stress echocardiography were evaluated from a LT centre between 2010-2017. Inducible LVOTO was defined as LVOT gradient ≥36mmHg. Perioperative major adverse cardiovascular events (MACE) at 30 days and all-cause death were recorded from a prospectively maintained LT database and supplemented by electronic medical record review.
Results: We evaluated 560 patients who underwent DSE during LT workup, 319 of which progressed to transplant. Inducible LVOTO was observed in 68 patients (21.3%). A higher baseline cardiac output (7.7 vs. 7.0 L/min, p=0.002) predicted for development of inducible LVOTO. Seventy-seven patients (4.1%) experienced a MACE including five deaths, 19 cases of heart failure, 11 cardiac arrests, 10 acute coronary syndromes and 46 arrhythmias (VT/AF). Overall MACE occurred in 17/68 patients (25.0%) with LVOTO and 60/251 (23.9%) without (p=0.85). However, there was a significantly increased risk of resuscitated peri-operative cardiac arrest in patients with LVOTO (7.4% vs. 2.4%, p=0.04). Patients with LVOTO also required significantly greater volumes of fluid intra-operatively (8.37L vs. 6.71L, p=0.043).
Conclusions: Inducible LVOTO is a frequent finding occurring in 21.3% of LT candidates. Despite higher intraoperative fluid resuscitation, LVOTO increased the risk of perioperative cardiac arrest. Patients with LVOTO undergoing liver transplantation may benefit from heightened perioperative surveillance.



Existing models to assess perioperative cardiac risk demonstrate poor predictive validity in patients undergoing liver transplantation

Background: Liver transplantation (LT) is associated with risk for perioperative cardiovascular events. Although guideline recommended risk scores are well validated in non-cardiac surgery, there is uncertainty regarding their utility in LT.

Methods: Consecutive adult patients undergoing LT at the Victorian Liver Transplantation Unit between 2010 and 2017 were evaluated. Perioperative 30-day major adverse cardiovascular events (MACE) and all-cause death were recorded from a prospectively maintained transplantation database and supplemented by electronic medical record review. Perioperative risk for each patient was calculated using the Revised Cardiac Risk Index (RCRI), Charlson Comorbidity Index (CCI) and American Society of Anaesthesiologists Score (ASA) and subsequently assessed for predictive validity.

Results: Among the 704 adult patients that underwent workup for LT, 462 proceeded to transplantation (mean age 52±13, 67.5% male). A total of 51 (11%) patients had perioperative MACE within the 30-day post-operative period. Events included 26 episodes of cardiac failure, 15 resuscitated cardiac arrests, 16 acute coronary syndromes and 10 episodes of ventricular tachycardia. Predictive capability of the assessed scores is reported in Table 1. The risk predictive ability of the RCRI, CCI and ASA scores were low, with all reporting an area under the curve (AUC) <0.60. A high risk score, as defined by guideline recommendations, demonstrated a modest negative predictive value (NPV) and a low positive predictive value (PPV).

Conclusion: Current preoperative risk prediction algorithms have poor predictive ability for cardiac events in a contemporary cohort of LT patients. Better risk prediction algorithms in this group of patients are warranted.

	NPV	PPV	AUC	AUC 95%CI
RCRI ≥3	91%	21%	0.57	0.51-0.64
CCI ≥5	92%	13%	0.56	0.49-0.63
ASA≥4	88%	10%	0.48	0.41-0.55

Beta blocker use increases the risk of perioperative cardiac events in liver transplant patients

Background: Recent evidence has linked beta blocker (BB) use with perioperative major adverse cardiovascular events (MACE) after non-cardiac surgery. BB are often used for treatment of portal hypertension in liver disease. We sought to determine whether BB use was associated with adverse perioperative outcomes in liver transplantation (LT).

Methods: Consecutive adult patients undergoing LT between 2010 and 2017 in the Victorian Liver Transplantation Unit were evaluated. Beta-blocker use, perioperative 30-day MACE (acute coronary syndrome, cardiac arrest, cardiac failure and ventricular tachycardia), and all-cause mortality were recorded from a prospectively maintained database.

Results: We evaluated 704 patients who underwent workup for LT. Of these, 462 proceeded to transplant (mean age 52±13; 67.5% male). There were 84 (19.8%) patients on BB at the time of surgery. Patients on BB were older (55±10 vs 52±13 years; p=0.025), and more frequently had coronary disease (15.5% vs 6.2%; p=0.005) and atrial fibrillation (22.6% vs 2.6%; p<0.001). There were 51 (11%) MACE and five deaths. BB use was associated with higher MACE (16.7% vs 8.5%; p=0.026), but not all-cause mortality (2.4% vs 0.9%; p=0.25). Multivariable logistic regression was used to adjust for age, Revised Cardiac Risk Index, coronary disease, atrial fibrillation and post-operative bleeding or infection. BB use was independently associated with increased risk of perioperative MACE (OR 2.06, 95%CI 1.14-3.71; p=0.017).

Conclusions: BB use in patients undergoing LT was independently associated with higher perioperative MACE. This study adds to a growing body of evidence suggesting an association of BB use with adverse perioperative cardiac events.

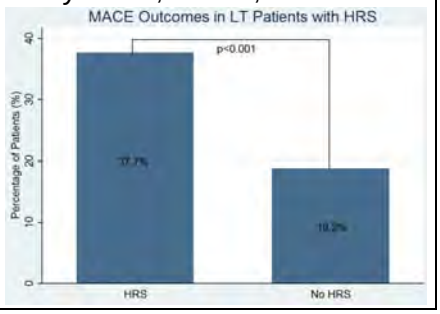
Hepatorenal syndrome in patients undergoing liver transplantation is an independent risk factor for perioperative cardiac complications

Background: Hepatorenal syndrome (HRS) is a serious complication of cirrhosis associated with a poor survival in the absence of liver transplantation (LT). Although HRS confers higher risk of complications due to cirrhosis, it is unclear whether it leads to increased risk of perioperative major adverse cardiovascular events (MACE) following LT.

Methods: Consecutive patients that underwent pre-liver transplant (LT) workup between 2010-2017 were included. All patients underwent a dobutamine stress echocardiogram (DSE) as part of the work-up. HRS was diagnosed using guideline-based criteria. MACE was recorded from a prospectively maintained transplantation database and supplemented by electronic medical record review.

Results: A total of 560 patients (mean age 56±12 years, 75% male) underwent workup for LT. Among these 319 proceeded to LT with viral hepatitis (37%) being the primary aetiology. Seventy-six (23.8%) MACE events occurred in the 30-day perioperative period. This included 5 deaths, 19 cases of heart failure, 11 cardiac arrests, 9 acute coronary syndromes and 46 arrhythmias (VT/AF). A significantly higher proportion of patients with HRS developed MACE (32/85, 37.7%) compared to those without HRS (44/234, 18.8%) ($p<0.001$). On multivariable logistical regression, after adjusting for age, gender, diabetes, pre-existing history of AF, NASH, BMI and an abnormal DSE, HRS was strongest predictor of perioperative MACE (OR 2.67, 95%CI 1.27-4.68, p=0.008).

Conclusions: HRS is associated with a higher risk of perioperative MACE when undergoing liver transplantation. This association is maintained after adjustment for comorbid conditions. Incorporating HRS in cardiac risk prediction algorithms may further improve risk stratification of patients undergoing LT.



AF-Express clinic in a tertiary, metropolitan hospital reduces Emergency Department re-admissions

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Background

The total number of Atrial Fibrillation (AF) hospitalisations in Australia continues to increase more than for any other cardiovascular condition[1]

- In Victoria there are ~15,000 Emergency Department (ED) presentations a year
- The lifetime risk of ischaemic stroke among patients >65 years is high[2]
- Australian research has suggested that program-management of AF improves mortality and other adverse outcomes[3]
- Preliminary work at the Austin in 2016-2017 indicated significant opportunities to reduce practice variation, and to close treatment gaps that have been observed globally [4]

Aims

- **To review patients as soon as possible after presenting to ED with AF**
- **To ensure provision of a basic suite of investigations (AF Care Set)**
- **To adhere to the basic guideline prescribing program**
- **To promote early follow up with family doctors and appropriate clinics (i.e. cardiology, arrhythmia, heart failure and general medicine)**

"Our rapid access clinic AF-Express (AF-X), was established to provide early review with emphasis on appropriate initial investigation, prompt clinical assessment and access to comprehensive treatment, with particular focus on stroke prevention. We work with patients and their families to deliver:

- *Evidence-based care*
- *Individual, patient focused management*
- *Education and reassurance for patients & their families"*

Method

- AF-X uses hospital data systems to automatically identify patients who have presented to ED with AF
- **Nurse-led clinic aimed at offering early review - within 5 working days**
- We aim to review *all* ED presentations
- The AF Care Set is guaranteed: electrocardiogram, chest X-ray, serum creatinine & electrolytes, full blood count, echocardiography to assess structural heart disease & cardiac dysfunction
- After clinical assessment, patients are referred to the most appropriate follow-up
- Data (including a health questionnaire[5] & experience measure) forms a clinical archive to facilitate clinician feedback & quality improvement activities

Fig: 1: Readmissions

Episode *n = 551*	Re-admissions
ED	117 (21.2%)
Previously seen in AF-X (ED post AF-X)	10 (1.8%)
Not seen in AF-X	51 (9.3%)
Not seen in AF-X: re-present ≥2 - ≤6 times	14 (2.5%)

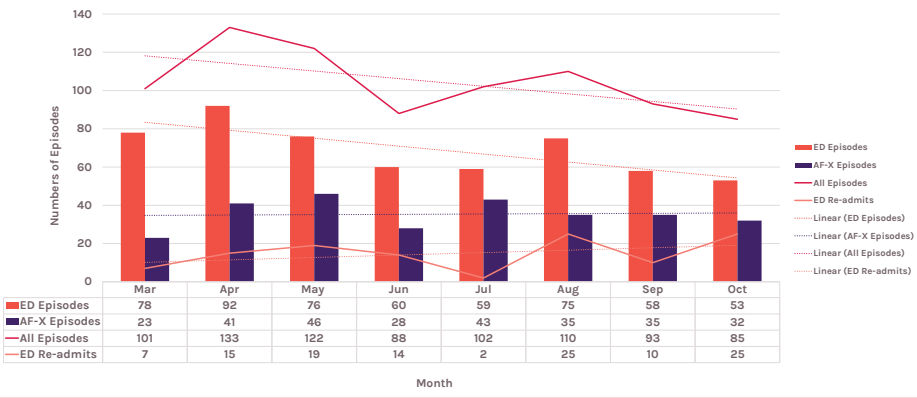
Results

In the first eight months of operation a total of 283 patient reviews occurred in AF-X:

- 178/551 ED presentations referred to AF-X
- 37 encounters referred by GP
- 27 encounters from ward services
- 46 patients were seen in clinic more than once

Data shows an increase in AF-X encounters, and significant downward trend in the number of ED encounters (Figure 2), explaining a preliminary finding of ~16% downward trend of all AF encounters. Supporting this evidence is the small number who re-present (1.8%) after being seen in AF-X as opposed to 9.3% who re-present who have not previously been seen in AF-X (Figure 1)

Fig: 2: AF Re-admissions to ED



	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
ED Episodes	78	92	76	60	59	75	58	53
AF-X Episodes	23	41	46	28	43	35	35	32
All Episodes	101	133	122	88	102	110	93	85
ED Re-admits	7	15	19	14	2	25	10	25

Conclusion

1. AF-X is a health service improvement initiative that delivers an innovative multi-disciplinary service underpinned by health informatics
2. Quality, Safety, Efficiency and Access are directly or indirectly addressed in the management of patients with AF presenting to the ED
3. **Preliminary findings suggest that early nurse-led review in the AF-X clinic may help reduce ED re-admissions, by ensuring consistent delivery of care**
4. AF-X has the potential to serve as a template for development of other informatics-based scalable, nurse-led healthcare delivery programs

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Trends in traumatic spinal cord injury in Victoria, Australia: 2007 to 2015

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Background: Spinal cord injury (SCI) can have devastating and lasting effects on individuals and these injuries are associated with significant societal and economic burden. There is a need to understand the epidemiological patterns of traumatic SCI to inform the development of injury prevention strategies and the provision of health care and disability services.

Aims: This study aimed to examine trends in the incidence and causes of hospitalisations for traumatic SCI over a 9-year period.

Methods: We performed a retrospective review of major trauma patients who sustained a traumatic SCI using data from the population-based Victorian State Trauma Registry from 2007 to 2015. SCI was defined as an AIS (2005 version 2008 update) score ≥ 4 in the cervical, thoracic or lumbar spine, with the exclusion of cauda equina and nerve root injuries.

Results: There were 628 cases of traumatic SCI in Victoria over the 9-year study period. Most patients were men and the median age was 50 years (interquartile range: 30-68). Forty percent resulted from transport-related events and 26% from low falls. Fifty cases of SCI (8%) resulted from being struck by or a collision with an object. Of these, 17 (34%) resulted from diving into shallow water and 10 (20%) resulted from water sport activities.

The incidence of SCI did not change over the study period (IRR = 1.01, 95% CI: 0.98, 1.05; P=0.352). Similarly, there was no change in the incidence of SCI in motor vehicle occupants (IRR = 0.97, 95%CI: 0.91, 1.04; P=0.416), motorcyclists (IRR = 0.95, 95% CI: 0.87, 1.05; P=0.302), cyclists (IRR = 1.06, 95% CI: 0.95, 1.19; P=0.269) or pedestrians (IRR = 0.96, 95% CI: 0.75, 1.20; P=0.702). While the incidence of SCI resulting from high falls did not change over the study period (IRR = 1.01, 95% CI: 0.94, 1.09; P=0.706), the incidence resulting from low falls increased 8% per year (IRR = 1.08, 95% CI: 1.02, 1.15; P=0.009). These low fall events were commonly observed in those aged 65 years and older (61%), were incomplete cord injuries in the cervical spine (64%) and were isolated SCI injuries (96%).

Discussion and conclusions: Over a 9-year period, we observed no change in the overall incidence of traumatic SCI and an increase in the incidence of traumatic SCI resulting from low falls. Given the devastating effects on individuals and their families, continued efforts in primary prevention are required to reduce the burden of traumatic SCI.

A human sensory pathway connecting the foot to ipsilateral face that partially bypasses the spinal cord

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Abstract

Human sensory transmission from limbs to brain crosses and ascends through the spinal cord. Yet, descriptions exist of ipsilateral sensory transmission as well as transmission after spinal cord transection. To elucidate a novel ipsilateral cutaneous pathway, we measured facial perfusion following painfully-cold water foot immersion in 10 complete spinal cord-injured patients, 10 healthy humans before and after lower thigh capsaicin C-fiber cutaneous conduction blockade and 10 warm-immersed healthy participants. As in healthy volunteers, ipsilateral facial perfusion in spinal cord injured patients increased significantly. Capsaicin resulted in contralateral increase in perfusion, but only following cold immersion and not in 2 spinal cord-injured patients who underwent capsaicin administration. Supported by skin biopsy results from a healthy participant, we speculate that the pathway involves peripheral C-fiber cross-talk, partially bypassing the cord. This might also explain referred itch and jogger's migraine and may be amenable to training spinal-injured patients to recognize lower limb sensory stimuli

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EEG-fMRI with causal modelling can identify the driving node in focal epilepsy networks

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Aim
A clinical dilemma in epilepsy localization occurs when the epileptic discharges on EEG are spatially discordant from a brain lesion on MRI. We investigated the network relationship between these two regions, using simultaneous EEG-fMRI data and stochastic dynamic causal modelling[1] (sDCM).

Methods
Three patients were identified meeting the following criteria: a solitary focal epileptogenic lesion, discordant scalp EEG localization, and an EEG-fMRI study showing significant peri-lesional activation. Simultaneous EEG and functional MRI data were acquired for one hour (3T MRI, echo-planar imaging, TR 3.0/3.2s, TE 30/40ms, voxels 3.0/3.4mm isotropic). The blood oxygen-level dependent time course was extracted from the two relevant regions. A set of plausible two-node bilinear sDCM models were evaluated for each patient, with the best-fit model in each case identified using Bayesian model selection and fixed-effects analysis.

Results
The same network model was found to have the highest probability in each case. It showed reciprocal excitatory connections between the lesion and the epileptic discharge node (strength 0.08 to 0.36Hz, Pr>0.99) and self-inhibition at each node (strength -0.05 to -0.22Hz). Scalp epileptic discharges corresponded to a driving input at the lesion (strength 0.009 to 0.017Hz, Pr>0.99), and a modulating influence on connectivity from the lesion to the epileptic discharge node.

Conclusion
EEG-fMRI can help to reconcile discordant EEG and structural MRI findings by revealing a multi-lobar network of inter-ictal epileptic activity. Causal modelling demonstrated the structural lesion as the most plausible driver of epileptic network fluctuations in each case. Hypothesis-driven application of causal modelling may be a useful method for identifying the driving node in similar cases of focal epilepsy.

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Fiona J. Gardiner[1], Alison M. Muir[2], Candace T. Myers[2], Michele G. Mehaffey[2], Aaron B.I. Rosen[2], Malika Sud[2], Natalie Weed[2], Aman Buttar[2], Apoorva Chowdhary[2], Chontelle King[3], Amy L. Schneider[1], Brigid Regan[1], Lynette G. Sadleir[3], Heather C. Mefford[2], Ingrid E. Scheffer[1,4]

The genetic landscape of the developmental and epileptic encephalopathies

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Aim
Developmental and epileptic encephalopathies (DEEs) are a group of severe, early onset epilepsies, characterised by refractory seizures, frequent epileptiform activity, developmental delay and/or regression. DEEs are highly genetically heterogeneous with over 100 genes implicated. However, around half of all patients remain unexplained after molecular testing. We sought to identify genetic causes of unsolved DEEs through whole exome sequencing.

Methods
214 patients with a DEE who were negative for a DEE genetic panel, underwent whole exome sequencing, including 168 proband-parent trios, 21 proband-parent duos, and 25 proband singletons. Ultra-rare, nonsynonymous variants that followed *de novo* dominant, compound heterozygous, newly homozygous or X-linked hemizygous pattern of inheritance were prioritised.

Results
We identified pathogenic or likely pathogenic variants in 36/214 (16.8%) of our unsolved DEE patients: 11/36 (31%) were biallelic, with homozygous or compound heterozygous inheritance. 13/36 (36%) of solved patients had variants in known DEE genes, which had been missed on screening due to insufficient coverage or undetected mosaicism. 12/36 (33%) had pathogenic variants in genes associated with neurodevelopmental disorders, but not well described in DEEs. We identified *de novo* variants in 4 extremely rare genes causing DEEs: *CMPK2*, *CPSF1*, *IRF2BPL* and *KCNV2*. In the remaining 178 patients, we identified *de novo* variants of uncertain significance in 110 genes not previously linked to DEE or other neurological disorders.

Conclusion
WES in 214 patients with unsolved DEEs identified a genetic cause for 16.8% patients, implicating novel candidate DEE genes, confirming the genetic heterogeneity of the DEEs and emphasising the need for large cohorts of patients to identify rare causes of DEEs. Recessive causes of DEE were found in a higher than expected number of patients for a cohort of apparently sporadic DEEs, highlighting the importance of considering this inheritance pattern, even in families without a history of consanguinity.

Inder MK[1], Grinton BE[1], Howell KB[2,3], Palmer EE[4], Wakefield C[5], Scheffer IE[1,2,3]

Natural history studies in the developmental and epileptic encephalopathies: the future is in the past

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Aim
Natural history studies (NHS) and patient registries are informing diagnosis and management of the developmental and epileptic encephalopathies (DEEs). Understanding the natural progression and features of these rare diseases is required to position the community to determine the effectiveness of novel therapies, and to promptly identify suitable patients for Precision Medicine trials. The goals of NHS are to: 1) understand the disease course, delineating how a disease begins and evolves over time; 2) improve diagnosis of comorbidities, influencing patient care and inform healthcare management; 3) provide a baseline for Precision Medicine trials; and 4) assess response to therapies in comparison to natural disease progression.

Methods
Key stakeholders, including families, and clinicians will form an Australia-wide network focused on the DEEs. We will develop an online patient registry, with functionality to enable information to be provided by both parents, carers and patients, as well as clinicians. Information will be collected by questionnaire and data regarding investigations such as gene variants, electroencephalogram (EEG), neuroimaging and information from medical records will be entered.

Results
Paediatric epilepsy experts from each state will engage a network including all Australian paediatric neurologists. Key stakeholders and personnel have been identified. The Epilepsy Research Centre's Epilepsy Genetics Database has 23,000 participants (~50 % affected) and the DEE NHS will leverage our expertise in phenotypic delineation and our extensive track record of family engagement and clinical trial experience.

Conclusion
The DEE NHS will be the first Australia-wide epilepsy patient registry, with cohorts engaged and keen to participate in studies, including trials, and a network of committed clinicians and researchers . As Precision Medicine trials are developed, we will be ideally positioned to take trials forward with our network and understanding of the natural history of these debilitating diseases.

A Prospective Study of Patients with Chronic Inflammatory Demyelinating Polyneuropathy (CIDP): Identifying Ultrasonographic Features for Diagnosis and Prognosis

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Background

There are no current biomarkers in CIDP, with diagnosis and treatment monitoring largely based on clinical parameters. High frequency ultrasound of peripheral nerves can reflect pathophysiological changes in CIDP, as well as changes with treatment, in a quick, non-invasive, and painless manner. This project aims to further the identification of useful diagnostic, prognostic and treatment-related biomarkers utilizing parameters found on neuromuscular ultrasound (NMUS).

Methods

We conducted a standardized clinical and ultrasonographic assessment of patients with CIDP at both Wake Forest Baptist Medical Center, NC (October to November 2017) and Austin Health, Melbourne, Australia (July 2018 to current). Our protocol focused on bilateral whole length assessment of the median and ulnar nerves, with unilateral assessment of radial, tibial, fibular and sural nerves. Correlation of clinical (disease duration, current clinical state, treatment history), electrodiagnostic (from most recent test) and ultrasound findings (in particular nerve size as measured by cross sectional area) was undertaken. 25 patients were studied at WFBMC neurodiagnostic laboratory, with data collection continuing at Austin Health (15 patients thus far).

Results

Of the 25 patients studied at WFBMC, all had abnormalities on ultrasound (as determined by focal nerve enlargement determined by increased cross sectional area), with 23 of 25 subjects having >=4 enlarged segments. All patients had at least one abnormality in either median or ulnar nerve, with no additional diagnostic information from other nerves tested. We analyzed our data in line with previously published diagnostic scores and protocols, and these findings will also be presented and discussed for typical vs atypical CIDP subtypes, as well correlation with clinical findings. Early data from the Australian cohort studied will also be presented.

Conclusions

This cross-sectional study of NMUS in patients with CIDP suggests assessment of bilateral median and ulnar nerves from wrist to axilla may be adequate in providing diagnostic information.

Abstract

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Co-Registration of Transcranial Doppler and Anatomical imaging (COTRADA)

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Background Transcranial Doppler (TCD) ultrasound has been extensively used in the diagnosis of intracranial arterial disease for more than 30 years. One of the primary limitations of the TCD technique has been the lack of any form of anatomical image information that is produced while scanning. This leads to TCD being particularly operator dependant, with the possibility for significant errors in vessel identification. We demonstrate the ongoing development of a technique that uses a radio frequency position location system as well as anatomical information from either CT or MR angiography, to provide guidance to a TCD operator while performing an ultrasound examination.

Methods A radio frequency position sensing system (Polhemus Fastrak, Polhemus, Vermont, USA) is combined with a TCD ultrasound system (Compumedics DWL, Melbourne, Australia) via the use of a synchronised pulse generator. The synchronised pulses allow the position of the TCD ultrasound probe in space to be correlated with both the ultrasound blood flow measurements, and the anatomical data stored in either a CT or MR angiographic image. A display system (InVesalius, Centro de Tecnologia da Informação Renato Archer, Brazil) is used to show the anatomical location being examined by the TCD ultrasound beam, in a manner similar to an image guided stereotactic surgery system.

Participants A group of five (5) participants will be recruited from acute stroke patients admitted to the stroke unit at Austin Health. Participants will receive an identical clinical TCD examination to that of the standard level of care, with the addition of the co-registration equipment being attached to the TCD ultrasound system.

Analysis Following TCD examination, the co-registered records of the ultrasound data and the CT or MR angiography data will be examined to determine the accuracy of operator identification of intracranial arteries. Additionally, the co-registered data will be used to optimise the functionality of the TCD co-registration system. The final end product of this research is intended to be a system suitable for point-of-care, image guided TCD ultrasound examination in the emergency department environment, with the goal of enhancing clinical decision making during the emergency treatment of stroke patients by providing accurate, continuous diagnosis of intracranial artery flow states.

MacDonald TM[1,2], Hui L[1,2], Robinson AJ[1], Dane KM[1], Middleton AL[1], Tong S[1,2], Walker SP[1,2]

The cerebral-placental-uterine ratio as a novel predictor of late fetal growth restriction: a prospective cohort study

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Aims
Despite being the biggest risk factor for stillbirth, the majority of cases of fetal growth restriction remain undetected antenatally. We aimed to evaluate which 36 week Doppler ultrasound parameters:

(i) best predict small-for-gestational-age (SGA; <10th, <5th & <3rd centile) infants
(ii) correlate most strongly with neonatal body composition measures reflecting fetal nutrient supply

Methods
347 nulliparas with singleton pregnancies prospectively underwent ultrasound examination at 36 weeks. The average pulsatility index (PI) of the placental umbilical artery (UA), fetal middle cerebral artery (MCA), ductus venosus, renal arteries, aortic isthmus, and maternal uterine arteries (UtA) were recorded. The cerebroplacental ratio (CPR) was calculated (UA PI/MCA PI). *A new combination parameter, the CPR/UtA PI (cerebral-placental-uterine ratio, CPUR) was created*. Infant customised birthweight centile, Ponderal Index and neonatal body fat percentage (BF%; measured with air displacement plethysmography) were recorded.

Logistic regression ascertained which parameters share a significant relationship with birthweight <10th centile. Where a significant relationship existed, areas under the Receiver Operator Characteristic curve (AUC) were compared. Doppler parameters' ability to predict SGA infants, and correlations with neonatal body composition, were evaluated.

Results
Multiple Dopplers were significantly associated with birthweight <10th centile. Of existing parameters, UtA PI performed best (AUC=0.69), followed by the CPR (AUC=0.67). When they were combined as the CPUR, the AUC increased to 0.76. CPUR <0.71MoM demonstrated sensitivities of: 50% for birthweight <10th (90% specificity), 68% for <5th, and 89% for <3rd centile infants; consistently outperforming its constituent parameters. The CPUR demonstrated stronger significant correlations with birthweight centile, Ponderal Index and BF% than the CPR or UtA PI alone.

Conclusion
The CPUR is a novel ultrasound Doppler combination representing the maternal, placental and fetal vasculature in uteroplacental insufficiency. In our cohort, the CPUR is the best Doppler predictor of SGA infants, and demonstrates the strongest correlations with neonatal body composition measures. The CPUR may improve detection of fetal growth restriction.

MacDonald TM[1,2], Hui L[1,2], Robinson AJ[1], Dane KM[1], Middleton AL[1], Tong S[1,2], Walker SP[1,2]

Increasing fetal growth velocity increases the risk of shoulder dystocia among non-macrosomic fetuses

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Aim

Shoulder dystocia is a serious obstetric complication. While macrosomia is the most significant risk factor, shoulder dystocia has consistently been found to be an unpredictable event, with 40-60% of all cases occurring in infants with birthweight <4000g[1]. The aim of this study was to examine whether non-macrosomic fetuses who demonstrate increasing estimated fetal weight (EFW) or abdominal circumference (AC) centile across the third trimester, are at increased risk of shoulder dystocia.

Methods

EFW and AC centiles were prospectively measured at 28 and 36 weeks in 347 nulliparous women. The change in centiles over exactly eight weeks was calculated. Only livebirths delivered vaginally were included. We excluded cases of EFW >95th centile at 36 week ultrasound, as this is a known risk factor for shoulder dystocia. We calculated the relative risk (RR) of shoulder dystocia for fetuses who demonstrated an increase in EFW or AC of >30 centiles over eight weeks, compared to the rest of the cohort. We also correlated AC and EFW change in centile with neonatal body fat percentage and Ponderal Index.

Results

Of the 347 participants, 39 (11.2%) had EFW >95th centile at 36 weeks and were excluded. Of the 308 participants remaining, 226 (73.4%) delivered vaginally and were included in the analysis, with 6 (2.7%) cases of shoulder dystocia. Increasing EFW and AC centile were both significantly associated with shoulder dystocia. Increasing EFW and AC by >30 centiles over eight weeks were associated with RRs of 8.9 (p=0.03) and 7.7 (p=0.02) for shoulder dystocia respectively. Change in EFW and AC centile were also both significantly correlated with neonatal fat measures.

Conclusion

Increasing EFW or AC centile across the third trimester is significantly associated with increased risk of shoulder dystocia in normal weight fetuses. This may assist prediction of shoulder dystocia among non-macrosomic infants.

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A Scoping Review of MRI Guided Breast Radiotherapy

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Aim: An MRI-Linac integrates a high strength Magnetic Resonance Imaging (MRI) machine and a linear accelerator into a single device. The machine will provide greater soft tissue delineation and real time imaging throughout a patients' radiotherapy treatment without contributing additional imaging dose[1]. Radiation professionals will be able to treat with greater precision thereby increasing the ability to escalate dose to a tumour and reduce normal tissue side-effects. The aims of this scoping review is to summarise, understand and disseminate findings for the use of an MRI-Linac/Simulator for breast cancer.

Method: Computerised searches were performed using Ovid MEDLINE for studies relevant to MRI guided breast radiotherapy. Search terms included breast cancer, MRI-guided radiotherapy, MR Linac/Simulation workflow in publications from 2010 to present. Papers were excluded if metastatic breast cancer was assessed, MRI imaging specific, case studies or non-English articles. Three independent screening of abstracts from EMBASE is currently underway. Relevant full text articles will be retrieved for analysis. Information gathered will be reported according to the Preferred Reporting Items for Systematic Reviews – Scoping Reviews (PRISMA-ScR) system.

Results: A total of 5368 abstracts have been identified, of which results to date have indicated that accelerated partial breast irradiation (APBI) may benefit from the integrated machine due to greater visibility of the tumour bed[1,2, 3]. Margins in this cohort of patients can potentially be reduced enabling favourable short term cosmesis and shorter fractionation. Additionally, contouring of tumour beds in all breast patients will allow for adaptive radiotherapy throughout a patients' treatment. Limitations identified include interactions between secondary electrons generated in the patient and the magnetic field, overall MRI-Linac work flow, quality assurance and MR compatible equipment[4].

Conclusion: This scoping review will provide a foundation of information regarding MRI-Linacs for the treatment and planning of breast patients. The new technology appears to be a promising and feasible treatment option for APBI patients.

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DCLK1: a novel promoter of gastric cancer progression

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Doublecortin-like kinase1 (DCLK1), a microtubule associated protein (MAP), has recently gained interest in the cancer research field. Whole-genome sequencing suggests that DCLK1 is a novel tumour driver and DCLK1 overexpression correlates with epithelial-to-mesenchymal transition (EMT) in pancreas, intestine and colon cancer. A recent meta-analysis in gastric cancer (GC) showed that DCLK1 overexpression correlates with advanced and poorly differentiated GC, lymph node metastasis and reduced overall patient survival.

Our analysis of the stomach adenomas (STAD) dataset from the Cancer Genome Atlas (TCGA), showed that *DCLK1*-high expressing tumours significantly clustered within the genomic stable molecular subtype and the histologically diffuse type. We are currently evaluating DCLK1 expression off 300 stomach cancer patients by immunohistochemistry on tissue microarrays.

We established a DCLK1-overexpressing MKN1 gastric cancer cell-line. The overexpression resulted in increased migration and invasion *in vitro and in vivo*. These findings support our TCGA-STAD data analysis where high DCLK1 levels correlated with EMT, chemokines, and stromal- and immune cell markers. Strikingly, we observed an overall increase in chemokine secretion when DCLK1 is overexpressed, *ex vivo*. CXCL12 is the one of the main upregulated chemokines; this is further supported by findings in the TCGA-STAD data set, which shows that DCLK1 and CXCL12 expression levels significantly correlate with each other. Furthermore, a DCLK1-inhibitor reversed migration, invasion and chemokine secretion in the DCLK1-overexpressing MKN1 cells to parental MKN1 cell levels, *in vitro* and *in vivo.* This suggests that DCLK1 could be a good target for poor prognosis GCs with high DCLK1 levels.

Thus far, the signalling cascade in which DCLK1 can induce EMT or increased chemokine secretion is poorly understood. Our aim is to answer these questions using SILAC mass spectrometry studies by comparing proteomics, phospho-proteomics and secretomics analysis on parental MKN1 and DCLK1-overexpressing MKN1 cells, with and without DCLK1-inhibitor.

Unravelling breast cancer heterogeneity using genetic barcoded patient-derived xenograft

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AIM

Breast cancer is a vast and heterogeneous disease, and it is thought that intra-tumour heterogeneity is responsible for treatment resistance. Therefore, the study of heterogeneity is of great interest for the optimisation of novel combinational therapies.

Methods

The study of tumour heterogeneity is based on new single cell “-omics” technologies now available. However, the caveat of these techniques is that they only represent a snapshot of heterogeneity, at a given time point, often after drug selection. In order to overcome this, we are developing genetic barcoded models using patient-derived xenografts, known to retain the clonal complexity of patient samples. In brief, drug naïve tumours from patients are engrafted in immune-deficient mice and to investigate the fate of transplanted cancer cells, thousands of cancer cells are infected with lentiviruses containing unique genetic tags (or barcodes) that can be integrated into their genome, and transmitted to their progenitors.

Results

We found that primary tumour dissected into pieces harbour a unique barcode repertoire underlying the spatial heterogeneity present in primary tumour. This result has extensive implications for the interpretation of solid biopsies to predict drug response and monitor tumour progression. Interestingly, our results suggest that the cellular features associated with tumour growth and metastases are not random, and we are currently linking the transcriptomic profile of these tumour clones with their phenotypic behaviour.

Conclusion

In this work, genetic barcoding has been elegantly combined with breast cancer patient-derived xenograft to decipher tumour heterogeneity at a cellular level. These new models enabled us to highlight the evolution of a complex clonal landscape during tumour growth and metastatic progression.

Title: Incidence of metastatic disease in low risk Differentiated Thyroid Carcinoma patients.

Authors: Chappell, BM; Lee ST; Scott AM, Department of Molecular Imaging & Therapy, Austin Health

Abstract: Background: 131I-NaI use for remnant ablation in patients who have undergone thyroidectomy for differentiated thyroid carcinoma(DTC) is long established with 85% of DTC patients cured by 131I-NaI therapy surgery in combination with surgery and TSH suppression (1). The presence of distant metastatic disease at initial presentation is low with disease being confined to the thyroid and local lymph glands. (2)
Low risk DTC Patient preparation for initial 131I-NaI treatment can use administration of recombinant human thyrotropin-(rTSH) instead of thyroxine cessation to elevate TSH levels. The use of rTSH (Thyrogen®) stimulation followed by 131INaI ablation dose for low risk DTC patients with low clinical suspicion of metastatic disease is standard practice at our institution.

Aim: To determine the incidence of previously undiagnosed metastatic disease in low risk DTC patients undergoing initial Thyrogen® stimulation before 131I-NaI ablation.
Method: A retrospective review was performed on consecutive low risk DTC patients presenting for initial post thyroidectomy Thyrogen® stimulation and 131I-NaI ablation from 2014-2018. Patient demographics, surgery type, histopathology, post ablation imaging results – including thyroid bed uptake and presence of 131I avid metastatic disease were collected. Statistical analysis was performed.

Results: A total of 108 patients with DTC reviewed with a follow up range of 12-61 months. The 131I post ablation imaging results were analysed and the incidence of 131I avid metastatic disease calculated, characterised and possible causal factors investigated.

The incidence of undiagnosed 131I avid metastatic disease in the Thyrogen® low risk patient population was 5.5% (n=6) and 0.9% for distant metastases. Of this metastatic disease group 83% (n=5) of patients had regional lateral lymph node involvement and 1 patient with distant 131I avid bone disease. On follow-up (median = 32.5 month) 50% of these patients had undergone further 131I-NaI Therapy.

Comparison of the metastatic spread patient group to the remaining 94.5 % of patients without disease spread identified no specific causal factors for the presence of 131I avid metastatic disease.

Conclusion: 131I-NaI avid metastatic disease in low risk patients is rare and does not contraindicate the use of Thyrogen® stimulation in low risk DTC.

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Wichmann CW[1,2,3], Ackermann U[1,3], Poniger S[3], Lee ST[1,2,3], Young K[3], Chan G[3], Hofman MS[4], Sachinidis J[3], and Scott AM[1,2,3]

Automated radiosynthesis of [^{177}Lu]Lu-PSMA-617 on the iPHASE MultiSyn module

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Aim:

Prostate-specific membrane antigen (PSMA) is highly expressed in primary and metastatic lesions of prostate cancer.[1] Due to its low abundance in healthy tissues, PSMA allows for highly targeted delivery of therapeutic radionuclide doses with minimal side effects.[2] A number of small molecules targeting the extracellular domain of PSMA with exceptional affinity and specificity have been developed.[3,4] The TheraP study has been designed to investigate the efficacy of the [^{68}Ga]Ga-PSMA-11 / [^{177}Lu]Lu-PSMA-617 theranostic pair. For this study, the radiosynthesis and formulation of [^{177}Lu]Lu-PSMA-617 was automated on an iPHASE MultiSyn radiosynthesizer.

Methods:

Automated radiolabeling of PSMA-617 with Lutetium-177 was optimized on the disposable cassette based MultiSyn. The system was programmed using an Excel based step list and synthesis progression was aided by the built-in radioactivity detectors. Activity losses were tracked using a dose calibrator and minimized by optimizing fluid transfer and cooling steps. [^{177}Lu]Lu-PSMA-617 was reformulated and sterile filtered using the built-in syringe drives.

Results:

Losses due to residual [^{177}Lu]$LuCl_3$ remaining in the isotope vial and the transfer tubing to the reactor were reduced by 55% from 15.0% to 6.7% ± 1.8% (n = 3) and by 94% from 6.6% to 0.4% ± 0.1% (n = 3), respectively. Losses during the recovery of [^{177}Lu]Lu-PSMA-617 from the reactor were reduced by 83% from 3.0% to 0.5% ± 0.02% (n = 3). Residual radioactivity on the sterile filter and in the manifolds remained constant at 1.2% ± 0.5% (n = 4) and 0.4% ± 0.1% (n = 3), respectively. This resulted in an overall increase in radiochemical yield from 75% to 90.1% ± 0.4% at EOS (n = 3) to give [^{177}Lu]Lu-PSMA-617 in 96.5% ± 1.1% (n = 9) radiochemical purity (HPLC) after 20 minutes. The content of [^{177}Lu]$LuCl_3$ was 1.2% ± 0.8% (n = 8).

Conclusion:

Fully automated production of [^{177}Lu]Lu-PSMA-617 for clinical use was achieved with minimal exposure to the operator. The cassette-based approach allows for multiple consecutive productions on the same day which will have clinical impact considering the growing number of clinical trials investigating the [^{177}Lu]Lu-PSMA-617 ligand.

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New approach to identify and treat patients at risk of breast cancer brain metastasis

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Aim
Brain metastases are associated with an extremely poor prognosis and are incurable. The mechanisms by which breast tumour cells home to and colonise the brain remain poorly understood. Accordingly, identification of predictive biomarkers or therapeutic targets is urgently needed.

Methods
We used gene array profiling to identify novel brain metastasis genes differentially expressed between brain-metastatic 4T1Br4 and parental 4T1 mouse mammary tumours. These analyses revealed 17 genes significantly upregulated in brain-metastatic 4T1Br4 tumours. Limitrin (DICAM), a cell adhesion molecule never previously investigated in the context of cancer, was found to be significantly increased (~12-fold) in 4T1Br4 tumours. We validated these observations at the mRNA and protein level by in silico analyses, immunoblotting and immunohistochemistry (IHC) in a panel of mouse and human cell lines or primary tumours and in a large cohort of tumours from breast cancer patients.

Results
Analyses revealed a strong prognostic association with TNBC and HER2 breast cancer, two subtypes of breast cancer associated with a high propensity to spread to the brain. Highest levels of limitrin were observed in brain-metastatic cells/tumours.
In normal epithelial cells, limitrin interacts with, and modulates the function of αvβ3 integrin, a receptor previously implicated in breast cancer brain metastasis. Its expression is also elevated in brain-infiltrating lymphocytes associated with inflammatory pathologies. Consistent with these observations, we found that limitrin promotes attachment and transmigration of tumour cells across a monolayer of brain-derived endothelial cells in vitro. Further, exogenous expression of αvβ3 in limitrin-expressing TNBC cells increased the formation of intra-parenchymal brain lesions compared to cells expressing limitrin alone which formed predominantly intra-vascular lesions.

Conclusion
Collectively, these results indicate that limitrin has prognostic significance for brain-metastatic breast cancer and contributes to tumour cell crossing of the blood-brain barrier. Experiments evaluating the impact of limitrin suppression on TNBC brain metastasis are ongoing and will be presented.

Characterising the role of IL-36G in the development of gastric cancer

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Introduction

Gastric cancer (GC) is one of the leading causes of cancer-related deaths worldwide whereby *Helicobacter pylori* is a major predisposition which leads to chronic inflammation. There is lack of effective treatments since high recurrence of GC are reported, thus increasing a demand to develop new therapeutic avenues to treat this disease. Our preliminary data indicates that IL-36G expression is elevated in gastric tumours from patients and high IL-36G levels correlate with poorer patient survival. We postulate that IL-36G could be a pro-tumour cytokine which can be targeted as a novel treatment. The aim of this project is to characterise the effects IL-36G elicits on gastric cancer cell proliferation, and whether these pro-tumour effects can be inhibited by its natural antagonist, IL-36RN.

Method

The expression levels of members of the IL-36G family of cytokines were measured by qPCR analysis in three gastric cancer cell lines (GCCs) (AGS, MKN45, MKN1). The effects of IL-36G on GCC proliferation was assessed by colony forming assays. IL-36G signalling can be inhibited by the natural antagonist IL-36RN. Therefore, GCCs were stimulated with IL-36G in the presence of IL-36RN to ascertain if the antagonist can inhibit IL-36G-mediated GCC proliferation. The effects of IL-36G stimulation on ERK phosphorylation in the absence and presence of IL-36RN was also determined by Western Blot.

Results

The mRNA expression levels of IL-36A, IL-36B and IL-36G and its heterodimeric receptors (IL-36R, IL-1RAP) were detected in AGS, MKN45 and MKN1 cell lines. IL-36G mounted a proliferative response at a concentration of 0.1 ng/ml, in comparison to untreated cells. The natural antagonist IL-36RN stimulation was found to inhibit IL-36G-induced colony formation at a concentration of 30 ng/ml. IL-36G was also found to induce ERK2 phosphorylation in GCCs.

Conclusion

Here, we report that IL-36G induces cell proliferation and ERK phosphorylation which can be suppressed by its natural antagonist, IL-36RN. Overall, results from this study provides a solid premise to evaluate IL-36G-based therapeutics for the treatment of GC using *in vivo* animal studies.

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Phenotyping the immune microenvironment in early- and late-stage melanoma

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Aim
Despite the tremendous success of immunotherapy in late-stage melanoma patients, it remains unclear how they affect the immune microenvironment during disease progression. We hypothesise that the immune microenvironment changes across disease stages and is influenced by the differentiation status of tumour cells measured by epithelial-to-mesenchymal transition (EMT). We aim to explore the relationship and correlation between immune cell subsets in melanoma tumours from various stages using multi-colour immunohistochemistry (mIHC) and whether EMT contributes to a different tumour microenvironment.

Methods
FFPE tumour blocks from 40 primary and 25 metastatic melanoma tumours were used. All patients were consented under HREC/14/AUSTIN/425. Three antibody panels staining for tumour-infiltrating lymphocytes (TILs), natural killer (NK) cells, dendritic cells (DCs) and EMT markers were optimised for the automated Lecia Bond RX staining processor. Sectioned tissue slides were stained with various marker combinations, scanned using the Vectra® Polaris™ Automated Quantitative Pathology Imaging System, and analysed using the inform software. Different cell fractions were scored against each other across primary/metastatic phenotypes.

Results
A total of 15 antibodies staining for CD4, CD8, CD20, FoxP3, CD68, CD1c, CD141, NKp46, HLA-I, HLA-II, CD3, PD-L1, THBS1 and melanoma lineage were optimised and protocols developed for automated staining. 48 sectioned tissue slides were stained for TIL's and 36 analysed for TIL phenotypes and numbers. Cell fractions were determined in the tumour region and a high-degree of heterogeneity within primary tumours was noted. The limited sample size does not allow for conclusive statistical analyses but enables the detection of trends and effect strength.

Conclusion
This study will provide insight into the co-evolution of the tumour and the immune microenvironment over a given time and reveal processes associated with tumour adaptation to the immune system. This data will lay the foundation for a sufficiently powered follow-up study.

Chi LH,[1,2], Burrows AD,[1,2], Anderson RL[1,2,3,4]

BMP4 INHIBITS BREAST CANCER METASTASIS INDEPENDENT OF TUMOUR SMAD4

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Aim

Localised breast cancer is largely curable; however, due to a lack of effective therapies, patients with tumours that have spread (metastasised) have a poor 5-year survival rate at 27%. In our search for therapeutic targets that modulate metastasis, an anti-metastatic protein, bone morphogenetic protein 4 (BMP4), was identified. By ectopically expressing BMP4 in tumours, metastasis can be inhibited in mice. However, BMP4 was reported to promote progression of colorectal and pancreatic cancers. We noted that a critical mediator of BMP4 signalling, SMAD4 (mothers against decapentaplegic 4), is mutated or lost in up to 40% of these cancers, rendering canonical BMP4 signalling defective. In the absence of SMAD4, BMP4 can induce non-canonical signalling through NF-κB and MAPK pathways.

To identify patients who will benefit from BMP4 agonists, we investigated whether the anti-metastatic effect of BMP4 is dependent on SMAD4, and whether detrimental effects can arise from activation of non-canonical BMP4 signalling.

Methods

In human breast cancer MDA-MB-231-HM cells, SMAD4 was reduced with shRNA. In SMAD4-null MDA-MB-468 cells, SMAD4 was ectopically restored. BMP4 was then ectopically expressed in these metastatic lines. Orthotopic tumours were established via injection into the 4^{th} mammary fat pad of NSG mice. Tumours were monitored and resected at 400 mm^3. Subsequent development of metastasis was characterised.

Results

Loss of SMAD4 abrogated canonical BMP4 signalling based on attenuation of target genes ($P<0.05$). Consistent with our hypothesis, BMP4 accelerated the growth of tumours with low or no SMAD4 ($P<0.05$) through angiogenesis, while having no effect on those that expressed SMAD4 ($P=0.68$). Surprisingly, BMP4 significantly inhibited metastasis regardless of SMAD4 expression in tumours ($P<0.01$).

Conclusion

BMP4 inhibits breast cancer metastasis independent of tumour SMAD4, but promotes the growth of SMAD4-low tumours. We are testing small molecule agonists as a therapy to treat metastatic breast cancer and to improve patient survival.

Investigating the role of GP130/STAT3 signalling in intestinal barrier function

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Aim

Colorectal cancer (CRC) is the third most common fatal malignancy worldwide, with 40-50% patients dying from this disease. As its prevalence continues to rise, advances in treatments are urgently needed to alleviate the morbidity and mortality associated with CRC. The intestinal epithelium provides a physical and biochemical barrier against commensal and pathogenic microorganisms. Perturbations in barrier function promotes chronic inflammation, which can drive tumorigenesis and alter responsiveness to anti-cancer therapies. The Signal Transducer and Activator of Transcription 3 **(STAT3)** is a key driver in the progression of inflammation-associated CRC. However, the role for STAT3 in intestinal barrier function is yet to be delineated. Here we study the role of STAT3 in intestinal barrier function during chemically-induced colitis.

Method

We utilised two different mouse models to partially ablate STAT3 protein or genetic expression *in vivo*. One mouse model harbours a truncated GP130 receptor **(GP130ΔSTAT/+)** to reduce GP130-dependent STAT1/3-mediated activation. The second mouse model carries a Doxycycline-inducible Stat3 short-hairpin RNA **(shSTAT3)** for the reversible genetic silencing of *Stat3*. These mice were then challenged with the chemical irritant Dextran Sulfate Sodium (DSS) and intestinal barrier function was assessed using an *in vivo* FITC-dextran permeability assay. Colonic tissues were harvested and analysed via qRT-PCR and western blotting.

Results

We demonstrate that partial STAT3 deletion significantly increases the susceptibility to DSS-induced colitis, indicated by i) decreased intestinal barrier function, ii) severe weight loss and iii) histological damage. We further identify that reduced barrier function is accompanied by altered expression of the *Reg3b and Reg3g* antimicrobial genes, as well as reduced expression of the tight junction Claudin proteins.

Conclusion

Together, our data suggest STAT3 activity is essential for the maintenance of intestinal barrier function. Therapeutically targeting the GP130/STAT3 signalling cascade in intestinal epithelial cells, and selectively manipulating barrier function, may pose as a potential strategy to alter responsiveness to chemo- and immuno-therapy in CRC patients.

Selective Stat3 inhibition in the tumour microenvironment restricts gastrointestinal tumour growth

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Aim

The signal transducer and activator of transcription 3 (STAT3) is key a transcription factor often found to be overexpressed in tumours, and is associated with the development of cancer hallmarks such as sustained proliferation and avoidance of cell death. Indeed, the pro-tumorigenic role of intrinsic Stat3 signalling within tumour cells is well characterised across a number of different cancers including gastrointestinal cancers. However, the influence of Stat3 among the non-tumour cells that infiltrate the tumour microenvironment is less explored. This project aims to elucidate the role(s) of STAT3 in the non-tumoural compartment of the tumour microenvironment.

Methods

We developed the shStat3 transgenic mouse that allows for the conditional knock-down of STAT3. The shStat3 was crossed with the $gp130^{F/F}$ mutant gastric cancer mouse. The shStat3 mice were also injected subcutaneously with MC38 murine colon cancer cells. Variations of this model were used for bone marrow chimera experiments, and testing with the Stat3 inhibitor BBI-608. Tissues from these experiments were subjected to protein and RNA analysis by western blot and q-RT-PCR respectively. The immune-profiles of the excised tumours were also interrogated by FACS analysis.

Results

Systemic Stat3 reduction in the $gp130^{F/F}$ mice decreased tumour burden. Importantly, Stat3 knockdown in the non-tumoural compartment alone significantly inhibited allografted-MC38 tumour growth. Bone marrow chimera experiments confirmed the hematopoietic compartment as the main drivers of this anti-tumour effect. Furthermore, an increase of monocytic ($Ly6C^{+}Ly6G^{-}$) cells were observed in Stat3-knockdown allografts, an affect recapitulated with pharmacological Stat3 inhibition. The Stat3-knockdown monocytes exhibited reduced immunosuppressive gene signature expression.

Conclusion

Our data provides compelling evidence of the therapeutic value of specific Stat3 targeting as a novel therapy option against gastrointestinal cancers. Strikingly, the anti-tumoural responses were shown to be partially mediated through immune cells such as the monocytes, highlighting a key role for the immune environment in the responsiveness to anti-Stat3 therapies.

Title: **Determining the effect of bazedoxifene in combination with chemotherapy on colon cancer cells**

Authors: **Rhynelle Dmello[1], Pathum Thilakasiri[1], Tracy Nero[2], Michael Parker[2], Matthias Ernst[1], Ashwini Chand[1]**

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Abstract

Inflammatory cytokines, such as interleukin-6 (IL-6) and IL-11, activate the signal transducer and activator of transcription 3 (STAT3), which drives the gene transcription of cellular processes attributed as hallmarks of cancer. High levels of these cytokines, in combination with driver mutations, facilitate tumour growth and progression in preclinical models of colon cancer. Previous studies in our laboratory identified bazedoxifene (BZA), currently approved for the treatment of osteoporosis, as a small molecule inhibitor of GP130 (the receptor common to the IL-6 family of cytokines), selectively suppressing IL-6 and IL-11 signalling to reduce colon and gastric cancer growth *in vivo* (Thilakasiri *et al*. *EMBO Mol Med* 2019).

The specific aims of the current study are to determine (i) the effects of BZA in combination with chemotherapy on apoptotic pathways in colon cancer cells and early passage patient derived colon cancer cells; (ii) the effects of BZA in combination with chemotherapy on apoptotic body formation in colon cancer cells and (iii) identify new compounds that inhibit GP130 activity. The combined effect of BZA, fluorouracil and oxaliplatin on inducing apoptosis in LIM2405 colon cancer cells was analysed using flow cytometry. STAT3 expression and response to IL-11/STAT3 signalling was characterised by Western blotting. An *in silico* screen of GP130 using a small molecule library was conducted and compounds were tested for effects on STAT3 transcriptional activity using cell-based assays.

Our results demonstrated that combination treatment with BZA, fluorouracil and oxaliplatin significantly increased apoptosis in LIM2405 cells. We have also identified novel analogues of our lead small molecule compound which decrease STAT3 transcriptional activity. Our data showed that BZA inhibited GP130-dependent STAT3 activity in the human colon cancer cell line LIM2405. BZA treatment sensitized cells to chemotherapy leading to increased apoptosis. The identification of novel compounds that target GP130 suggests a role for STAT3 inhibition in colon cancer as a treatment strategy.

Riley J Morrow[1,2], Robert O'Donoghue[1,2,] Ashleigh Poh[1,2,] and Matthias Ernst[1,2]

Therapeutically targeting Myc in gastric cancer

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Background:
Myc is a critical regulator of gastric tumour development and progression, and is associated with a poorer survival rate in human gastric cancer patients. Hyperactivation of inflammatory signalling cascades, including the Jak/Stat3 pathway, is crucial for gastric cancer development and can result in the overexpression of Myc. However, the pro-tumorigenic role of Myc in gastric cancer remains poorly understood.

Aim:
Previous findings from our lab using the $Gp130^{FF}$ mouse model, which spontaneously develops gastric adenomas through IL-11 dependent hyperactivation of Stat3, identified an upregulation of Myc in these tumours.

Here, we investigate the cellular requirement of Myc in gastric tumourigenesis by genetically ablating Myc within gastric epithelial cells. As well, we explore the therapeutic benefit of reducing the transcriptional activity of Myc through the use of the small-molecule inhibitor IBET-151.

Methods:
Tumour-bearing $Tff1^{CreERT2}$;Myc^{flox};$Gp130^{FF}$ mice were treated with tamoxifen for 3 days and/or IBET-151 for 21 days. At the experimental endpoint, tumour weights were recorded and tissue collected for biochemical analysis.

Results:
Genetic ablation of Myc in gastric epithelial cells significantly reduced tumour growth and activation of Jak/Stat3 signalling, as observed by decreased phosphorylated Stat3. Immunohistochemical analysis revealed a significant reduction in the percentage of Ki67+ proliferating cells. RNA-Sequencing of whole tumours subjected to KEGG pathway analysis similarly demonstrated a significant downregulation of cell-cycle related genes.

Therapeutic inhibition of Myc using the small-molecule inhibitor IBET-151 also significantly impaired tumour growth, consistent with a reduction in Myc, demonstrating its therapeutic benefit in this gastric cancer mouse model.

Conclusions:
Excessive Myc activity in epithelial cells promotes gastric cancer development and progression by enhancing tumour-cell proliferation. Future work will identify the underlying mechanisms by which IBET-151 similarly impairs gastric tumour growth. Taken together, our results suggest that inhibition of Myc may be a promising therapeutic target for the treatment of gastric cancer patients.

Ryan O'Keefe[1], Shoukat Sterle[1], Cyril Seillet[2], Richard Locksley[3], Matthias Ernst[1], Michael Buchert[1]

Targeting Tuft cells and Innate Lymphoid Cells in Gastric Cancer

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[3] UCSF, San Francisco, US

Aim
Gastric cancer is the third leading cause of cancer-related deaths, and accounts for 900,000 deaths annually. Tuft cells are a rare subset of mucosal epithelial cells that are significantly increased during gastric tumorigenesis, and serve as a major source of IL25 within the tumour microenvironment. The production of IL25 promotes the activation of type 2 Innate Lymphoid Cells (ILC2s), and results in a feed-forward loop that promotes tuft cell development through the IL25/IL13 signal transduction pathway. Here we assess the therapeutic potential of targeting tuft cells and ILC2s during gastric cancer.

Methods
To better understand the role of tuft cells and ILC2s in gastric tumour progression, we utilized the $Gp130^{F/F}$ mouse model of spontaneous intestinal-type gastric cancer to assess tuft cell and ILC2 numbers. To study the therapeutic benefit of targeting tuft cells and ILC2s interactions, we genetically ablated tuft cells in treated tumour-bearing $Gp130^{F/F}$ mice or treated them with a neutralising anti-IL25 antibody.

Results
We observed a significant increase in tuft cells and ILC2s in the blood and gastric tumours of $Gp130^{F/F}$ mice compared to wild-type (WT) controls. These results were consistent with increased Il13 and Il25 gene expression in $Gp130^{F/F}$ tumours compared to WT tissue. Accordingly, tuft cell ablation significantly impaired tumour growth and ILC2s in $Gp130^{F/F}$ mice, and reduced Il13 and Il25 gene expression within tumours.

Likewise, anti-IL25 treatment in $Gp130^{F/F}$ mice lead to significantly smaller tumours and reduced tuft cell numbers in these mice. In vitro analysis of gastric tumour organoids similarly demonstrated that treatment with anti-IL25 suppressed tumour organoid growth, while stimulation with IL13 enhanced organoid growth.

Conclusion
Together, our results suggest tuft cells and ILC2s form a positive feed-forward loop that drives gastric tumour development through an IL25/IL13 signalling cascade. Inhibition of this pathway therefore provides a promising therapeutic approach for the treatment of gastric cancer.

Title: "Seeing the Opportunity"

Background:

Our Palliative Care Unit (PCU) had 553 deaths in 2017 however, only 11 eye donations occurred.

Many patients and families find the opportunity to restore sight in others a fulfilling outcome.

Barriers to donation were identified as:

- Lack of staff knowledge regarding process involved
- Misconceptions around eligibility and exclusion criteria
- Low confidence levels in conducting the donation conversation

Aim:

To increase number of eye donations within the palliative care unit and to improve staff confidence in discussing eye donation with families.

Methods:

- Staff surveyed to establish understanding of and barriers to donation
- Attended education sessions provided by " Donate Life"
- Tour of "Lions Eye Donation Service"
- Education sessions held on eye donation
- Screening tool created and introduced to identify all eligible patients
- 1:1 staff training provided on facilitating eye donation
- Ward donor register developed, allowing patient's donor status to be identified and communicated to staff and families

Results:

Since the introduction of the screening tool in June 2018, screening each patient for eye donation eligibility is now standard practice in PCU, resulting in:

- 36 corneal donations from PCU in 2018 and 39 so far in 2019 (11 in 2017 pre screening tool)
- Austin Health now the leading hospital for corneal donors in Victoria with 91% coming from PCU
- Since introducing the screening tool, 627 deaths occurred, of those 237 were eligible, 137 were offered donation and 75 consented
- 36 registered donors were identified and of those 32 consented
- Reduction in missed potential donors - January to June 2018 (pre introduction of screening tool), there was 117 missed potential donors; this number reduced to 43 from June to December 2018 once the tool was launched. In the period of January to June 2019 there has only been 9 missed potential donors, 6 of these have been due to family aggression.
- Sight has been restored in 125 people since June 2018.

Conclusion: Staff education and routine patient screening dramatically increased donation rates.

Title of Abstract: Introducing Mindfulness as a Self Care tool in the Palliative Care Unit (PCU)

Juli Moran, Hilary Hodgson

Background:

The Austin Palliative Care Service has changed considerably in the last 5 years, moving from the sub-acute campus into a new purpose built facility on the acute site. There has been a doubling of admitted patients, a decrease in length of stay and an increase in patient acuity. Patient and carer expectations have also increased significantly.

In 2017 a winter strategy was to increase the PCU beds by 33% to 28 beds. This resulted in an increase in deaths per week, averaging 15 per week and peaking at 20 per week.

Whilst the staff are very resilient and have developed their own self care plans, it was identified that introducing them to mindfulness as a self care skill would be beneficial to both their work and personal life.

Aim

The aim was to provide palliative care staff with the opportunity to learn and develop mindfulness skills to assist them with their overall wellbeing.

Methodology

A block of six sessions in a one-hour format were offered to all staff. At the session skills in meditation and yoga nidra are introduced allowing participants to set their own goals and work towards their own goals eg stress reduction.

Results

A program evaluation via a staff survey was undertaken. Questions relating to helpfulness of sessions, the staff ability to practice their new skill and any barriers to practice identified will be shared.

Conclusions

We aim to demonstrate the effect of a mindfulness program on the well-being of acute palliative care unit staff.

What a difference more beds make!

Hilary Hodgson, Juli Moran, Helen Longton

Background: The Austin Palliative Care Unit (PCU) is a 21 bed unit based at an acute tertiary hospital. As part of our hospital Winter strategy an extra 7 beds were opened from April to October 2018.

Aim: To describe the impact on hospital flow and the PCU workload with a 30% increase in bed numbers.

Method: Specific Key Performance Indicators (KPI) were set by the palliative care staff and executive to determine the impact of the additional beds on hospital flow and PCU performance. Data was tracked monthly, with a formal report at the end of the period. Regular monitoring with staff was undertaken.

Results: There was a 48% increase in referrals and 59% increase in admissions. There was a dramatic increase in admissions from the intensive care and emergency departments due to the increased availability of beds. There was a reduction in waiting time for all referrals. The only KPI that was not met was a 20% increase in direct admissions from the community (10% increase seen). There were multiple challenges related to rapid increase in staffing, faster turnover of patients and lack of equipment and space on the ward.

Conclusion: The increase in bed numbers produced a significant improvement in access to the PCU although there were several challenges that needed to be overcome. As a result of the success of the increase, funding for additional permanent beds was provided, and it is expected that 28 beds will again be offered during the winter peak.

Jeannette Milgrom[1,2], Paul R. Martin[3], Carol Newnham[1], Christopher J. Holt[1,4], Peter J. Anderson[5,6], Rod W. Hunt[6,7,8], John Reece[4], Carmel Ferretti[1], Thomas Achenbach[9], Alan W. Gemmill[1] and Sarah Maher[1]

Influence of an Early Stress-reduction Intervention for Very and Extremely Preterm Infants on Behavioural, Cognitive and Academic outcomes from 2 to 9 Years of Age

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Aim

The landmark findings of the Mother-Infant Transaction Program (MITP) showing improved neurodevelopment of preterm infants following parent-sensitivity training in the neonatal intensive care unit have been inconsistently replicated. This study evaluated outcomes from an MITP-type intervention to school age.

Methods

A randomised controlled trial involved 123 very preterm and extremely preterm infants allocated to either a parent-sensitivity intervention (PremieStart, *n* = 60) or to standard care (*n* = 63). When children were 2 and 4.5 corrected age, parents completed the Child Behavior Checklist. General development was assessed at 2 years with the Bayley Scales of Infant Development. At 4.5 years, cognitive functioning was assessed with the Wechsler Preschool and Primary Scale of Intelligence and executive functioning with the NEPSY-II. The children's cognitive assessment was replicated at 6.5 years and Grade 3 NAPLAN results were collected when they were approximately 9 years of age (results are currently being analysed).

Results

There were no significant between-group differences in behaviour problems at 2 or 4.5 years, general development at 2 years, or cognitive and executive functioning at 4.5 years.

Conclusion

Despite promising findings in infant communication at an earlier time point, this cohort has not shown sustained improvement. It is possible that advances in the quality of neonatal intensive care may mean that MITP-type interventions now have limited additional impact on preterm infants' long-term neurobehavioural outcomes. We included infants with a gestational age (GA) < 30 weeks (mean GA 27 weeks) including extremely preterm infants. The intervention may have decreasing benefit for children born at successively lower GA. The timing of intervention may also have affected its efficacy. It is vital that researchers continue to publish the full, long-term outcomes of MITP-type trials or place them in open access repositories, in order that the evidence base can be collectively assessed without bias.

Brotto J [1], Grabsch EA [2], Leroi ML [2]

Simplification of Direct MALDI-TOF Identification from Positive Blood Culture Broth

1. RMIT University, Bundoora, Vic., Australia;
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Aim
Evaluation of Matrix-assisted Laser Desorption Ionization-Time of Flight Mass Spectrometry (MALDI-TOF) using saponin lysis and pre-warmed short-incubation chocolate blood agar (pCBA) methods for rapid identification of positive blood culture (posBC) isolates. A simple direct method (from posBC broth) using saponin lysis has the potential to reduce turn-around times (TAT) for reporting posBC isolates, with minimal impact on laboratory workflow.

Methods
PosBC broths were subcultured on pCBA (manually), and standard culture media (automated BD Kiestra system).
Direct broth saponin-lysis method was performed by adding 1 ml of posBC broth to 200 µl 5% saponin, vortexing for 1 minute, centrifuging for 1 minute), resuspending the pellet in 1 ml deionised water, and then re-centrifuging the suspension. The final spun-pellet was spotted onto 4 target wells (each with 70% formic acid) on a MALDI-TOF slide.
pCBA short-incubation subcultures were checked for growth at 2, 3 and/or 4 hours. MALDI-TOF (4 wells each with formic acid [BioMerieux]) was performed from pCBA when visible growth was present.
Results of both early identification methods were compared to MALDI-TOF identification from standard culture media at 18-24 hours.
All MALDI-TOF testing was performed on Vitek-MS (Biomerieux).

Results
Overall, 227 mono-microbial and 20 poly-microbial posBC were analysed. In the mono-microbial posBC group, saponin lysis was concordant with 24-hour MALDI-TOF in 92/158 (58%) Gram-Positive (GP) and 49/58 (85%) Gram-Negative (GN) culture samples. pCBA concordance rates were 85/158 (54%) and 45/58 (78%) for GP and GN posBC respectively. 2/227 (2.2%) of isolates were misidentified using saponin lysis, and none with pCBA. Labour time for saponin lysis was 7.4 min compared to 4.5 min for pCBA. Notably, results using the saponin method were available 2-4 hours earlier.

Conclusion
Saponin-lysis identification rates were comparable to pCBA rates but resulted in earlier notification of results, with expected benefits in patient management and anti-microbial stewardship.

Sullivan MK, [1], **Grabsch EA**,[1] **Leroi ML.** [1]

Benchmarking Blood Culture Turnaround Times at Austin Pathology

1. Microbiology Department, Austin Pathology Heidelberg, Vic., Australia;

Aim
Positive-blood culture turnaround times (BC-TATs) for Austin Pathology Microbiology Laboratory (AuPath-Micro) were compared against recently published benchmarks for microbiology laboratories (with/without automated systems) for reporting; Gram stain (GS), organism identification (Org-ID) and antibiotic susceptibility testing (AST). Blood cultures (BCs) detect blood-borne bacteria/fungi that may be causing an infection with serious and life threatening implications. Rapid and proficient (BC) results are essential in providing best patient outcomes and reducing hospital-associated costs.

Methods
AuPath-Micro utilises advanced technology to standardise specimen/culture processing and improve workload efficiency. Technology/automation includes Bactec-FX BC-System, Kiestra-Automation, mass spectrometry (MALDI-TOF) identification and automated antimicrobial-susceptibility (Vitek2-XL). BCs collected January-February 2019 from Austin Health patients (N=7838 bottles, 3976 requests, 1391 patients; 508/7838 [6.5%] positive) were reviewed. Detailed analysis of all first positive bottles (n=220, 184 patients) was performed, as these results have the most impact on patient management and are given highest priority.

Results
The median (Interquartile Range [IQR]) BC-TATs (hours from BC collection) to GS, preliminary results for Org-ID and AST were 21.1 (14.9-31.2), 24.2 (19.2-36.0) and 36.0 (32.9–43.4), respectively. Similarly, final-results for Org-ID and AST reporting were 35.3 (27.1-46.6) and 49.4 (40.3-65.3). Respective benchmark results (in hours) for non-automated and automated laboratories were GS 19.2 (15.4-25.9), 19.2 (14.6-28.3); final Org-ID 43.4 (32.2-59.0), 36.0 (22.3-43.7); final AST 65.0 (59.0-71.8), 60.0 (45.4-73.0). Unlike AuPath-Micro, both laboratories reported GS results 24/7. GS BC-TATs during AuPath-Micro business hours (BH) were 18.7 (13.4-26.6) and after hours (AH) 23.3 (19.0-37.7). During BH AuPath-Micro reported BC-GS TATs 0.5hrs earlier than the benchmark. Facilitated by Kiestra-Automation and standardised incubation, final Org-ID and AST are set up where possible using 6hr subcultures from positive-BCs, potentially explaining rapid BC-TAT.

Conclusion
AuPath-Micro performs well against published benchmarks for ID and AST of positive-BC. Further method development and monitoring of BC-TATs will ensure that rapid and proficient reporting of BC results is ongoing.

Automated Resistance Detection:
Comparison of BD Phoenix to bioMérieux Vitek2 for Susceptibility Testing of Multi-drug Resistant Isolates

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Objective: There is a lack of literature comparing the performance of the BD Phoenix M50 (PHX) with the Vitek 2XL (V2) system in susceptibility testing of multidrug resistant organisms. We evaluated the accuracy, reliability and reproducibility of these systems using a collection of organisms with confirmed resistances (molecular +/- phenotypic).

Methods: The PHX NMIC-404 and PMIC-84 panels and the V2 AST-N246 and AST-P612 cards were tested for analytical reproducibility across different organism categories. 10 ATCC organisms, 200 Gram negative bacilli (GNB) and 100 Gram positive cocci (GPC) were used in this study. Isolates were tested simultaneously on both platforms and minimum inhibitory concentration (MIC) values of antibiotics common to both systems compared. Organisms with >1-fold difference in MIC had broth microdilution (BMD), (Thermo Fisher Sensititre panels GN3FG- and GPALL1FG+) performed as a reference standard.

MIC data was compared across the instruments and analysed by MIC and categorical interpretation (CLSI standards). MIC measurements were classified as concordant (EA – essential agreement) if MIC results were within 1 dilution of each instrument, while categorical interpretation was classified (CA – category agreement) using standard definitions of susceptibility errors (minor (mD), major (MD) and very major discrepancies (VMD).

Results: 10 ATCC strains each tested 5 times found 100% EA on both instruments.
For the 200 GNB tested, overall EA and CA were 95.8% and 90.7%, respectively. 50.5% of isolates required BMD to resolve discrepancies. The VMD, MD and mD rates were 0.16%, 0.48%, 1.18% and 0.29%, 0.61%, 1.09% for PHX and V2, respectively. The antibiotic with highest percentage of discrepant MICs overall was cefepime with an EA and CA of 79% and 65.5%.

Relative discrepancies were low for GPC, the overall EA and CA was 95.0% and 94.7%.

Conclusion: The performance of both systems was comparable with a low level of VMD and MD. Evaluation of a resistant population revealed generally acceptable results similar to more susceptible populations.

Automated Resistance Detection:
Comparison of the expert systems of BD Phoenix and bioMérieux Vitek2 for Susceptibility Testing of Multi-drug Resistant Isolates

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Objective:

The rising incidence of multidrug resistant organisms has made interpretation of antibiograms more challenging for Microbiologists. Assistance through use of interpretive algorithms in automated platforms such as the Vitek® 2XL has been valuable. The comparative performance of these systems has not been well documented. The expert systems (ES) of the BD Phoenix M50 (PHX) and the Vitek 2XL (V2) was tested against a collection of organisms with confirmed resistances (molecular +/- phenotypic).

Methods:

Isolates were tested simultaneously on both platforms. The instruments interpretation of resistance mechanisms was evaluated based on the ability to accurately classify a number of key resistance mechanisms including extended spectrum β-lactamases (ESBL), acquired AmpC β-lactamases (AmpC), carbapenem resistant Enterobacteriaceae (CRE), vancomycin resistant Enterococci (VRE), glycopeptide non-susceptible Staphylococci and MRSA (Methicillin resistant *Staphylococcus aureus).*

Results:

From 200 Gram negative bacilli tested, there were 158 isolates which harbored 178 designated acquired resistances. For specificity, 42 isolates were included that had no acquired resistance mechanisms detected either phenotypically or genotypically. The sensitivity for the ES corresponding to the reference genotype/phenotype was (PHX 90%, V2 77%), although the error rate was higher when analysed as a proportion of total tests (PHX 91%, V2 78%).

100 Gram positive cocci were tested. For 30 VRE, the sensitivity of the ES to correctly classify vanA & vanB was 100% for both systems, for low MIC vanB, the sensitivity was 30% for PHX and 10% for V2, however the limitation of the PHX system was its inability to differentiate between vanA & vanB. Both ES were able to correctly classify methicillin resistance across the variety of Staphylococci tested. The sensitivity of the V2 ES to alert to possible hVISA/VISA was 53.3% compared to 0% on the PHX.

Conclusion: The performance of the ES was difficult to compare due to different levels of sophistication of the reporting algorithm, however, the V2 had superior performance, with a greater specificity. Both systems were designed to maximise sensitivity and should be considered screening algorithms only.

R.Viswanath[1], S.Nagabhushan[1]

A Comparative evaluation of Cepheid GeneXpert® and BD MAX™ Enteric Viral panel for the detection of Norovirus in faeces.

Department of Microbiology[1], Austin Health

AIM

This study involves comparative evaluation of Cepheid Xpert® Norovirus Real time PCR and BD MAX™ Enteric Viral Panel assay against Primer Design genesig assay.

Norovirus is a highly infectious virus with low infective dose known to cause outbreaks of acute gastroenteritis, across various institutional settings such as hospitals and aged-care facilities.

The current diagnostic method at Austin pathology involves Primer Design genesig kit for Norovirus genotypes I and II which has decreased sensitivity and slower turn-around time in comparison to many commercial assays.

METHODS

50 unformed and unpreserved faecal samples from patients with symptoms of acute gastroenteritis were run in parallel on Cepheid Xpert® Norovirus PCR, BD MAX™ Enteric Viral Panel and compared against Primer Design genesig. 10 known positive samples underwent further 2 log10 dilutions to check for analytical sensitivity. Any discrepant results were retested.

RESULTS

In total, 15 samples tested positive out of which 10 samples underwent 2-log10 dilutions. All 10 samples tested positive on further dilution and 9/10 samples showed linear progression of Ct values. One sample gave false negative result on BD MAX™ on the neat specimen, though on repeat testing gave positive result with higher Ct value.

CONCLUSION

A 100% concordance were noted between all three assays. Both kits were easy to use but Xpert® was quicker at sampling by a minute and the overall runtime faster by an hour. Xpert® also had the advantage to be able to distinguish between genotypes I and II.

Both BD MAX™ and Xpert® demonstrated similar performance. The one false negative result initially observed on BD MAX™ could be due to sample being on the cut-off for limit of detection in this assay. The Ct values on some samples on BD MAX™ also did not produce a direct relationship with dilution but could still detect viral RNA.

This comparative evaluation has demonstrated that both the assays accurately detect Norovirus from stool samples, and both fit for purpose in replacing the Primer Design genesig assay.

Ms Parnaz Aminian[1], Mr Kyle Booth[1], Ms Alison Tyedin[1], Dr David Liew[1], Ms Elizabeth Su[1], Dr Tom Wilsdon[1], Dr Bonnia Liu[1], Mrs Asmara Jammali-Blasi[1], Prof Albert Frauman[1], Mr Kent Garrett[1]

[1]Austin Health, Melbourne, Australia

Slow-release opioids post surgery: what messages are patients receiving?

Background

The use of slow-release opioids for acute pain has been under scrutiny since the release of the ANZCA position statement in 2018. Despite a lack of supporting evidence, prescribing slow-release opioids has been traditional practice following surgery at our institution; a large tertiary Victorian public hospital. Some reasons for this may include facilitating post-operative mobility, reducing length of hospital stay and an extrapolated benefit drawn from chronic pain practices.

At our institution, clinical ward pharmacists review all discharge prescriptions. Special instructions regarding intended duration and follow up advice are often communicated on dispensing labels and medication lists.

Aim

The aim of this retrospective audit was to assess the completeness and consistency of information provided to patients upon discharge from pharmacists, review the documentation of follow-up plans conveyed to general practitioners from hospital prescribers and evaluate the appropriateness of slow-release opioids quantities when discharged post-surgery based on local guidelines.

Methods

Patients discharged with a slow-release opioid following inpatient surgery during October 2018 were included in the study and retrospectively recruited utilizing pharmacy dispensing software. Data evaluated was obtained from electronic medication charts and discharge summaries, departmental pharmacy dispensing history and archived medication lists.

Results

227 patients were included in the study equating to 275 slow-release opioids prescribed. 211 of these (77%) were new, for which 58% had clear end dates or follow-up instructions documented by discharge pharmacists. Although there were 201 (95%) completed discharge summaries, 58% contained no information regarding follow-up plans for local practitioners and 23% simply stated “weaning analgesia”. Only 18% discharge summaries had clearly documented slow-release opioid plans, whilst 15.1% did not have any discharge summary.

Conclusion

Our study has demonstrated that patients and community prescribers are not consistently provided specific information about when to stop or review slow-release opioids after surgery.

Compliance with hospital guidelines for antipsychotic prescribing in the management of delirium: a retrospective audit

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Background

Delirium is a common complication that may prolong length of hospital stay and worsen patient outcomes. At Austin Health, delirium guidelines assist prescribers in making appropriate treatment choices, including use of non-pharmacological management as first-line treatment, minimising unwarranted use of antipsychotics, obtaining consent for antipsychotic use, selecting appropriate antipsychotic doses and monitoring for adverse effects.

Aim

To assess compliance with Austin Health guidelines when prescribing antipsychotics for patients with delirium.

Methods

Data was obtained about patients admitted to Austin Health between 15/02/19 and 14/04/19, diagnosed with delirium and given an antipsychotic medication. Patients who were taking an antipsychotic medication prior to admission, prescribed an antipsychotic for indications other than delirium or prescribed an antipsychotic during end-of-life care, were excluded. Prescribing data was collected from Cerner. Compliance with the guidelines was evaluated from patient notes in Cerner and Scanned Medical Records.

Results

Thirty patients met the inclusion criteria (median age 78 years). Fourteen (46.6%) patients met the criteria for prescribing an antipsychotic (distressing symptoms despite implementation of non-pharmacological management or evidence of imminent risk of harm to patient or others). Two (6.7%) patients had documented evidence that the patient or family were consented or informed about antipsychotic treatment. Only one patient received all recommended monitoring during treatment. Eight (26.7%) patients received a starting dose that was consistent with guideline recommendations taking into consideration advanced age (≥70 years) and frailty (FI-LAB score ≥0.3).

Conclusion

Documentation supporting the decision to prescribe an antipsychotic medication for delirium was lacking for more than 50% of patients. There was little evidence that patients or their families were informed or consented when antipsychotic medications were prescribed. Antipsychotic starting doses often exceeded guideline recommendations. These findings highlight a need to improve adherence to Austin Health delirium guidelines and documentation when prescribing antipsychotics.

Measuring peak cough flow in the clinical setting: an evaluation of devices and interfaces

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4. The University of Melbourne, Parkville, VIC, Australia

Aim
Peak cough flow (PCF) is used as a measure of cough effectiveness, especially in people with neuromuscular disease (NMD) and routine measurement of PCF may aid clinical assessment. Unlike other respiratory function tests, there are no standardized methods for measuring PCF in healthy or NMD-affected populations. The aim of this study was to compare PCF between different devices and interfaces.

Methods
Experiment 1: Forty healthy participants performed three coughs, at two effort types ("maximal" and "weak"), into three devices: i) EasyOne Spirometer (PCF_{EO}), ii) Peak Flow Meter (PCF_{PFM}) and iii) pneumotachometer (Hans Rudolph™ Model 3700A)(PCF_{PN}). Devices were connected in series and testing and effort order were randomized.

Experiment 2: Forty healthy and NMD affected participants each performed three coughs into i) PCF_{EO} using a mouthpiece (PCF_{MP}), and ii) oro-nasal facemask (PCF_{ONM}), with the order of interface randomized.

Results were analysed using paired t-tests and Bland and Altman analyses.

Results
Experiment 1: Five hundred and forty coughs were sampled (PCF_{PN} range =18.49 - 535.2 L/min). Thirty-five "weak" coughs were not detected on the EasyOne spirometer (n=17) or the Peak Flow Meter (n=18). Of the remaining paired data, PCF_{PN} was significantly higher than PCF_{EO}, with a mean (95% Limits of agreement) bias of -6.75L/min (-50.00 to 36.50), $p < 0.001$. There was no significant difference between PCF_{PN} and PCF_{PFM} (-1.56L/min (-26.15 to 23.02, p=0.114)).

Experiment 2: On average, the PCF_{MP} was significantly greater than PCF_{ONM} (15.075 ±30.02 L/Min, 95% CI, 2.98 to 27.17, p=0.01,) in healthy participants, however there was no difference in participants with NMD (-1.0 ±41.29 L/Min, 95% CI, -13.35 to 12.24, p= 0.93).

Conclusion
PCF_{PFM} demonstrated high agreement with the PCF_{PN}. Although PCF_{EO} produced statistically different readings, the mean bias was not considered clinically important. PCF_{MP} reports higher cough strength than a PCF_{ONM} in healthy individuals but no significant difference in NMD. This has clinical implications as both interfaces could potentially be used reliably in NMD population.

McDonald L,[2,3], Berlowitz DJ,[1-4], Howard, ME[1,3], Rautela L[1,2], Chao, C[1,2], Sheers N[1,3,4]

Pneumothorax in neuromuscular disease associated with lung volume recruitment and mechanical insufflation-exsufflation.

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Aim:
To describe two cases of pneumothorax associated with lung volume recruitment and mechanical insufflation-exsufflation in neuromuscular disease and review the literature on incidence and risk factors.
Methods:
The medical records of two patients with pneumothorax and neuromuscular disease were reviewed. Keywords from each case informed a literature search. Published databases searched included: MEDLINE, EMBASE and the Cochrane Library.
Results:
Case 1: A 25-year-old male with Duchenne muscular dystrophy presented to the emergency department with chest pain and dyspnoea secondary to a large right-sided pneumothorax. Onset of symptoms began following prolonged use of mouthpiece intermittent positive pressure ventilation and multiple sessions of mechanical insufflation-exsufflation. Case 2: A 71-year-old male with motor neurone disease presented to the emergency department with worsening dyspnoea and chest pain immediately following lung volume recruitment therapy. Chest radiograph revealed a large right-sided pneumothorax.
Literature Review: The minimum prevalence of patients with neuromuscular disease on home mechanical ventilation is estimated at 3 people per 100,000. Within this population, few cases of pneumothorax have been published, suggesting this complication likely rare. Additionally, there is no published data identifying lung function thresholds or respiratory system compliance values for which the risk of pneumothorax secondary to lung volume recruitment or mechanical insufflation-exsufflation increases. Given the probable rarity of this complication, it is unlikely that robust measures for risk of pneumothorax can be developed and prospectively validated. As such, clinicians are required to make a judgement based on the patient's primary pathology, comorbidities, disease trajectory and ability to perform the techniques safely.

Conclusion:
The presence of prior pathology is a precaution that warrants careful consideration when prescribing lung volume recruitment or mechanical insufflation-exsufflation. However in cases where no established risk factors exist, clinicians may need to consider the goals of therapy and educate patients on the risk versus benefit.

Sheers N,[1,2,3] Berlowitz DJ,[1-4] Rochford P,[1,3] Dirago R,[1,4] Naughton P,[1] Henderson S,[1] Howard ME.[1,2,3]

Respiratory function and infections in people with motor neurone disease

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Background

Respiratory complications are the primary cause of death for people living with motor neurone disease (MND). Our understanding of respiratory physiology however, comes largely from studies of people with slowly-progressive neuromuscular disease (NMD), not rapidly-progressive disease like MND. Furthermore, the rate of respiratory tract infections (RTI) is not well established, with between 9-75% reported in MND. Thus, study aims were to compare respiratory function and history of RTI in people with MND compared to those with other NMDs.

Methods

Vital capacity (VC), peak cough flow (PCF), lung volumes, maximal inspiratory and expiratory pressures (MIP, MEP) and total respiratory system compliance (C_{rs}) were measured in 27 community-dwelling participants with MND and 53 people with other NMDs. *A priori* comparisons of respiratory function were made by disease type (MND or Other)(Student's t-test) and RTI history in the previous year (Fisher's exact test for proportions).

Results

Respiratory muscle strength was not significantly different between groups (MND vs Other, mean±SD: MIP 39±19% vs 47±28% predicted, MEP 40±19% vs 44±23% predicted). The VC was higher (53±15% vs 35±17% predicted, $p<0.01$) and the chest less stiff (C_{rs} 0.041±0.027 vs 0.023±0.020 L/cmH_2O) in people with MND. History of RTI was associated with lower VC and PCF, and fewer people with MND reported RTIs (22% vs 53%, p=0.010).

Discussion

In this exploratory study of respiratory function, people with MND had better-preserved lung capacity despite similar reductions in respiratory muscle strength compared to those with other NMDs, who were stiffer. People with MND reported fewer RTIs and while a lower VC and PCF were noted in people with a RTI, the sensitivity and specificity of these measures was not high.

These findings support the hypothesis that lung capacity is influenced by weakness initially, but that lack of flexibility of the lungs or chest wall may have a compounding effect.

Sheers N,[1,2,3] Howard ME,[1,2,3] Rochford P,[1,3] Dirago R,[1,4] Naughton P,[1] Rigoni A,[1] Berlowitz DJ,[1-4]

The physiological effects of a single session of lung volume recruitment in people with motor neurone disease

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Background

Lung volume recruitment (LVR) is a simple and inexpensive technique that uses a specially designed resuscitation bag to deliver deeper breaths. Using the bag to assist inspiration, consecutive inflations are delivered until maximal assisted lung insufflation capacity (LIC) is reached. At LIC, the lungs are near-fully inflated and chest wall expanded. Some guidelines advocate daily use, with the aim of maintaining respiratory "flexibility", lung function and avoiding infections. Only one previous study has measured compliance (stiffness), a hypothesised mechanism behind these proposed benefits, hence study aims were to describe the short-term physiological effects of LVR on lung capacity, cough and total respiratory system compliance (C_{rs}).

Methods

Vital capacity (VC), peak cough flow (PCF), static lung volumes, C_{rs}, LIC and assisted PCF (PCF_{LIC}) were measured before (T0) and after (T2) a single session of LVR in community-dwelling participants with MND and respiratory system involvement. Ability to perform LVR was defined as LIC-VC difference >10% above VC.

Results

Twenty-five out of 27 people with MND were able to perform LVR. Lung volume recruitment increased volume during the manoeuvre (mean±SD VC_{T0} 2.12±0.75 vs LIC_{T0} 2.62±1.05 L) however we found no augmentation of cough flow (PCF_{T0} 187±61 vs PCF_{LIC_T0} 192±65 L/min). Respiratory system compliance improved following LVR therapy (C_{rs_T0} 0.041±0.027 vs C_{rs_T1} 0.050±0.027 L/cmH_2O). However there was no carry-over effect on volume or cough flow between T0 and T1 (VC_{T0} 2.14±0.75 vs VC_{T1} 2.09±0.77 L; PCF_{T0} 185±61 vs PCF_{T1} 191±66 L/min).

Discussion

A session of LVR improved C_{rs} by an amount comparable to the only other study in people with MND that investigated physiological mechanisms, however in contrast we found no increase in cough flow or lung capacity before and after this single session. Longer-term treatment studies are necessary to determine how large any effect might be and whether it is sustained over time.

Benefit versus Burden of Regular Respiratory Physiotherapy in Neuromuscular Disease: A Follow-up Questionnaire

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Aims: Lung volume recruitment (LVR), and deep breathing exercises (DB) are simple and inexpensive respiratory therapies that may help people living with a neuromuscular disease (NMD). This study aimed to understand the perceived benefits and burden of these therapies and to investigate why participants continued therapy or not.

Methods: Participants involved in a randomised controlled trial (RCT) comparing LVR and DB were offered training in *either* therapy at completion. Twenty participants were contacted 6-12 months after RCT completion and consented to a telephone survey, comprising 20 open-ended, short-answer or 5-point Likert-scale questions, aiming to understand the experience, barriers and enablers of these therapies.

Results: Sixty-five percent (n=14) of participants continued with a respiratory therapy post trial. Participants in both groups identified the exercises as helpful (LVR 9, DB 7) and encouraged positive thoughts about their condition (LVR 9, DB 5). More participants performing LVR identified a greater change in cough strength (LVR 8, DB 3) and mucus clearance (LVR 6, DB 1) compared to DB.

Major barriers to performing regular respiratory therapy were having less energy or time because of the exercises, and dependency on others to complete (LVR). Four themes emerged from the open-ended questions: therapies made no change to their condition (LVR 2, DB 4), the need for more support with continuing therapy (LVR 2, DB 3), the need to understand the benefit of the therapy (LVR 2, DB 1) and the belief that their condition was too severe to be assisted by the therapies (BS 2, LVR 1).

Conclusion: Overall both the qualitative and the quantitative data suggests that whilst patients had positive experiences to performing LVR and DB, barriers existed. The results demonstrate the need for evidence-based information when commencing therapies, and ongoing support from therapists.

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Measuring adherence to long-term assisted ventilation

Introduction:
Non-adherence to long-term assisted ventilation may risk persistent symptoms, unplanned hospitalisations or premature mortality for those that require this treatment. Previous studies have reported non-adherence rates of up to 50% but limited data are available from Australian populations.

Aim
The primary aim was to determine the usage of long-term assisted, non-invasive ventilation (NIV) during the initial six months of therapy in naive users. Secondary aims were to examine adherence patterns across demographics, disease groups and locations of care.

Methods
A prospective observational study was undertaken enrolling consecutive patients commencing NIV during an inpatient or outpatient visit to a centralised home mechanical ventilation service based in Victoria. Participant usage (minutes per day) was collected over their first six months after implementation of NIV via manual device downloads. Adherence per month of use was categorised as an average usage of greater than 4 hours per night.

Results
Data from 86 of the 100 participants enrolled was available for analysis. Missing data was primarily due to device malfunction or failure to attend for follow-up. The majority (65%) of participants had a diagnosis of motor neuron disease (MND), were implemented on NIV in an outpatient setting (72%) and lived in Melbourne (70%). Twenty two percent, all with MND, died within the study period. During the first month after NIV initiation, people with MND were significantly less likely to be able to adhere with NIV (27 of 56 (48%), versus 22/30 (73%), p=0.028). At study conclusion (6 months or the month prior to death in those with MND), overall adherence was 61%. Only a small number of those with MND shifted from non-adherent to adherent (n=3) during the observation period.

Conclusion
Non-adherence is common in those commencing NIV, especially in people with MND, despite enrolment within a centralised home mechanical ventilation service. Strategies aimed at reducing non-adherence rates may improve health outcomes.

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Social Support – A Protective Factor for Perinatal Depression?

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Aim
Social support before and after childbirth is a possible protective factor for perinatal depression. It may also be a protective factor for adverse child development, which is a known consequence of perinatal depression. Previous studies of social support and perinatal depression have generally been short-term and cross-sectional. This study examined the trajectory of the relationships of perceived social support with depression and anxiety in pregnancy and postpartum as well as with child development and parenting-related stress up to 2 years.

Methods
The present study followed up a cohort from a randomised controlled trial of psychological treatment for antenatal depression (n=54). Perceived social support, depression and anxiety were assessed twice in pregnancy and twice postpartum up to 2 years using the Social Provisions Scale, Beck Depression Inventory and Beck Anxiety Inventory. Parenting-related stress was assessed at 24 months postpartum using the Parenting Stress Index. Child development was assessed at 9 months using the Revised Infant Behaviour Questionnaire Short Form, the Ages and Stages Questionnaire and the Ages and Stages: Social Emotional and at 24 months using the Bayley Scales of Infant Development and the Child Behaviour Checklist.

Results
There was a strong relationship between perinatal depression and anxiety and two aspects of social support, Reassurance of Worth and Reliable Alliance, particularly in late pregnancy and this was maintained to 6 months postpartum. Consistent with this finding, social support predicted the parent domain score of the Parenting Stress Index at 24 months. However, the effect of postnatal depression on child development at 9 and 24 months postpartum was not mediated by social support.

Conclusion
Social support may play a protective role against mood disorders in pregnancy. Given the deleterious effects of antenatal depression on maternal and child wellbeing, developing interventions that increase social support from late pregnancy may be especially important.

The Role of Glycolysis in Progression of Renal fibrosis

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Aim: Fatty acid oxidation is reduced in renal fibrosis but the role of glycolysis is unclear. We mutated a key controller of glycolysis in mice to determine its effect on renal fibrosis.

Methods: 6-phosphofructo-2-kinase/fructose-2,6-biphosphatase (PFKFB) is a key regulator of glycolysis. Mice with inactivating mutations of the phosphorylation sites in PFKFB2 (PFKFB2 KI mice) were generated, which is predicted to reduce the ability to increase the rate of glycolysis following stimulation. Unilateral ureteric obstruction (UUO) and folic acid nephropathy (FAN) models were used.

Results: In both UUO ($p<0.01$) and FAN ($p<0.05$) models, there was reduced expression of PFKFB2 in WT mice versus controls. In the UUO model, there were significant increases in fibrosis in PFKFB2 KI mice when assessed by picrosirius red staining ($p<0.001$), RT-PCR and Western blots for alpha-SMA ($p<0.05$) and fibronectin ($p<0.05$) compared to WT. Glycogen increased in both KI and WT mice following UUO, but lipid accumulation, measured by oil red O ($p<0.005$), was greater in PFKFB2 KI mice. In contrast, similar studies with the folic acid nephropathy (FAN) model showed no significant increase in fibrosis, greater glycogen content in the PFKFB2 KI mice compared to WT ($p<0.05$), and no difference in lipid accumulation.

Conclusions: These data show that inhibition of the regulation of glycolysis by PFKFB2 increases fibrosis in the UUO but not the FAN model.

Accurate measurements of dose calibrator gain settings with high purity germanium detector spectroscopy.

Background: Dose calibrators (DC) are operated as standard with manufacturer specified gain settings that have been shown to differ from those measured experimentally. Accurate determination of these settings is essential for dose optimisation in therapeutic and diagnostic applications.

Aims: This work presents a method of calibrating DC gain settings against a primary standard with quantitative high purity germanium (HPGe) detector spectroscopy for a range of nuclear medicine isotopes.

Methods: The efficiency of an HPGe detector was measured according to a primary standard and used as a ground truth to optimise a monte carlo model for efficiency calculations in the 88-1332 keV photopeak range. Modelled efficiencies of sources in extended geometries were validated with experimental measurements and used to cross calibrate DC gain settings against the primary standard. Gain settings for different models of DC were subsequently determined by comparison. The HPGe detector measured gain settings were cross checked against positron emission tomography measurements of standard uptake value (SUV) for applicable isotopes.

Results: The monte carlo model was optimised to produce efficiency values to within $\pm 3.9\%$ at 95% confidence. The discrepancies between activities measured with default gain settings and those measured with HPGe detector spectroscopy are shown in table 1. The HPGe detector measured gain settings agreed with SUV measurements to within 8.2%.

Table 1: Percentage difference in activity with default and HPGe detector measured gain settings.

Isotope	Activity Difference %
F-18	-1.0
Ga-68	0.8
Tc-99m	1.6
C-11	0.8
Zr-89	9.6
Cu-64	22.0
I-124	29.0

Conclusion: Using manufacturer specified gain settings resulted in erroneous activity measurements of high-energy beta emitters or isotopes with extraneous decay pathways. Accurate determination of DC gain settings is essential, particularly in light of high energy beta emitters such as Lu-177 becoming increasingly prevalent in therapy.

A high performance liquid chromatography quality control method for 4-[18F]Fluorobenzyl dexetimide (4-[18F]FDEX)

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Molecular Imagining and Therapy, Austin Health, Melbourne

Background / Aims:4- [18F]FDEX is a new radioligand for positron emission tomography (PET) imaging of muscarinic acetylcholine receptors (mAChR) particularly M1 subtype. This radioligand is promising diagnostic agent for cognitive dysfunction in schizophrenia.

Our department has developed and optimised the HPLC quality control method to evaluate the in-house radiosynthesis of 4-[18F]FDEX for human clinical trial.

Method: Phenomenex Luna 5µm C18 75 x 4.6mm column with 0.1% formic acid in water (A) and 0.1% formic acid in acetonitrile (B) at a flow rate of 0.5 mL/min with a gradient from 5% (B) to 90% (B) in 16 minutes. Shimadzu HPLC system with FlowRam radioactive detector was used for UV absorbance and radioactive detection. LabSolution software from Shimadzu was used for analysis.

FDEX, flurobenzaldehyde (precursor 1) and nordexetimide (precursor 2) reference were prepared to determine the separation efficacy of our HPLC method. Serial dilution of each was also performed to determine the minimum detectable concentration and establishing standard a curve for specific activity calculation.

Results: Base line separation was achieved with retention times of flurobenzaldehyde, FDEX and nordexetimide were approximately 7, 11 and 14 minutes respectively. Standard curve of FDEX yielded a r^2 value of 1 with a minimum detectable limit of 1 µg/mL.

Conclusion: We have developed a robust HPLC method to evaluate the in-house production of 4-[18F]FDEX for human trial.

Ask an Informationist – engaging with the evidence

Issue:

The Choosing Wisely framework encourages clinicians and patients to ask questions and examine the evidence around the necessity of tests or treatment options. For clinicians today, the amount of information available can be overwhelming. Does emerging evidence question existing practices; or has a previous finding been overturned through new research? These key questions inform evidence-based practice decisions, enabling delivery of the most appropriate level of care.

Objectives:

Ask an Informationist is an initiative that translates clinical questions into practice. As a member of the Austin Health Choosing Wisely Steering Committee, the Austin Health Sciences Library brings expertise in evidence-based literature searching. A clinical question, directly related to the evidence for tests, treatments or procedures, is submitted to the Steering Committee. The Library team create an infographic as a visual summary of the available evidence, supported by a written report. When coupled with audit data or local policies and procedures, this provides an evidence-rich foundation for clinicians to initiate change and "Choose Wisely" in their delivery of patient care.

Outcomes and impact:

To date, six infographics and reports have been produced: intravenous magnesium in atrial fibrillation; continuous intravenous PPIs for acute non-variceal upper gastrointestinal bleed; minimum retesting intervals in microbiology tests; the necessity of opioids for pain management following limb fracture; the management of renal colic; and the use of pregabalin in acute neuropathic pain.

The impact of *Ask an Informationist* is seen throughout Austin Health. The initiative has: driven change in emergency department practice for intravenous magnesium use; led to delivery of clinical education around PPIs through workshops and media activities; been a catalyst for broader discussion around opioid use throughout the hospital.

Through this collaboration we are engaging with the evidence, encouraging critical thinking and shaping the future of our patient care.

Michele Gaca – Austin Health Sciences Library
Helen Baxter – Austin Health Sciences Library

Austin HEALTH

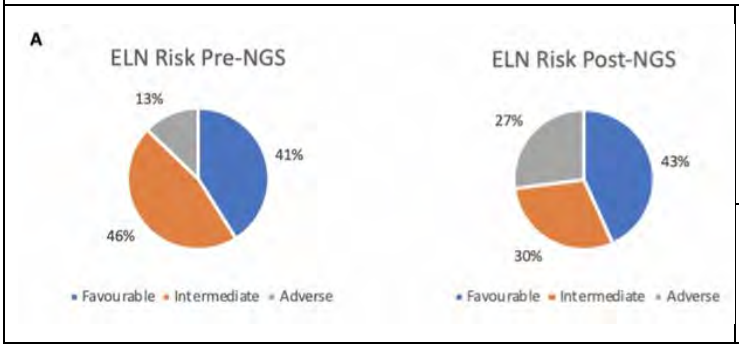
Clinical utility of next generation sequencing in AML: a real-world experience

Aim: Acute myeloid leukaemia (AML) is a genomically heterogenous disease [1, 2]. Advanced molecular techniques, principally next generation sequencing (NGS), are required to analyse the multiple genes of diagnostic, prognostic and therapeutic relevance [3]; yet NGS is relatively expensive, poorly reimbursed and requires expertise for implementation and interpretation [4, 5], resulting in variable access to this technology. The clinical utility of NGS testing in routine care of Australian AML patients is unknown. This study evaluates the impact of NGS in AML management in an Australian tertiary hospital.

Methods: Patients (n=45) were retrospectively identified; comprehensive clinical and pathological data was collected from medical records. Clinical utility was defined by a change in diagnosis (WHO classification), prognosis (ELN risk stratification; predicted three-year overall survival calculated by an online multistage prediction tool) and/or therapy (CR1 allograft recommendation; targeted therapy) following addition of NGS results to standard diagnostics.

Results: NGS was clinically significant in more than one third of patients (16/45). In the newly diagnosed cohort (n=40), NGS led to changes in WHO diagnosis (1 patient), ELN risk stratification (7 patients), >10% change in predicted overall survival (11 patients) and change to allograft recommendation in first complete remission (2 patients), primarily through the detection of RUNX1, ASXL1 and TP53 mutations in baseline ELN intermediate risk disease. Of particular note is the 39% of patients (7/18) upgraded from intermediate to adverse risk by detection of these mutations. 3 patients received targeted therapy after NGS; one with a novel FLT3 mutation received midostaurin, and 40% of relapsed patients (2/5) received IDH1/2 inhibitors.

Figure 1: Impact of NGS analysis on ELN risk categorisation



B

Category	Pre-NGS	Post-NGS
Favourable	16	16
Intermediate	18	11
Adverse	5	10

Panel A: The distribution of patients according to ELN risk category pre and post NGS data

Panel B: Patient numbers in each risk category pre and post NGS data

Conclusion: NGS testing is clinically useful in a significant proportion of AML patients, particularly those with ELN intermediate risk and relapsed disease. Funding for NGS as a standard-of-care investigation for AML should be strongly considered; further data supporting the clinical utility of NGS will lend weight to this argument.

References:

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Aim

Refractory fevers in haematology patients with prolonged and severe neutropenia raises suspicion for invasive fungal infection (IFI). This study aimed to estimate the prevalence of pulmonary IFI in high-risk haematology patients on antifungal prophylaxis, and analyse the outcomes of routine chest CT and its impact on the evaluation and management refractory febrile neutropenia (FN) in this cohort.

Methods

A retrospective analysis of haematology inpatients with refractory FN investigated with chest CT whilst on antifungal prophylaxis between 2010 and 2018 was conducted. Patient demographic and clinical information regarding FN characteristics and chest CT outcomes was analysed with descriptive statistics. The primary endpoint was the proportion of FN episodes in which chest CT led to a diagnosis of probable or proven pulmonary IFI. Secondary endpoints included the proportion of chest CT scans that led to bronchoscopy and broncheoalveolar lavage (BAL)/lung biopsy or a change in antifungal/antibacterial therapy, as well as the presence of respiratory symptoms/signs, positive smoking status, and positive blood cultures.

Results

140 eligible FN episodes were identified. Overall, 6 cases (4.29%) were identified to have probable or proven pulmonary IFI, of which 4 (2.86%) were invasive pulmonary aspergillosis (IPA); 100% of these cases exhibited respiratory symptoms/signs, and 83.33% had a positive smoking history. Importantly, 67.14% of the chest CT scans did not result in a change in management, and 82.35% of the bronchoscopy and BAL procedures performed due to chest CT yielded no significant results.

Conclusion

The prevalence of pulmonary IFI in this sample group of high-risk haematology patients on antifungal prophylaxis was quite low (<5%), and our findings suggest that routine chest CT in the evaluation of refractory FN in this cohort may lead to excessive investigation. These observations provide the rationale for future larger cohort studies to further investigate clinical features (i.e. respiratory symptoms/signs and smoking status) and risk factors for breakthrough pulmonary fungal disease that could facilitate the more directed (rather than routine) use of chest CT in this setting.

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Measurable residual disease detection by next generation sequencing in B-cell acute lymphoblastic leukaemia

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Introduction
Measurable residual disease (MRD), a key prognostic factor in B-cell acute lymphoblastic leukaemia (B-ALL), is traditionally assessed by flow cytometry and/or allele specific oligonucleotide PCR (ASO-PCR). Here we use novel next generation sequencing (NGS) technology to measure MRD. Our aims are to determine the sensitivity of a NGS based assay for MRD and define normalisation techniques for result standardisation.

Methods
Bone marrow samples were analysed using the LymphoTrack® Dx Assay Panel to detect IgH gene rearrangements. The IgH locus was amplified using primers targeted at three conserved framework (FR1-3) regions of the variable gene segments and corresponding joining gene segments. Target genes were sequenced on the Illumina® MiSeq with data analysis undertaken using provided software. Sequence clonality determination was defined as >2.5% of the total reads and >2x the read frequency for the third most frequent sequence. Clinically relevant MRD timepoints were analysed as above in 3 replicates. A 100 cell equivalent spike-in control (LymphoQuant™) was added in each MRD replicate for normalisation. Serial dilution of a commercially obtained known IgH rearrangement was performed to determine the limit of detection of the assay.

Results
Results were concordant (82.86%) between assay methods with the exception of 6 samples. In 5 cases MRD was detected by NGS at a lower level than flow cytometry and ASO-PCR which were negative. MRD positivity by NGS corresponded with poor clinical outcomes in these patients. The dilution series validates the ability of the assay to detect 1 leukaemic cell in 100,000 normal cells (10^{-5} sensitivity). Replicates of diagnostic samples within and across sequencing runs demonstrate the intra/inter run precision of the assay.

Conclusion
MRD detection by NGS is complementary to standard of care testing using flow cytometry and ASO-PCR. NGS has the added advantage of increased sensitivity, detection of clonal evolution and a rapid turnaround time. Normalisation of MRD levels to cell equivalents is required to suitably compare results with flow cytometry and ASO-PCR.

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Do parents make good decisions when bringing their child to the Emergency Department? Comparing GP and parent-referred paediatric emergency presentations.

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Aim
To determine whether the demographics and outcomes of parent-referred paediatric emergency presentations significantly differ from GP-referred presentations.

Methods
A cross-sectional prospective study, conducted from January to May (2019), in the Paediatric ED at Austin Hospital in Melbourne, Australia. Study sample was all paediatric presentations of all triage categories aged 15 or under. Measured outcomes were demographic data (age, sex, triage category and arrival mode) and outcome data (admission, specialty consultation, consultation time greater than 1 hour, intravenous/ nasogastric therapy, procedural sedation, procedures, imaging studies and pathology collection).

Results
The demographics of parent-referred presentations were not significantly different to GP-referred patients but were more likely to arrive via ambulance (13% vs. 2%, $p<0.01$). GP-referred patients triaged to category 4 and 5 (low-urgency) were more likely to require a procedure (risk difference 0.07, 95% CI 0.02 - 0.13) and pathology (risk difference 0.05, 95% CI 0.01 - 0.1) than parent-referred presentations. The proportion of low-urgency presentations who required no measured outcomes was not significant between the two referral sources (risk difference -0.02, 95% CI -0.07 - 0.03). Current policy to decrease ED overcrowding suggests diverting low-urgency emergency presentations to GPs(1). Objective results demonstrate that parents and GPs are making similar referral decisions.

Conclusions
The demographics and outcomes of parent-referred paediatric emergency presentations do not substantially differ from GP-referred presentations. Policy focused on diverting low-urgency cases to GPs is likely to be ineffective.

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Kelsey Hibberd and Ian Baldwin

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Nursing handover tools in the ICU ; A practice survey.

Background.

Nursing handover in the Intensive Care Unit (ICU) is bedside and commonly between two nurses for the introduction, background, current status, plan of care, and transfer of responsibility to the next shift.

At Austin Health we use a dedicated and designed A5 page two sided document for short notes and prompts associated with handover. This includes a job list to time brackets, assessments, and any follow up. Some of these notes are used for the next handover, and as a reminder when completing clinical notes and check off requirements for care standards and safety.

Aims. To investigate the use of any similar document in ICU's across Australia and International.

Methods. Telephone contact was made to 15 hospitals using a prepared question algorithm to ask: If any document was used ? If Yes; was the document purpose designed and the basic elements ? If no, what is used at nursing handover for this purpose ?

Results. 15 or 100 % of those interviewed indicated no formal document was available and nurses referred to history and admission notes and clinical notes made on paperer charts and or computer screen views. 10 or 75% indicated scrap paper and or clinical progress documents were used, and later discarded; i.e. scrap paper again.

All reflected this is a need, and they would appreciate the opportunity to see the Austin ICU version and idea.

Discussion. There is a need to provide a paper document with basic structural headings as a tool for personal and reminder notes to link the complex clinical data and presentations of such in multiple Software views at a bedside in the ICU.

Conclusion. We believe our existing tool is clearly unique, has originality and could progress better method and structure for handover and nursing work in the ICU.

Patients With Diabetes Are At No Greater Risk For Contrast Induced Nephropathy Than Those Without Diabetes

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Background

- Contrast-induced nephropathy (CIN) is an important cause of kidney injury in inpatients.
- Prevalence and predisposing factors of CIN as a result of iodinated intravenous (IV) contrast are unclear in diabetes. Limited studies have examined the association of CIN and diabetes.
- Incidence of CIN is variable between 3 to 30%, depending on pre-existing co-morbidities. Risk increases if patients have underlying renal disease and/or diabetes[1,2].

Objectives

1. To investigate the association between CIN and Diabetes Status.
2. To investigate the potential modifying effect of Diabetes on the association between baseline creatinine and CIN.

Methodology

- As part of the Austin Health Diabetes Discovery Initiative, routine HbA1c testing was performed on all inpatients aged ≥54 years if no HbA1c was available within the preceding 90 days.
- Routine HbA1c results were extracted from the hospital electronic system, Cerner Millennium IT Health Platform[3].
- Inpatients who received IV contrast prior to computed tomography (CT) scans from July 2012 to March 2018 at Austin Health, Melbourne were identified.
- Serum creatinine measurements at baseline, 48 hours and 72 hours post contrast administration were obtained.
- CIN was defined as:
    1. an absolute rise in serum creatinine of ≥44 µmol/L from baseline after 48 and/or 72 hours or
    2. a relative measurement of ≥25% increase from baseline after 48 and/or 72 hours[4,5].
- Patients were divided into those with or without a history of

Table 1. Baseline Characteristics

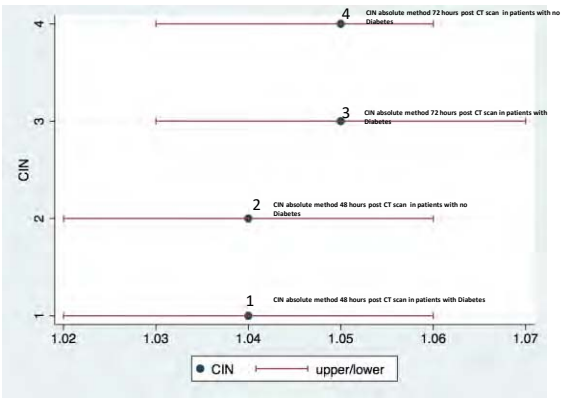
Characteristics (n=1431)	Diabetes (n=441)	No Diabetes (n=990)
Male (56%)	33%	67%
Age (years) (IQR)	71 (64-78)	72 (63-80)
HbA1c (%)	6.7 (5.9 - 7.7)	5.6 (5-5.4)
Length of Stay	14 (8-21)	13 (8-20)
Charlson score†	3 (2-5)	1 (0-3)
Baseline Creatinine	94 (71-35)	79 (62-106)
Baseline eGFR	75 (53-91)	94 (71-135)

† Charlson comorbidity index - a validated method of weighting chronic medical conditions (the score for diabetes and age were excluded as they were analysed as a separate variable).
n = sample size. Data presented as medians with interquartile intervals.

Table 2. Prevalence of CIN

CIN Calculated with Absolute Method				CIN Calculated with Relative Method			
48 Hours		72 Hours		48 Hours		72 Hours	
Overall Prevalence 5.4%		Overall Prevalence 5.5%		Overall Prevalence 8.9%		Overall Prevalence 10.3%	
Diabetes 2%	No Diabetes 3.4%	Diabetes 2.4%	No Diabetes 3.1%	Diabetes 2.8%	No Diabetes 6.1%	Diabetes 3.9%	No Diabetes 6.4%

- Overall, for every baseline creatinine increments of 10 µmol/L, the chance of developing CIN was 5% higher measured using absolute method at 48 or 72 hours.
- After adjusting for baseline creatinine and age, there was no difference in the prevalence of CIN between patients with and without diabetes.



1. CIN calculated with absolute method 48hours post contrast CT scan in patients with Diabetes
2. CIN calculated with absolute method 48hours post contrast CT scan in patients with no Diabetes
3. CIN calculated with absolute method 72 hours post contrast CT scan in patients with Diabetes
4. CIN calculated with absolute method 72 hours post contrast CT scan in patients with no Diabetes

Conclusion

- Patients with or without diabetes who had a CT scan with IV contrast appear to have a similar risk for the development of CIN after adjusting for other variables.
- Patients with higher baseline creatinine had a higher risk of developing CIN.
- A larger data set may yield different outcomes.

Acknowledgements

Diabetes Discovery Initiative Team, Department of Endocrinology, Department of Radiology, The Florey institute of Neuroscience and Mental Health, Austin Centre for Applied Clinical Informatics, Department of Administrative Informatics, Department of Pathology, Department of Medicine, University of Melbourne – Austin Health, Department of Endocrinology and Diabetes, St Vincent's Hospital Melbourne.

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Doctors' perspectives on adhering to advance care directives when making medical decisions for patients: an Australian interview study

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Background
Advance care planning (ACP) assists people to identify their goals, values and treatment preferences for future care. Ideally, preferences are documented in an advance care directive (ACD), to be used by doctors to guide medical decision-making should patients subsequently lose their decision-making capacity. However, studies demonstrate that ACDs are not always adhered to by doctors in clinical practice.

Aim
To describe the attitudes and perspectives of doctors regarding ACD adherence and the utility of ACDs in clinical practice.

Methods
Doctors from a variety of medical specialties and with varying experience levels were recruited from a large tertiary hospital in Melbourne, Australia. Face-to-face semi-structured interviews were conducted using three case-based vignettes to explore doctors' decision-making and attitudes towards ACDs. Transcripts were analysed using thematic analysis.

Results
Twenty-one doctors were interviewed, 48% female (10/21). Most (19/21) reported having experience using ACDs. Four themes were identified: aligning with patient preferences (avoiding unwanted care, prioritising autonomy, navigating family opposition), advocating best interests (defining futile care, relying on clinical judgement, rejecting unreasonable decisions, disregarding legal consequences), establishing validity (doubting rigor of the decision-making process, questioning patients' ability to understand treatment decisions, distrusting outdated preferences, seeking confirmation) and translating written preferences into practice (contextualising patient preferences, applying subjective terminology, prioritising emergency medical treatment).

Conclusion
ACDs provide doctors with opportunities to align patient preferences with treatment and uphold patient autonomy. However, doctors experience decisional conflict when attempting to adhere to ACDs in practice, especially when they believe that adhering to the ACD is not in the patients' best interests, or if they have doubts about the validity of the ACD. Future ACP programs should consider approaches to improve the validity and applicability of ACDs. In addition, there is a need for ethical and legal education to support doctors' knowledge and confidence in ACP and enacting ACDs.

Are we overdosing older people with paracetamol in hospital?

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Background

Paracetamol can cause hepatic injury when used in excessive doses. Older people may be at increased risk. Some guidelines recommend a maximum paracetamol dose of 60 mg/kg/day for older people who weigh < 50kg, especially in the presence of frailty or chronic disease.[1,2]

Aim

To determine whether older hospital inpatients weighing < 50kg are prescribed potentially excessive paracetamol doses.

Method

Patients aged ≥70 years at a large metropolitan teaching hospital admitted between August and December 2018, with length-of-stay >72 hours, weight < 50kg and prescribed paracetamol were included in this retrospective audit. Medication data, including the total dose of paracetamol administered on the first full day after paracetamol was prescribed, and the dose prescribed on discharge, were extracted from patients' electronic medical records. The primary endpoint was the percentage of patients who received a potentially excessive paracetamol dose (>60 mg/kg/day).

Results

One hundred and eight older patients who weighed < 50kg (mean age 85.6 years, 90.7% female) received paracetamol during 120 hospital admissions. They received an average of 10.1 medicines, indicating a high level of multimorbidity. During 63/120 (52.5%) admissions, patients received >60 mg/kg/day of paracetamol (mean dose 81.3 mg/kg/day, range 61.2-117.3). On 72 occasions, patients were prescribed paracetamol on discharge, and 61 (84.7%) of these were >60 mg/kg/day (mean dose 87.0 mg/kg/day, range 61.2-129.0). Most inpatient and discharge paracetamol orders were for regular administration (84.2% and 65.2% respectively).

Conclusion

More than 50% of hospital inpatients aged ≥70 years who weighed < 50kg received potentially excessive doses of paracetamol. Strategies are required to raise awareness of the need to reduce paracetamol doses in older patients who weigh < 50kg.

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Reduced handgrip strength in liver transplant recipients is associated with poor outcomes after transplantation

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Aim:
Sarcopenia and frailty are common in patients with liver disease. Handgrip strength (HGS) has recently been shown to predict wait-list mortality in liver transplant (LT) candidates but little is known about its association with post-transplant outcomes. This study aimed to evaluate the impact of reduced HGS on a range of clinical outcomes after LT.

Methods:
This is a retrospective review of all adult patients undergoing LT between January 2009 and December 2016. Functional muscle strength was assessed by HGS at wait listing and repeated prior to LT. Study outcomes included length of stay (LOS) in ICU and hospital, episodes of infection, rejection and biliary strictures within 90 days, readmission within 90 days, and graft and patient survival.

Results:
373 patients (70% male, median age 55 years [IQR 47; 60], MELD 13 [9; 19]) were included. 175 patients (47%) had impaired HGS at time of LT wait listing, with mean HGS 32.4kg (±9.32) for males and 18.4kg (±6.29) for females. There was a small but significant decline in muscle strength following median waiting time of 142 days [52; 318] to 31.4kg (±9.35) for men (p=0.006) and 17.6kg (±5.78) for women (p=0.037).

Impaired HGS at LT was associated with significantly longer ICU LOS (82 hr vs 63 hr, p=0.032), increased hospital LOS (21 d vs 15 d, p<0.001) and increased incidence of infection (48% vs 33%, p=0.003) compared to those with adequate HGS. Logistic regression showed the lowest quartile of gender-specific HGS independently predicted adverse post-LT outcomes, including; longer ICU LOS (HR 0.69 [0.54; 0.88], p=0.003), longer hospital LOS (HR 0.73 [0.58; 0.93], p=0.011), and development of infection (OR 1.83 [1.12; 2.97], p=0.015). There was no significant association between HGS and prevalence of rejection, biliary complications, hospital readmission, graft loss or survival.

Conclusion:
Low HGS is common in patients awaiting LT and we report for the first time its association with adverse clinical outcome after transplantation. HGS offers a simple, objective, repeatable measure of muscle function that allows clinicians to identify LT candidates at risk of early post-transplant morbidity.

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Title: Recurrence of colorectal liver metastases in the regenerating liver
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Acknowledgements: University of Melbourne RTP Scholarship, Reg Worcester Foundation for Surgery Scholarship, Royal Australasian College of Surgeons

Background and Aim

Emerging clinical and experimental data suggests that processes which stimulate liver regeneration post hepatectomy also drive tumour recurrence and that biochemical events occurring in the tumour periphery and tissue adjacent to the tumour appear to be key to this. This is a major problem for hepatobiliary surgeons and oncologists. We investigated the mechanisms underlying CRLM recurrence in the regenerating liver and the efficacy of treatment with renin-angiotensin inhibitors (RASi) to attenuate this.

Methods

All animal experiments were approved by the Austin health animal ethics committee. Liver metastases were established using mouse colorectal cancer (MoCR) cells routinely passaged subcutaneously in CBA mice and induced via splenic injection. One week later, 70% partial hepatectomy (PH) or sham surgery was performed. Mice received either captopril (renin-angiotensin inhibitor) or saline. Mice were culled at day 16 and livers were collected for tumour burden calculations, QRT-PCR and immunohistochemistry.

Human CRLM samples were obtained from consenting adults, with approval of the Austin Health human ethics committee and used to culture patient-derived organoids. These are currently being optimised.

Results

PH stimulates tumour growth ($p=0.04^*$) and is associated with significantly higher Ki67 staining in both the tumour and liver ($p=0.04^*$ and $p<0.01^*$ respectively). PH also upregulated markers of epithelial-to-mesenchymal transition (EMT), such as vimentin and Zeb-1 in the tumour ($p=0.04^*$ and $p=0.01^*$ respectively). Inhibition of the renin-angiotensin system was associated with a significant reduction in tumour burden post hepatectomy ($p=0.04^*$). Preliminary data from our human samples indicate that tissue from the tumour periphery/adjacent tissue region more consistently generates tumour organoids.

Conclusion

PH stimulates CRLM progression in the regenerating liver and this effect can be attenuated by administering RASi. One mechanism for tumour progression in the regenerating liver appears to be upregulation of EMT and this may explain why organoids grown from the adjacent tumour regions develop better.

"First do no harm": significance of delays to surgery in patients with non-metastatic breast cancer.

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Aim/Background

The majority of patients in Australia with non-metastatic breast cancer will undergo primary surgery with curative intent. This involves many complex decisions that inevitably increase time from diagnosis to surgery. Current guidelines suggest surgery should occur within 30 days of a decision to treat. However, there may be appropriate reasons to justify a delay to surgery. This study aims to analyse factors that contribute to an increased time to surgery (TTS) and establish whether the associated wait time is justifiable in the context of improved individualised breast cancer management.

Methods

This is a retrospective analysis of all patients at Austin Health surgically managed for non-metastatic invasive breast carcinoma between 20013 and 2019. TTS was defined as time between informed diagnosis and cancer surgery. Patients were categorised into TTS groups of ≤30 and >30 days. Kaplan-Meier survival analysis was used to evaluate the impact of TTS on survival outcomes.

Results

A total of 842 patients were included. Median number of days to surgery was 34 days. 43.9% of the total cohort received surgery within the recommended 30 days. Factors identified to be associated with an increased TTS were screening, transfer of care, ER positive tumour, mastectomy, immediate reconstruction and use of pre-operative imaging including MRI and staging scans. Median follow up for the cohort was 30 months. Between wait groups of ≤30 and >30 days, there were no significant association found between TTS and survival outcomes for DFS (HR 1.20 95% CI 0.56 to 2.60) and OS (HR 1.58 95% CI 0.82 to 3.03).

FACTORS	MEDIAN DAYS TO SURGERY	ODDS RATIO (95% CI)
Screened vs. symptomatic	35 vs. 27	2.39 (1.77 to 3.23)
Transfer of care vs. none	35 vs. 27	2.31 (1.73 to 3.10)
Mastectomy vs. BCS	34 vs. 28	1.789 (1.31 to 2.43)
Immediate reconstruction vs. not	36 vs. 29	2.321 (1.55 to 3.48)
ER positive vs. ER negative	33 vs. 28	2.058 (1.34 to 3.14)
Pre-operative MRI scan vs. none	35 vs. 29	2.074 (1.36 to 3.24)
Pre-operative staging vs. none	34 vs. 28	1.580 (1.18 to 2.12)

Table 1. Factors associated with a significant increase in time to surgery

Conclusions

Breast cancer management involves many complex factors that significantly increases time from diagnosis to surgery. Surgery within 30 days of diagnosis is not associated with improved DFS and OS. Time delays associated with integral element of care should be used to guide a revision of current TTS recommendations.

Evaluation of the practice of intravenous to oral antimicrobial switch in hospitalised patients.

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Aim

Early switch from intravenous (IV) to oral antimicrobials (IV-to-oral switch) is a key antimicrobial stewardship strategy to optimise antimicrobial prescribing. A guideline incorporating criteria to determine patient eligibility for IV-to-oral switch and recommended oral alternatives was implemented at Austin Health in 2017. We aim to explore concordance with the guideline.

Method

A retrospective review of general medicine and surgical patients admitted to wards 7E, 7W, 8E & 8W and prescribed ≥ 1 IV antimicrobial(s) for ≥ 48 hours, over a 2-month period (29 Oct to 21 Dec, 2018), was undertaken. Data collected included variables in the IV-to-oral switch criteria, infection type, microbiology results, antimicrobials prescribed and total duration of IV and oral therapy. The appropriateness of IV-to-oral switch, including choice and dose of oral alternative(s), was assessed by an infectious diseases pharmacist and physician.

Results

One-hundred and seven IV antimicrobial patients/courses were evaluated. Intra-abdominal (30.9%), lower respiratory tract (27.4%), urinary tract (19.4%) and skin and soft tissue (11.5%) infections were the most common reasons for antimicrobial prescription. IV antimicrobials prescribed were mainly ceftriaxone (31.1%), amoxicillin-clavulanate (19.3%), benzylpenicillin (9.6%), metronidazole (8.1%) and cefazolin (8.1%). Forty-six (43%) patients did not switch within 24 hours of meeting criteria. The median total duration (days) of IV therapy before a switch was made was 3 (interquartile range 2.25 to 5). In 20 patients (18.7%), the choice/dose of the oral alternative was considered inappropriate. Approximately 50% of patients received antimicrobial therapy exceeding the recommended duration of therapy for the infection by one or more days.

Conclusion

Overall the practice of IV-to-oral switch at Austin Health was generally concordant with the guideline. Whilst 43% of patients did not switch when the criteria was met, the median number of days before switch was short. Prolonged duration of therapy was identified as a target for improving antimicrobial prescribing.

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Therapeutic potential of targeting the protective arm of the renin angiotensin system in cirrhotic and non-cirrhotic portal hypertension

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Introduction
Portal hypertension (PHT) and bleeding from varices is the major cause of morbidity and mortality in patients with cirrhosis. Splanchnic vasodilatation which leads to an elevated portal venous inflow plays an important role in the pathogenesis of PHT. This study investigates the role of vasodilatory Mas and Mas-related G-protein coupled receptor type D (MrgD) in PHT and whether blockade of theses receptors produce a clinically significant reduction in portal pressure (PP) in cirrhotic and non-cirrhotic animals with PHT.

Methods
Cirrhotic PHT was inducted in Sprague-Dawley rats by bile duct ligation (BDL) surgery or twice-weekly carbon-tetrachloride (CCl_4) injections. Non-cirrhotic PHT was inducted by partial portal vein ligation (PPVL) surgery. Two-weeks (BDL), 8-weeks (CCl_4), and 1-week (PPVL) after each procedure, rats received either MasR blocker A779 or MrgD blocker D-Pro^7-Ang-(1-7) (D-Pro) (28μg/kg/hr) via subcutaneously implanted osmotic mini-pumps. Saline infused sham-operated or diseased rats served as controls. After treatment, rats were cannulated to measure PP. Coloured microsphere injections were used to calculate splanchnic vascular resistance (SPVR) and mesenteric blood flow (MBF). Mesenteric resistance vessels isolated from separate groups of CCl_4 rats were used in myographs to study their vasodilatory properties.

Results
D-Pro and A779 significantly ($p<0.01$) reduced PP in BDL and CCl_4 rats compared to saline-infused controls. In CCl_4 rats PP reduction from the baseline was larger with D-Pro (33%) than A779 (21%). Treatment with both drugs increased SPVR, however, in CCl_4 model, this was greater with D-Pro than that of A779, leading to a marked reduction in MBF (by >50%). D-Pro but not A779 profoundly reduced vascular relaxation of first order (45%) and 2nd/3rd order (13%) vessels in response to acetylcholine. In-contrast, neither D-Pro nor A779 had any effect on SPVR, MBF or PP in non-cirrhotic PPVL rats.

Conclusion
These findings demonstrate profound effects of blockade of newly identified receptor, MrgD, on PP in cirrhotic but not in non-cirrhotic PHT. MrgD but not MasR blockade showed splanchnic vasculature-specific effects in cirrhosis. We therefore conclude that MrgD, is a potential target for the design of drugs that can specifically block splanchnic vasodilatation in cirrhotic PHT, and we have commenced work to develop small molecule MrgD blockers.