Australian and New Zealand College of Perfusionists

38th ANNUAL SCIENTIFIC MEETING

Cathedral Cove, Coromandel, New Zealand

Zoom-Webinar

25th – 26th November 2021



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Conference Information

Welcome....

On behalf of the organising committee, we would like to welcome you to the 38th Annual Scientific Meeting of the Australian and New Zealand College of Perfusionists.

2021 has continued from 2020, with the COVID-19 pandemic still rampant. These unprecedented times led to the unfortunate decision to postpone The Inaugural Tri-Society Cardiac & Thoracic Symposium (3SCTS) 2021 earlier this year, which was postponed to 16-19th November 2022 Cairns Convention Centre, Queensland.

We are all becoming familiar with virtual meetings, and the Executive made the decision to hold our second ANZCP virtual ASM. We all have had to adapt and overcome obstacles that COVID-19 has imposed on us again this year, so too has the scientific meeting.

Our second virtual meeting will bring our members and guests two days of domestic, international, and special guest speakers, as well as a trainee breakout session and ECMO services presentations. We are very grateful to all the presenters and moderators this year for their time and effort in contributing to such an important meeting.

The organising committee would like to thank the assistance from the Executive over the last few months in supporting the organising committee through this time. Their invaluable experience in hosting some insightful COVID webinars throughout the year has been a great help.

We would also like to thank the continued support and participation from our corporate partners, whom without their generous assistance, this ASM would not be possible.

We want to thank you for your participation and look forward to catching up with everyone in person next year at the 2022 3SCTS meeting.

The Organising Committee.

Faculty

Committee

International: Dave Fitzgerald Rachel Johnson

Regional:

Annette Mazzone Timothy Willcox Alex Peterson Martin Bennett Jack Bhana Nicole Gifford

Organising & Scientific:

Britney Westbrook Andrea Hunt Rob Baker Richard Newland

Faculty Information

Invited International Faculty

Assistant Professor David Fitzgerald



Dr. Fitzgerald is an Assistant Professor and Division Director for the Cardiovascular Perfusion (CVP) program at the Medical University of South Carolina in Charleston. Prior to his tenure at MUSC, he was the Director of Perfusion Services for the INOVA Fairfax Hospital in Falls Church, VA. Dave's area of interest in perfusion education include blood management, patient safety and human factors, and high fidelity simulation.

Dave has volunteered in numerous perfusion organizations, including several committees and elected board positions. He has previously served AmSECT as President, Zone Director, Associate Editor of the Journal of Extracorporeal Technology, and Committee

Chair for the Safety Committee. He still enjoys serving the society on the International Consortium of Evidence Based Perfusion, Safety, and Conventional Planning Committee Groups. He has received numerous professional awards, including AmSECT's Award of Excellence in 2009, and the John H. Gibbon Jr. Award in 2020.

Ms. Rachel Johnson



Rachel has an academic background in molecular cell biology and genetic engineering. After completing her MSc in Adult Nursing she worked at Royal Papworth critical care unit where she trained to become an ECMO nurse. Her special interests are machine perfusion and transplantation.

Invited Australian & New Zealand Faculty

Timothy Willcox



Tim Willcox is a clinical perfusionist who has worked in the Green Lane Cardiothoracic Unit since the early '70s, training under Sir Brian Barratt-Boyes and has extensive experience all aspects of perfusion. Tim led the Green Lane perfusion department for over three decades. He has been involved in the development of perfusion in New Zealand including the programmes for cardiac, lung and liver transplantation and ECMO, for which Auckland is the national referral centre. Tim is widely published in the perfusion literature

and has presented internationally in his areas of research interest including, emboli and air handling of CPB, perfusion safety and CPB outcomes. Tim is an honorary senior lecturer at the University of Auckland Faculty of Health Sciences department of Anaesthesiology and founded the annual trans-Tasman multidisciplinary perfusion focused Perfusion Downunder Winter Meeting in 2004 and has been involved in perfusion education in the Peoples Republic China since 1999. He is the editor of the ANZCP Perfusion Incident Reporting System, a reviewer for JECT and Perfusion journals, and a past president and board member of the ANZCP. Tim is married with 2 daughters, 2 grandsons, is a hobbiest beekeeper and a trekker with strong links to the Solukhumbu region of Nepal.

Alex Peterson



I am the Lead Perfusionist for the Adult Perfusion Service at Auckland City Hospital, New Zealand. ACH completes around 1200 adult cardiac cases per year and is the national Transplant and ECMO centre for New Zealand. Our unit consists of 18 Perfusionists who have extensive experience in all aspects of Cardiac Surgery.

I certified as a Perfusionist at St Bartholomew's Hospital, London in 2006 and have subsequently worked in the United Kingdom, New Zealand, Australia and Samoa.

My passion for training led me into coordinating the perfusion

training scheme in Auckland and more recently, I have joined the Australasian Board of Cardiovascular Perfusion (ABCP). My role within the Board is to liaise with the Medical University of South Carolina as we transition to their new MSc in Perfusion for Australia and New Zealand trainee perfusionists.

Annette Mazzone



Annette Mazzone is a senior perfusionist in the Department of Cardiac and Thoracic Surgical Unit at Flinders Medical Centre. After gaining her CCP in 2004 Annette has developed her skills in adult perfusion and ECMO. In 2014 Annette commenced a PhD part-time, researching the role of microRNA levels in hypoxia and cardiopulmonary bypass in the development of acute kidney injury. In March 2020 Annette was awarded her PhD. Annette has been involved in the set up and initiation of the SA organ procurement program and Women's and Children's ECMO program. Annette has a passion for perfusion education and has

been an active member of the Australasian Board of Cardiovascular Perfusion and is the supervisor of trainees at FMC.

Dr. Nicole Gifford



Dr Nicole Gifford a registered Clinical Psychologist and a member of the NZ College of Clinical Psychologists (NZCCP). Nicole works half a day in private practice and the rest of the week is with the Auckland District Health Board in the Community mental health.

Martin Bennett



Martin has been a Perfusionist at The Royal Children's Hospital, Melbourne for more than 20 years having originally trained in adults at the Austin Hospital. He is the Perfusion lead for the RCH's ECMO program and has helped develop the hospitals ECMO retrieval service, having been on the first interstate retrieval in 2004. He is a past Chairman of the ABCP and is keen volunteer in OHI's

He is a past Chairman of the ABCP and is keen volunteer in OHI's Tonga program.

Competition: Perfusion Crossword



Across

- **5.** Synthetic catecholamine with strong affinity for beta adrenoceptors
- 9. Metalloprotein in red blood cells
- 10. pH less than 7.35
- 13. Largest vein
- **15.** Maintain oncotic pressure
- 16. Largest organ by surface area
- 19. Reverses heparin
- 20. Selective separation of plasma water and blood
- 23. Procedure to restore perfusion
- 24. Endogenous vasodilator
- 25. Natural colloid

Down

- **1.** Fibrinogen level <100mg/dl
- 2. Atheromatous plaque dislodged
- 3. Complication of immobility
- 4. Emergency treatment for ventricular fibrillation
- 6. Low potassium
- 7. pH greater than 7.45
- 8. Gas samples are not temp-corrected
- 11. Hypoperfusion of intestines increases production
- 12. Anti-coagulant used to prevent emboli
- 14. Concept from which CPB arose
- 17. Performed first successful CPB
- **18.** Binds electrostatically to heparin
- **21.** Most common vent placement
- 22. Serum amylase rise over 10000IU/l



Meeting Program

Submitted abstract titles are in capital text.

Thursday 25th November

12:00 Rob Baker Welcome

Session 1: COVID-19 (Moderators: Alison Horton and Rob Baker)

12:05-13:15

12:05 US COVID-19 Experience David Fitzgerald

- 12:25 UK COVID-19 Experience Rachel Johnson
- **12:45** AUS COVID-19 Experience Adam Roshan and Emerson Sgammotta
- 13:00 Panel discussion

Session 2: Student Abstracts (Moderator: Wendy Saad Salib)

13:15-13:51

- **13:15** HEPARIN MANAGEMENT REVIEW James Campbell
- **13:27** COMPARISON OF CEREBRAL EMBOLIC LOAD BETWEEN SINGLE AORTIC CROSS-CLAMP AND PARTIAL AORTIC SIDE-CLAMP TECHNIQUES DURING CORONARY ARTERY BYPASS GRAFTING Jenny Jeng
- **13:39** IDENTIFYING CURRENT BEST PRACTICE PROCEDURES FOR ESTABLISHING EXTRACORPOREAL SUPPORT DURING CARDIOPULMONARY RESUSCITATION (ECPR) IN EMERGENCY DEPARTMENT PATIENTS PRESENTING WITH REFRACTORY CARDIAC ARREST TO A TERTIARY CARE HOSPITAL Justine Proctor

13:51 Intermission



Session 3: Perfusion Hot Topics (Moderator: Richard Newland)

14:00-14:40

- **14:00** Clinical burnout in healthcare professionals *Dr. Nicole Gifford*
- 14:17 RBC Conservation project Tim Willcox
- 14:35 Panel discussion

Session 4: Submitted Abstracts (Moderators: Carla Zazulak and Rob Baker)

14:40-15:30

- 14:40 TRIPLE EXTRACORPOREAL MEMBRANE OXYGENATORS INTEGRATED WITHIN HIGH FLOW VENO-VENOUS CONFIGURATION: NOVEL SUPPORT FOR A MORBIDLY OBESE PATIENT WITH PERSISTENT REFRACTORY HYPOXAEMIA *Ray Miraziz*
- 14:52 HYPERTHERMIC INTRATHORACIC AND INTRAPERITONEAL CHEMOTHERAPY FOR CANCER IN WAIKATO, NEW ZEALAND Britney Westbrook and Jack Bhana
- **15:04** HOW TO DIMINISH THE INCIDENTS IN RELATION TO GAS SUPPLY Angel Johnes Vilayil
- **15:16** THE ROLE OF CARDIOPULMONARY BYPASS IN THE PREDICTION OF RISK OF 30-DAY MORTALITY FOLLOWING CARDIAC SURGERY *Richard Newland*

Concurrent session: Student Breakout

(Moderator: Casey Edwards)

14:40-15:30 STUDENT ONLY session

Student introduction, Q&A session, VIVA tips and ANZCP structure *Casey Edwards*

15:30 Closing Remarks



Friday 26th November

Session 1: Student Abstracts (Moderator: Casey Edwards)

12:00-12:24

- **12:00** UPGRADING HEART-LUNG MACHINES: AN OPPORTUNITY TO OPTIMISE PERFUSION STRATEGIES *Neesha Ghedia*
- **12:12** COMPARATIVE STUDY OF PORTABLE POINT-OF-CARE ACTIVATED CLOTTING TIME SYSTEMS UTILIZED FOR CARDIOPULMONARY BYPASS SURGERY Rosemary Belbin

Session 2: Corporate Presentations

12:24-12:39

Terumo Medtronic Stago

Session 3: Submitted Abstracts (Moderators: Tim Willcox and Britney Westbrook)

12:40-13:05

- **12:40** DEVELOPMENT OF AN ORGAN PROCUREMENT PROGRAM IN SOUTH AUSTRALIA Annette Mazzone
- **12:52** EMBARKING UPON CANINE CARDIAC SURGERY AN INTRODUCTION TO THE AUSTRALIAN PROGRAM *Casey Edwards*

Session 4: Corporate Presentations

13:05-13:25

LivaNova Spectrum Medical REM Systems Getinge

13:25 Intermission



Session 5: ECMO (Moderators: Carla Zazulak and Rob Baker) 13:35-14:15

13:35 Waikato Hospital: Initiation centre Jack Bhana

Auckland City Hospital: Retrieval centre *Alex Peterson*

13:50 Woman's and Children's Hospital Adelaide: Initiation centre Annette Mazzone

Melbourne Children's Hospital: Retrieval centre Martin Bennett

14:05 Panel discussion

Session 6: Perfusion Safety and Education (Moderators: Jessica Cantrick and Rob Baker)

14:15-14:55

- 14:15 Perfusion Incident Reporting System Update Tim Willcox
- **14:30** A new era in Perfusion Education *Alex Peterson*
- 14:45 Panel discussion

Award Presentations and Closing Remarks

14:55-15:00

Corporate Information

Getinge

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ANZCP ASM 2021 Awards



The Terumo award is in recognition of the best scientific or clinical paper presented by an ANZCP member.



Encouragement Award – Medtronic Australasia

This award is made for an especially meritorious presentation by an ANZCP member.



Syd Yarrow Award - LivaNova

The Syd Yarrow award is in recognition of the best presentation by a student ANZCP member.

ANZCP Awards

ANZCP Meritorious Award

The purpose of the ANZCP sponsored meritorious award is to acknowledge presentations of excellence.

Abstracts – Thursday 25th November

HEPARIN MANAGEMENT REVIEW

James Campbell, Royal Melbourne Hospital

Activated Clotting Time (ACT) is the test of choice due to it being Point-Of-Care (POC) for the heparin management of patients requiring Cardiopulmonary Bypass (CPB). However, the ACT may become deranged due to the effects of haemodilution and temperature, thus creating potential for insufficient anticoagulation. Additionally, heparin's variable potency and a patient's own sensitivity to heparin can lead to deranged ACT results. The aim of this study into departmental heparin management protocol was to determine if sub therapeutic heparin levels during CPB despite adequate ACT could result in poor postoperative outcomes. During the perioperative

period, the Hemostasis Management System (HMS) Plus was used to calculate a heparin dose response before CPB and a heparin assay was run concurrently with each ACT on CPB. This investigation was performed with 14 patients, no exclusion criteria existed for the purpose of this study. Initial heparin bolus was dosed at 3.0mg/kg as

per departmental protocol. 11 patients tested for sub therapeutic heparin levels at some interval during their bypass run, despite therapeutic ACT values over 480 seconds. The patient's protamine dose and postoperative transfusion, stroke and mortality were also assessed. Preliminary findings suggest subtherapeutic levels of heparin and overdosing of protamine however, these findings will be discussed in more detail once further statistical analysis has been undertaken and, if further investigation is required.

COMPARISON OF CEREBRAL EMBOLIC LOAD BETWEEN SINGLE AORTIC CROSS-CLAMP AND PARTIAL AORTIC SIDE-CLAMP TECHNIQUES DURING CORONARY ARTERY BYPASS GRAFTING.

Sojin (Jenny) Jeng

Department of Clinical Perfusion, Auckland City Hospital, Auckland, New Zealand

Objective:

Cerebral emboli have been associated with post-operative cognitive decline and stroke following cardiac surgery requiring the use of cardiopulmonary bypass (CPB). We conducted a prospective, observational study comparing the cerebral embolic load between two clamp techniques (single aortic cross-clamp (SACC) application versus an additional partial aortic side-clamp (PASC) application) when performing the proximal anastomosis during coronary artery bypass grafting (CABG).

Methods:

This study was part of a larger investigation comparing cerebral arterial emboli exposure on cerebral autoregulation in open-chamber versus closed-chamber cardiac surgery at Auckland City Hospital. Twenty consented patients (n=14 PASC, n=6 SACC) who underwent CABG, had emboli (gaseous and solid) monitoring using transcranial Doppler in the left and right middle cerebral arteries during the entire duration of CPB. Our phase of interest was from aortic cross clamp removal to the termination of CPB.

Results:

Total emboli counts (median (interquartile range)) for our phase of interest were 102.5 (46-197) and 181.5 (92-300) in the SACC and PASC groups, respectively. The median gaseous emboli counts for our phase of interest for the SACC group were 84 (44-185) and 157.5 (80-254) in the PASC group; median solid emboli counts were 12.5 (1-18) and 16 (10-39) in the SACC and PASC groups respectively.

Conclusions

Patients with the use of an additional PASC technique had a higher number of detected cerebral arterial emboli compared to the SACC technique, although statistically not significant. Such findings provide guidance to re-evaluate and modify current surgical techniques to reduce cerebral embolic events during CABG.

IDENTIFYING CURRENT BEST PRACTICE PROCEDURES FOR ESTABLISHING EXTRACORPOREAL SUPPORT DURING CARDIOPULMONARY RESUSCITATION (ECPR) IN EMERGENCY DEPARTMENT PATIENTS PRESENTING WITH REFRACTORY CARDIAC ARREST TO A TERTIARY CARE HOSPITAL.

Justine Proctor Department of Clinical Perfusion Sir Charles Gairdner Hospital Perth, Western Australia

The purpose of this paper is to assimilate all data pertaining to best current practice in the use of extracorporeal support during cardiopulmonary resuscitation (ECPR) in out of hospital cardiac arrest (OHCA) patients who do not respond to advanced life support. ECPR is a potentially lifesaving rescue intervention for refractory cardiac arrest has been used in multiple jurisdictions, the theme for the literature search preformed was to determine procedures used to best apply this intervention as a hospital-based ECPR program, in order to maximise patient outcomes. A systemic review of the literature was undertaken to identify studies examining ECPR and its uses, however, a heterogeneity amongst the published studies was found making a group analysis not possible. Study limitations and discussion of reviewed results with recommendations for best practice are presented in the following review.

TRIPLE EXTRACORPOREAL MEMBRANE OXYGENATORS INTEGRATED WITHIN HIGH FLOW VENO-VENOUS CONFIGURATION: NOVEL SUPPORT FOR A MORBIDLY OBESE PATIENT WITH PERSISTENT REFRACTORY HYPOXAEMIA

Ramen Miraziz, Westmead Hospital NSW, Australia

Background

The use of the high-flow veno-venous (VV) Extracorporeal membrane oxygenator (ECMO) may be necessary for patients with a high body mass index (BMI) acquired persistent refractory hypoxaemia.

Initially, a second oxygenator was integrated, in parallel, within this configuration to assist with gas exchange. Subsequently, a third oxygenator, in a stand-alone parallel configuration was required to assist with high oxygenation demands.

This case report outlines the implementations, limitations, and success of multiple extracorporeal oxygenators in dual parallel settings within the high-flow VV-ECMO configuration.

<u>Method</u>

A 40-year-old, 180kg male with a BMI of 55.6 kg/m2 (BSA 2.82m2) was supported with conventional high-flow VV-ECMO configuration for persistent refractory hypoxaemia secondary to Covid pneumonitis. Within 14-22 days of ECMO support, he developed sepsis requiring maximum blood and gas flows beyond the manufacturers' rating. A secondary oxygenator, on day 22, was integrated into a parallel configuration within a high flow circuit configuration.

Finding

This arrangement did not improve oxygenation demands and mandated immediate circuit re-modifications by adding a third oxygenator in a novel parallel configuration, to the already established parallel dual oxygenators. The patient was then supported for 11 days further with this model before reverting the circuit to the classic single oxygenator high flow configuration as his gas exchange requirements decreased. Currently, on day 48, the patient is supported on high-flow VV-ECMO and remaining single organ failure, with signs of improvement.

Conclusion

Our novel approach for supporting and managing persistent refractory hypoxaemia for a morbidly obese male using multiple extracorporeal membrane oxygenators configured in a parallel high-flow VV-ECMO setting, demonstrated the possibilities of ECMO configuration strategies and its life-saving aptitudes when conservative methods are unsuccessful.

HYPERTHERMIC INTRATHORACIC AND INTRAPERITONEAL CHEMOTHERAPY FOR CANCER IN WAIKATO, NEW ZEALAND

RACS published authors: Varun Sharma, Jack Bhana, Simione Lolohea and Felicity Meikle. Unique Case Presentation by: <u>Jack Bhana</u> and <u>Britney Westbrook</u>

1. Department of Cardiothoracic Surgery, Waikato District Health Board, Hamilton, New Zealand.

2. Waikato Institute of Surgical Education and Research, Hamilton, New Zealand

3. Department of General Surgery, Waikato District Health Board, Hamilton, New Zealand

Purpose: There has been success with Hyperthermic Intraperitoneal Chemotherapy (HIPEC) including Hyperthermic Intrathoracic Chemotherapy (HITHOC) performed at both Waikato District Health Board and Braemar Hospitals in Waikato, for the treatment of pseudomyxoma peritonei (PMP). PMP peritoneal disease that can disseminate throughout the peritoneum and rarely into the pleural cavity. Treatment options are limited. The operative technique has not previously been described for HITHOC.

Methodology: Description of current hyperthermic chemotherapy perfusion (HCP) services are described. Both HIPEC and HITHOC techniques and outcomes are discussed, including HP machines, disposables, and chemotherapy drugs. The case presentation of the HITHOC patient is as follows: the patient is positioned in lateral decubitus position. A thoracotomy is undertaken to excise malignant tissue. Two incisions are made in the 7th intercostal space for two 28 French chest drains: the inflow drain placed apically and the outflow drain set lower. A small incision is made for separate suction drainage to evacuate cytotoxic fume. The drains are connected via 3/8" inlet lines to the 'HITHOC circuit' (the standard HCP system with a roller pump, reservoir and heat exchanger primed with 1800ml of Dianeal-fluid) and circulated to maintain a temperature of 41-43 degrees Celsius. Chemotherapy drug Oxaliplatin is added to the priming-fluid and circulated for 30mins. On completion, the thoracic cavity is irrigated with 1.5 litres of Dianeal-fluid. All cytotoxic waste is disposed.

Results: The presentation investigates the success and operative techniques for HCP. The case presentation on the patient who underwent HITHOC was discharged from hospital on Day-7 with no complications.

Conclusions: We hope that description of these techniques and background of HCP provides a feasible alternative to palliation in patients with pleural PMP disease and informs of the successes of HCP in Waikato, New Zealand. Global research is ongoing as breakthroughs in HCP continually produce successful outcomes for varying forms of cancer, providing more significant alternatives.

HOW TO DIMINISH THE INCIDENTS IN RELATION TO GAS SUPPLY

<u>Angel J. Vilayil CCP, BSc Perfusion, FANZCP</u>, J.Suthumporn CCP (ANZ), J.Pauli CCP (ANZ), J. McMillan CCP (USA), CCP (ANZ) Perfusion Services Pty Ltd.

Background:

The Cardiopulmonary bypass system has multiple components. Hardware including all gas supply components are an integral part of all Heart Lung Machines. This may include mechanical and computerized systems. The gas supply may be delivered from large storage (main supply) or in the form of various size cylinders on, or adjacent to, the HLM. In an attempt to diminish incidents/accidents concerning all gases utilized during CPB, there should be a protocol which is dedicated to the configuration and checking of the system. Search of the literature, including the Australian and New Zealand College of Perfusionists PIRS, reveals several issues relating to gas supply, such as connections and delivery.

Objective:

This paper aims to address the techniques and methods which our practice has adapted to an operating standard in order to avoid potential sequalae.

THE ROLE OF CARDIOPULMONARY BYPASS IN THE PREDICTION OF RISK OF 30-DAY MORTALITY FOLLOWING CARDIAC SURGERY.

Newland RF, Baker RA, Kholmurodova F. On behalf of the Australian and New Zealand Collaborative Perfusion Registry. Flinders Medical Centre, Flinders University, Bedford Park, South Australia.

Currently 30-day mortality is commonly used as a quality indicator for cardiac surgery; however, prediction models have not included the role of cardiopulmonary bypass (CPB). We hypothesized that reproducing the approach taken by Bilah et al (2009) to identify a predictive model of 30-day mortality using the Australian and New Zealand Collaborative Perfusion Registry (ANZCPR) would identify relevant CPB predictors.

Nine centers in Australia and New Zealand collected data using the ANZCPR between 2011 - 2020. CPB parameter selection was determined by evaluating association with 30-day mortality. Data were divided into model creation (n = 15,073) and validation sets (n = 15,072). The model was developed on the creation set and then validated on the validation set. Bootstrap sampling and automated variable selection methods were used to develop candidate models. The final model was selected using prediction mean square error (MSE) and Bayesian Information Criteria (BIC). Using a multifold validation, the average receiver operating characteristic (ROC), p-value for Hosmer—Lemeshow chi-squared test and MSE were obtained.

In total, 30,145 patients were included, of which 735 (2.4%) died within 30 days of surgery. The area under the ROC for the model including CPB parameters was significantly greater than preoperative risk factors only (0.829 vs 0.783, p<0.001). CPB parameters included in the predictive model were; red blood cell transfusion, mean arterial pressure <50mmHg, minimum oxygen delivery, cardiac index <1.6 l/min/m2.

CPB parameters improve the prediction of 30-day mortality. The application of these variables as quality indicators will facilitate improvement initiatives for CPB.

Abstracts – Friday 26th November

UPGRADING HEART-LUNG MACHINES: AN OPPORTUNITY TO OPTIMISE PERFUSION STRATEGIES.

Neesha Ghedia, CCP Trainee Prince of Wales Hospital

Background:

Capital expenditure on medical equipment is infrequent due to the significant costs involved. Upgrading heart-lung machines (HLM) however, offers a rare opportunity to make improvements to your system of perfusion. Careful consideration is required in determining the best pump configuration and features to include, while also evaluating the benefits to patient care. In addition, the design must be as future proof as possible while mitigating risk to patient safety. The Perfusion Department at Prince of Wales Hospital had the opportunity to update hardware recently; changing the configuration of the HLM and cardioplegia delivery system, as well as incorporating additional safety measures.

Methods:

A clinical patient audit was conducted following the HLM and cardioplegia delivery reconfigurations to evaluate the clinical impact to patients during cardiopulmonary bypass (CPB). Retrospective data was collected before and after the changes, with inclusion criteria being coronary artery bypass graft (CABG) procedures with a body surface area (BSA) > 1.6 m2 to remove the impact of haemodilution on the varying number of small patients in each group. The data was separated into two groups, pre HLM change (n=89) and post HLM change (n=79). Data distribution was analysed with the Shapiro-Wilk test before using Mann-Whitney test for non-parametric data for the analysis of continuous variables. The Fisher's exact test was used to analyse categorical data. There were no statistically significant differences in patient demographics or operative characteristics between groups.

Results:

This audit examined differences in the two groups for the following CPB parameters: nadir haematocrit, exposure to packed red blood cells (PRBC), crystalloid volume administered, maximum potassium concentration [K+], requirement for zero balance ultrafiltration (ZBUF) to manage high [K+] and the proportion of spontaneous conversion after cross-clamp removal. The analysis showed statistically significant improvements in all of the above parameters.

Conclusions:

Our audit and statistical analysis demonstrated the impact that updating HLM hardware and configurations can have on patient care during CPB. Minimising haemodilution was our primary objective with monitoring and emergency back-up equipment reorganised to provide additional safety. Whilst this audit focused on CPB practices, haemodilution and reduced need for transfusions, our investigation could be extended to determine whether there is an overall reduction in blood product usage in the postoperative period as a result of the changes made.

COMPARATIVE STUDY OF PORTABLE POINT-OF-CARE ACTIVATED CLOTTING TIME SYSTEMS UTILIZED FOR CARDIOPULMONARY BYPASS SURGERY

Rosemary Belbin, The Canberra Hospital

Objective: An essential component of Cardiopulmonary Bypass (CPB) Surgery is patient anti-coagulation. The study aimed to bridge an identified gap in information surrounding a comparison of the latest Point of Care (POC) Activated Clotting Time (ACT) systems available for use in hospitals as a means of testing patients ACT undergoing CPB Surgery and assess the overall efficacy of these systems.

Methods: The devices included in this study

are: Hemochron Response, Hemochron Signature Elite, Medtronic ACT Plus, Abbott i-STAT 1 and Abbott i-STAT Alinity. The study sampled 49 patients, undergoing elective cardiac surgery on CPB. Samples were collected at 4 time points. Tests were conducted by one of two trained operators using a split sample run and in duplicate on each device type.

Results: All devices returned a mean difference in duplicates which was close to zero, and a low standard deviation. The greatest standard deviation occurred with Medtronic ACT Plus 167.05 seconds, and the lowest with i-STAT 1 34.47 seconds. Results were statistically interpreted using Bland-Altmann Plot's and linear regression analysis. For all devices the coefficient of determination was close to 1 and the relationships between duplicates were statistically significant (p < .05), Medtronic returned the lowest 0.66 and the i-STAT 1 the highest, 0.983. Physical impedance clot detection systems returned higher results than amperometric detection.

Conclusions: All devices were shown to be reliable, have a low degree of variability and be repeatable on duplication. Device systems from different manufacturers are not interchangeable and decision points for heparin administration should consider the system utilised.

DEVELOPMENT OF AN ORGAN PROCUREMENT PROGRAM IN SOUTH AUSTRALIA

<u>Mazzone, A.L.</u>, Gimpel, D., Crouch, G., Bennetts, J. and Baker, R.A *Cardiac and Thoracic Surgical Unit, Flinders Medical Centre, Adelaide, Australia.*

Purpose: The effects COVID-19 and the resultant border closures and limitations on interstate travel had resulted in an inability to procure the heart and lungs from South Australian donors. In March 2020 an organ procurement service was commenced to service St Vincent's hospital, Sydney to mitigate the impact of COVID-19 from South Australia on organ donation. The successful set up and implementation of the program has resulted in the FMC CTSU team procuring heart and/or lungs for retrieval to transplanting sites around Australia. The complexities of initiating a new service, the initial data and feasibility of the service will be presented.

Methods: A single centre, multi-site retrospective review from March 2020-August 2021 of all organ retrievals undertaken by the Flinders Medical Centre cardiothoracic service across the Adelaide metropolitan area. Data was prospectively collected and analysed from the Donate Life South Australian centralised database. All data was de identified.

Results: A total of 27 organ procurements had been undertaken across 17 months. A total of 10 hearts and 17 bilateral lungs were harvested with median age of donor 43 +/- 16.2 years for heart donation and 50 +/- 15.6 years for lung donation. Eight organs were donated after determination of circulatory death and 19 after neurological determination of death. Median ischaemic time for heart donation was 4.4 +/- 0.1 hours and lung donation 3.5 +/- 0.1 hours. There was 100% viability of organ at the recipient site. Heart and/or lung procurement in SA resulted 9 organ transplants in in Victoria, 11 in NSW, 3 in QLD and 4 in WA.

Conclusions: The necessity of flexibility within the field of cardiothoracic surgery is evident during the COVID-19 pandemic. The successful initiation of the organ procurement program in South Australia highlight that support and collaboration from the perfusion community is vital in the success of a new service. The implementation of an organ retrieval service in South Australia has been successful with no apparent increased risk to successful transplant outcomes.

EMBARKING UPON CANINE CARDIAC SURGERY – AN INTRODUCTION TO THE AUSTRALIAN PROGRAM

Casey Edwards BMSc, CCP, Australian Blood Management, NSW

Three dogs have undergone cardiac surgery on cardiopulmonary bypass at the *Charles Perkins Centre*, Sydney University and there is intent to continue developing the canine cardiac program. The patients were each family pets requiring mitral valve repair, all weighing less than 12kg. The Australian canine cardiac team joins just two other centres known to be performing valve repairs on dogs globally: *JASMINE Animal Referral Hospital*, Yokahama and the *Royal Veterinary College*, London. Given the low reported case numbers, scarce data exists to guide practice for dogs on cardiopulmonary bypass. Consequently, perfusion for the three Australian cases was based heavily on paediatric bypass circuit design and technique. This report outlines the relevant background canine physiology as it varies from human physiology. It overviews the Australian program, with a focus on how the surgeries were planned, the perioperative team design and challenges that were encountered. Finally, the report summarises the operative course and outcomes for each dog.

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¹Bruppacher H, Alam S, LeBlanc V et al: Simulation-based training improves Physicians' Performance in Patient Care in High-Stakes Chronical Setting of Cardiac Surgery, Anesthesiology 2010;112:4. "Medical simulation can improve patient safety by producing elevated knowledge, skill and proficiency in device operation and reducing errors in the delivery of healthcare".

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