Gazette Issue 07/17

The AUSTRALIAN AND NEW ZEALAND COLLEGE of PERFUSIONISTS GAZETTE

DECEMBER 2017

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ANZCP

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1. Trowbridge, et al. The Effects of Continuous Blood Gas Monitoring During Cardiopulmonary Bypass: A Prospective, Randomized Study – Part I. Journal of Extracorporeal Technology. 2000;32:120-128.
2. Trowbridge, et al. The Effects of Continuous Blood Gas Monitoring During Cardiopulmonary Bypass: A Prospective, Randomized Study – Part II. Journal of Extracorporeal Technology. 2000;32:129-137.
3. Data on file.

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The
AUSTRALIAN AND NEW ZEALAND COLLEGE *of* PERFUSIONISTS GAZETTE

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This edition of the Gazette has been proudly supported by LivaNova.

A MESSAGE FROM THE EDITOR

by Molly Oldeen, *CCP*

As 2017 comes to a close, I want to say thank you to all of the volunteers that contributed articles this year. Congratulations to this year's Gazette Award winners (and $250 recipients) for best original articles!

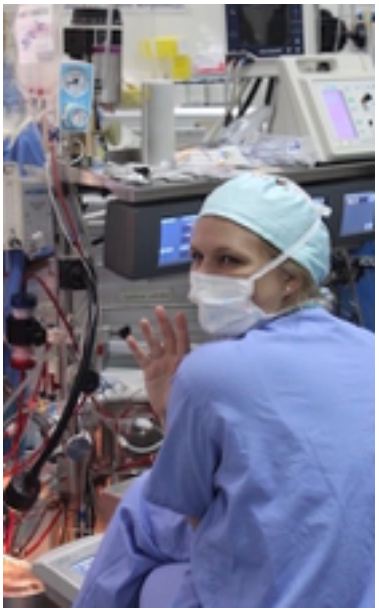
- Helen Scarrott: Workplace Bullying – Bad Things Happen When Good People Do Nothing
- Rona Steel: Open Heart International – Bolivia

Please see the Annual Scientific Meeting Awards section to see who else was acknowledged for their hard work and dedication.

This edition may feel a bit slimmer than usual—I hope to have some more volunteers pop up in 2018. We often have a lot of the same generous people writing articles for some editions (thank you!), but we don't want to risk burnout. We all have unique experiences and talents and we owe it to our profession to share them with each other. Don't feel intimidated –start small, take risks! They will pay off.

Hope to hear from you in 2018!

Molly Oldeen
The Gazette Editor



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Clarke Thuys – Member
Casey Edwards - Member

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Alison Horton – Registration committee
Jane Ottens – Simulation Committee
Tim Willcox – PIRS Editor

A MESSAGE FROM THE PRESIDENT

by Mark Ambrose, *President, ANZCP*

On behalf of the executive of the Australian and New Zealand College of Perfusion, I would like to thank you for your support over what has been a full and productive 2017.

This year's Annual Scientific Meeting was held in Melbourne at the Langham. The ASM was a well-attended, successful meeting, both in terms of scientific content and forward movement in the Annual General Meeting. Thanks must be extended to the ASM organisers - Clarke Thuys, Jane Ennor, and Emerson Sgammotta. Also a big thank you to the scientific committee of Rob Baker, Richard Newland, and Killian O'Shaugnessey.

Progress on the website is continuing, and we look forward to it up and running in early 2018. I apologise for the amount of time that this has taken, and I'd like to thank you for your patience. I am confident that the website will be a valuable asset to the ANZCP. It will be a point of first contact for the ANZCP and will also be a single portal for the membership, allowing us to stay abreast of college and conference news, PIRS, student content, general information and more.

Looking ahead to 2018 I am excited about the 2nd Australian Simulation and Perfusion Meeting (ASAP). The last ASAP meeting was a great success, and I look forward to what the faculty, Jane Ottens, Darryl McMillan, and Arthur Preovolos, have in store. ASAP will be held in Sydney in March and will be a valuable experience for all attendees I am sure.

The ASM for 2018 will be held in Adelaide. Plans are already underway, so be sure to keep the dates clear.

On behalf of the executive I would like to extend our best wishes to you as this year draws to a close. Perfusion as a profession is not an easy undertaking, and I hope that those who have the opportunity to take a break from clinical work can return from holidays refreshed.

I look forward to the New Year and the opportunities that it brings.

ABCP
BOARD REPORT

by L. Vincent Rajkumar

Greetings to everyone, on behalf of the Board.

I am pleased to have the opportunity to share details of the Board's progress as the end of 2017 approaches.

As you will probably be aware, the Board has been in dialogue with the Commonwealth Tertiary Education Quality and Standards Agency (TEQSA) in relation to our Structured Course in Clinical Perfusion and whether the College has unintentionally breached TEQSA legislation by offering the course as a "Diploma". The relevant TEQSA legislation dates to 2012 and affects only students since 2012.

We have been in discussions with TEQSA for some months. We have nearly concluded the matter – to the satisfaction of TEQSA – by ceasing marketing and advertising the Course as a diploma and by contacting current and past students affected (post 2012 students). Lastly, we need to alter the ANZCP Constitution – and this will be discussed at the November AGM. I would like to thank Richard Mullaly, the ANZCP Executive Officer and Alison Horton for their valuable time and support towards getting this resolved. We are continuing the structured ABCP Course and currently settling on the best title – likely the "Structured Course in Clinical Perfusion". There are 12 students enrolled at present out of which six students are expected to present for the Feb 2018 exam.

The Autotransfusion course is running smoothly – Jessica Ozdirik is doing a commendable job with this. We have 31 students for this term.

Sara Varghese has resigned from the Board due to her current work circumstances. We will miss her valuable support and wish her the very best for the future. We would like to invite an enthusiastic volunteer to fill the position.

The recertification process for 2017 is almost complete. There were some concerns raised by affected members and we are working through these. It is regrettable if this caused any apprehension to anyone and we can assure you that it's not our intention. We are here to support and embrace everyone – in addition to ensuring a safe practice environment and adherence to the Guidelines. There is a massive effort involved in the review process. The entire voluntary process strives to evaluate using fair standards and transparent guidelines that have been determined and agreed by the Executive and approved by the Members. Whenever candidates have issues in meeting these requirements, the Board endeavours to support them while maintaining the agreed standards set out in the guidelines. We greatly appreciate your understanding as the Board attempts to facilitate a smooth process.

We are also currently in the process of reviewing the recertification process, with a view to ensuring all Clinical Perfusionists are safe to practise; that different working circumstances can be countenanced; that we are as flexible as possible; and that new regulatory requirements from NASRHP are in our sights.

The College and Board are also actively reviewing accreditation of the Perfusion course and its duration. As you will appreciate these issues will require considerable consultation and discussion before the membership is asked to endorse. Richard Mullaly, who has a wealth of knowledge and understanding in respect to our vision, is working closely with the College, Board and external stakeholders.

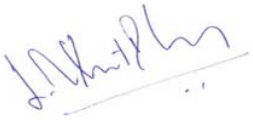
We are pleased to let you know that ABCP modules have been reviewed by Clarke Thuys; however, amendment on content overlap among the modules etc. still requires further work. I would like to thank the volunteers who agreed to help with this and we will be seeking their support soon.

As mentioned in my earlier letter, I encourage the students and the supervisors to provide feedback and offer assistance on reviewing and refining the course content and delivery method.

Our Perfusion community in Australia and New Zealand is not only a small group but also a diverse group – not all Perfusionists are Australian Board certified. The Board and College are working on several strategies to embrace Perfusionists practising in Australia and New Zealand and who have overseas qualifications. We do this while striving to maintain the high standards we have stipulated. We believe this proactive approach and a willingness to actively engage with our overseas trained colleagues will serve to add more value to the College. We hope to have everyone on a common platform in order to standardise practice and to create a better and more robust College and profession in the future.

I would like to thank every member of the Board and the College for their time and continued support.

Kind Regards



AUSTRALASIAN BOARD OF CARDIOVASCULAR PERFUSION

AUTOTRANSFUSION COURSE 2018

The ABCP invites all healthcare workers interested in Autotransfusion to enrol in the 2018 Autotransfusion Course.
The purpose of the course is to provide current and future autotransfusionists with the background information necessary to provide a safe and effective service.

The course runs for 10 weeks and is conducted three times per year at a total cost of $250.00 (free to ANZCP members).

We are currently registering students for 2018 course commencement dates:

12 February (applications close 5 Feb)
21 May (applications close 14 May)
27 August (applications close 20 Aug)

For additional information and enrolment details, please contact the course co-ordinator, Sara Varghese at Sara.Varghese@act.gov.au

PIRS REPORT
NOVEMBER 2017

by Tim Willcox, *FANZCP, PIRS Ed*

ANZCP PIRS has been restricted in terms of access due to prolonged reconstruction issues with the College website. It has been difficult for perfusionists to submit reports and difficult for communications from the PIRS office. However there are positive signs of resolution of these problems with a more secure platform that is under development.

This year I have started a PIRS Newsletter that features a recent PIRS report of interest and also to share commentary and articles on safety with the perfusion community. There is a paradigm shift in the way we measure safety from "Safety-I" to "Safety-II". The concept of Safety-I shifts the focus from analyzing the occasional things that go wrong to analyzing the very frequent things that go right. Professor Erik Hollnagel has written widely on the subject and his book Safety-I and Safety-II the Past and Future of Safety Management makes important reading. Safety-I and Safety-II are not mutually exclusive. However the concept of measuring what go right – the so called dynamic non-events – takes a bit of getting used to.

PIRS now uses WHO criteria for categorizing incidents

Near miss (didn't reach the patient)

No Harm Incident (reached the patient but caused no discernable harm

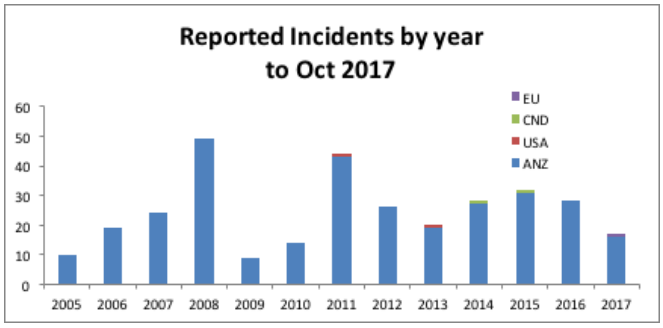
Harmful incident (reached the patient resulting in harm)

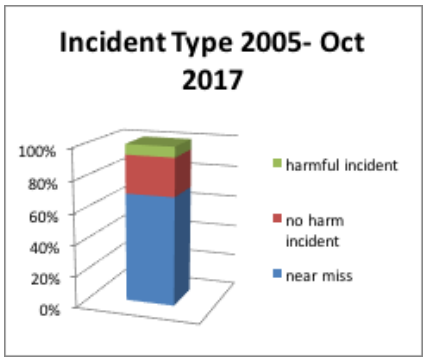
These criteria are much clearer than the previous and make sense. The vast majority of incidents are near miss or no harm. The PIRS form now contains a descriptor box asking What went right? From a Safety 2 perspective we constantly make practice variations to adjust for the unexpected. Tthis is especially applicable in a near miss or no harm accident where practice variations to cope with the issue prevented further harm. Thinking about these in relation to the incident demonstrates what went right and discussing what went right provides reinforcement to accident prevention.

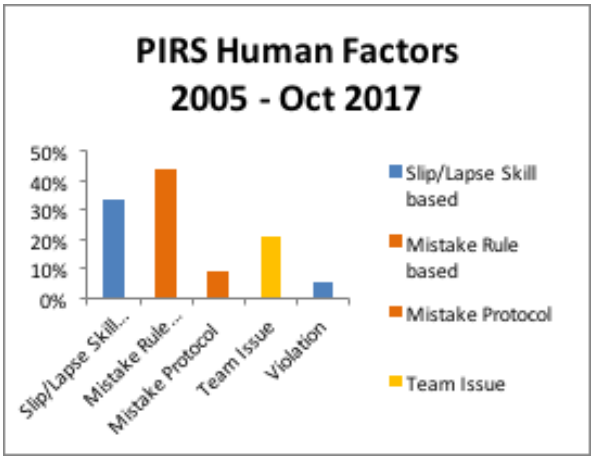
Considering the high frequency of what goes well on a day to day basis and indeed measuring this is requires a change in outlook. There are opportunities associated with the sign out of the WHO Surgical safety Checklist where the team can variously contribute to what went well during thwe case from their perspective to reinforce its importance to the team. Another example of measuring what went right is the Australia and New Zealand Collaborative Perfusion Registry (ANZCPR - formerly the PDU research database) that has demonstrated the value of measuring what we do on a case by case basis resulting in regional and individual centre improvements in patient care.

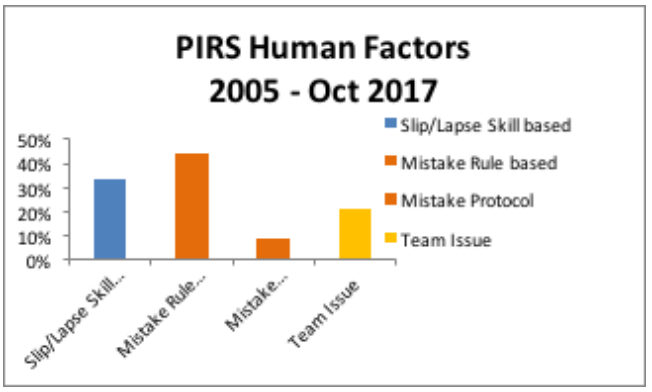
If we look at the PIRS data we know there is a vast underreporting of perfusion incidents. With a refocus on incident definition clarity and shifting the emphasis to what went well and what was learnt we are hopeful more of you will engage.

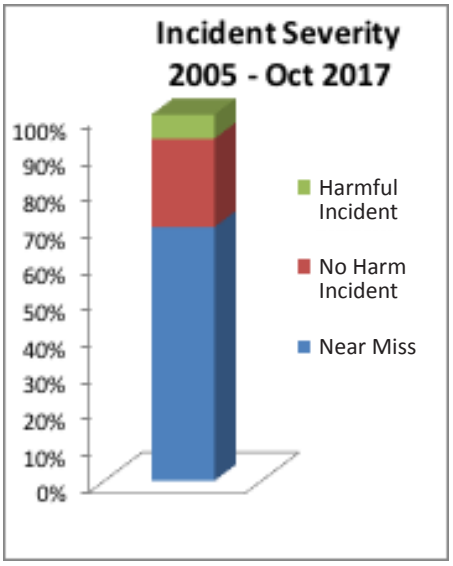
Some updated graphical data from PIRS is attached below and the next PIRS Newsletter will feature slides from Professor Hollnagel's recent masterclass in Auckland .

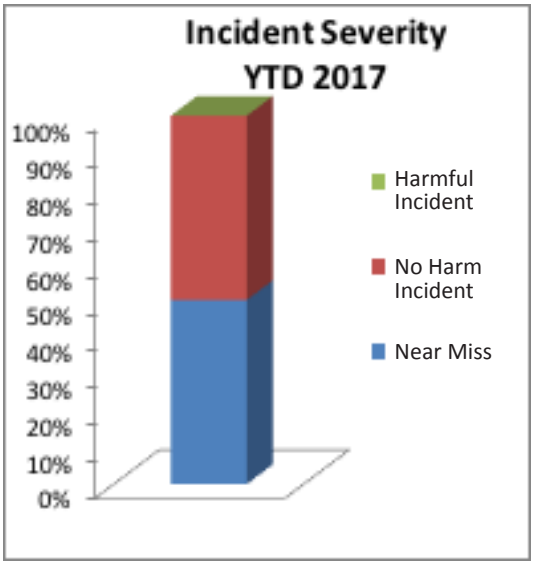


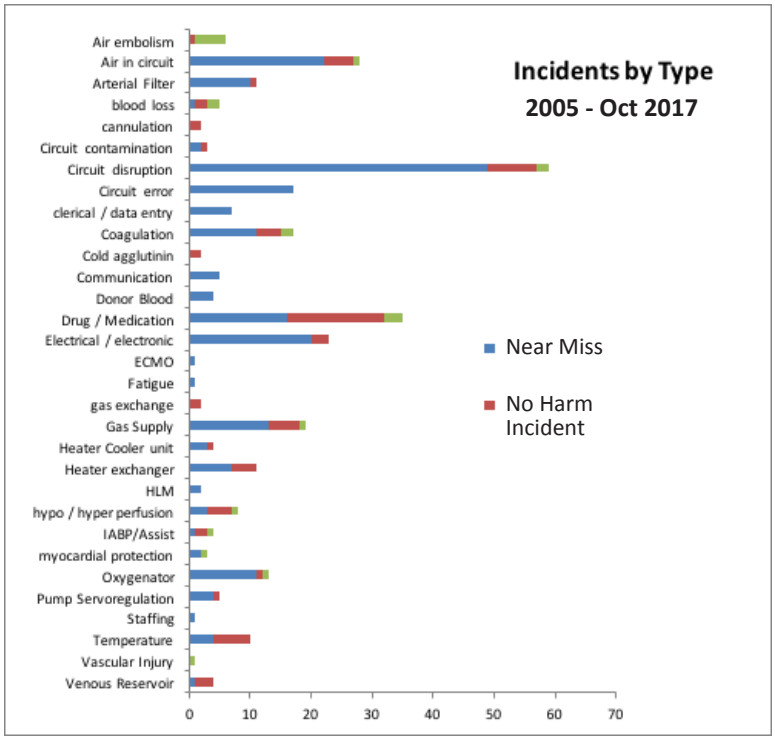



PIRS Human Factors
2005 - Oct 2017
50%
40%
30%
20%
10%
0%
Slip/Lapse Skill...
Mistake Rule...
Mistake Protocol
Team Issue
Violation
Slip/Lapse Skill based
Mistake Rule based
Mistake Protocol
Team Issue


PIRS Human Factors
2005 - Oct 2017
50%
40%
30%
20%
10%
0%
Slip/Lapse Skill...
Mistake Rule...
Mistake...
Team Issue
Slip/Lapse Skill based
Mistake Rule based
Mistake Protocol
Team Issue


Incident Severity
2005 - Oct 2017
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Harmful Incident
No Harm Incident
Near Miss


Incident Severity
YTD 2017
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Harmful Incident
No Harm Incident
Near Miss


Incidents by Type
2005 - Oct 2017
Air embolism
Air in circuit
Arterial Filter
blood loss
cannulation
Circuit contamination
Circuit disruption
Circuit error
clerical / data entry
Coagulation
Cold agglutinin
Communication
Donor Blood
Drug / Medication
Electrical / electronic
ECMO
Fatigue
gas exchange
Gas Supply
Heater Cooler unit
Heater exchanger
HLM
hypo / hyper perfusion
IABP/Assist
myocardial protection
Oxygenator
Pump Servoregulation
Staffing
Temperature
Vascular Injury
Venous Reservoir
0
10
20
30
40
50
60
70
Near Miss
No Harm Incident

CONFERENCE CORNER

APELSO
CONFERENCE REVIEW 2017

by Anthony Black, CCP. Lady Cilento Children's Hospital, Brisbane

Sun, sand, surf and ECMO, a better way to spend the weekend would be hard to find anywhere in the world, alas I had the good fortune of representing our hospital in the 3rd Asia-Pacific ELSO meeting, held just up the road in Surfers Paradise , Gold Coast, Qld.

The meeting was well organised with excellent attendance, overlapping with the ANZICS/ACCCN meeting obviously aided in full participation in the workshops which preceded the conference and then the formal presentations on the Friday and Saturday.

The first day of the conference consisted of several workshops , adult basic and advanced, and a paediatric workshop. The paediatric workshop was a shortened version of our regular course, which we run annually, this included short teaching sessions followed by 4 different simulation senarios, using the ECLS equipment currently available, 2 different maquet rotaflow circuits, a deltastream pulsatile flow impella and the Cardiohelp.

The conference was officially opened by : Hon Cameron Dick, Minister for Health and Minister for Ambulance Services, before Robert H. Bartlett, M.D gave a presentation on the history of ECMO, He gave an in-depth insight into the early successes and failures using ECMO, how his team identified a patient cohort that could survive with the use of an artificial long term ECMO machine, it was an inspiring era and he was at the forefront of pioneering the device that so many of us take for granted, problem solving was a matter of course for the early ECMO runs, bleeding, clotting, , infection, mechanical breakdown.

Bartlett reported the first neonatal survivor of ECMO, referred to as Baby Esperanza, in 1976. Baby Esperanza suffered lung damage from meconium aspiration syndrome and she was so sick that ECMO was applied as a last-ditch effort to save her life. The baby spent three days on Bartlett's machine and she recovered.

The calibre of presentation continued giving insight into where we can expect ECLS to go, a total implantable artificial lung is still some way off, but with the progress in technology, I shouldn't have to hold my breath too long.

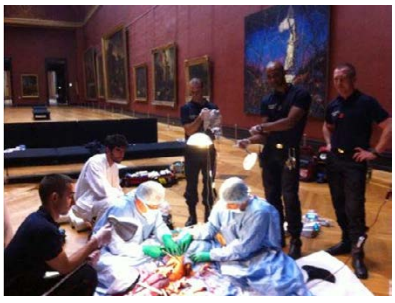
Some very interesting points were raised during the presentations, not least a patient who was cannulated inside the Louvre in Paris, and placed on ECMO under the watchful eye of the Mona Lisa?

The French have an ambulance dedicated to ECMO, although dependant on where the patient actually is, it was probably quicker to transport the patient to a hospital and cannulate under asseptic conditions!

Three different auditoriums were in used, so that whatever your particular interest, whether that be medical, or technological , adult or Paediatric there was something for everyone.

The industry exhibition was a little limited; maybe we need more competitors to the Cardiohelp, however with more than 200 poster presentations in the exhibition area, there was always something to look at, as well as the different mix of people to talk too.

Having previously worked in a joint adult and Paed centre, I was surprised at the number of adult ECMO's now being performed, what was once primarily used to support children, is now proven to be beneficial in the adult population.

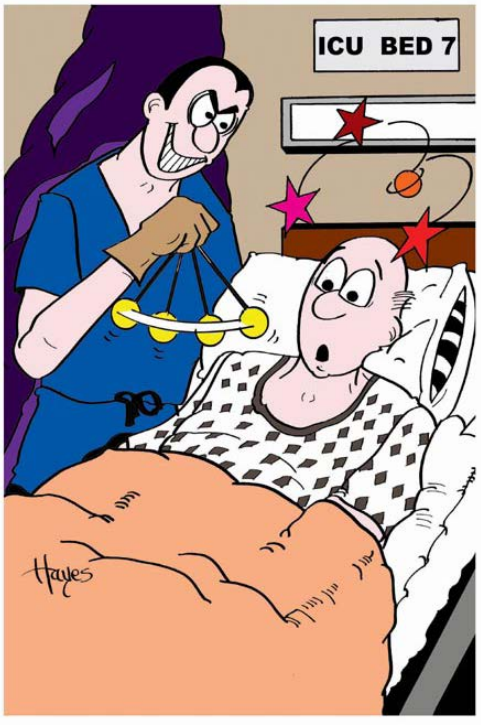


ECLS Registry Report: July 2017: Pulmonary Diagnosis

	Total Runs	Survived ECLS		Survived to DC	
Neonatal	26719	22394	83%	19252	72%
Paediatric	8287	5608	67%	4812	58%
Adult	13712	9174	66%	8040	58%

So after listening to as many presentations as I could, I have come to the conclusion that as per usual, there is not one gold standard way of "doing ECMO". Each individual unit has there own strategy, which they believe to be the best.

So the search goes on, maybe by the next meeting of APELSO in Thailand 2019, we could have a definitive strategy, or maybe not!



"Now continue saying, 'I want my surgery to be performed with the pump.' "

CONFERENCE CORNER, QUALITY & OUTCOMES PORTLAND, OREGON

by Jane Ottens, *Ashford Hospital*

The 2017 AmSECT Quality and Outcomes meeting was held this year in Portland, Oregon, USA, and as announced at the end of the meeting, it was to be the last of its kind.

This meeting began as the Best practices meeting, under Al Stammers' Presidency in 2006, and was platform for the formation of the ICEBP- the international consortium of evidence based practice. Over the years it has incorporated the perfusion safety meeting and the Blood management meeting and now unfortunately the meeting will no longer be held and will merge into the AmSECT International meeting in April 2018.

In Rainy Portland, a city famous for food carts, microbreweries, coffeehouses and distilleries (and I hope one day go back and have time to visit them) the meeting commenced with a one day "Leadership Symposium" (which Molly has reported on) and I had the honour to be invited to as an observer and then a mentor. I truly value the experience to be able to attend and participate in this innovative, and informative symposium. Many of us move into leadership roles, within our profession with no real background or training, and this was enlightening to say the least. There were so many areas and things that we can all learn about, and that leadership doesn't have to stop with the chief of the unit, we can and should, all have a role in it.

The theme of the meeting this year was "Continuum of Care "with each session following the journey of our patients through cardiac surgery.

Preoperative management, readiness to perform, team training, measuring intraoperative success of our patients as well as postoperative issues.

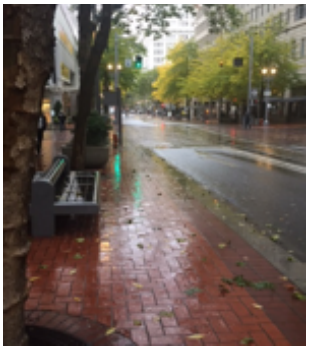
Dr Glenn Whitman, Director of CVSICU/Heart Transplantation, Johns Hopkins Hospital, Baltimore USA was the meetings key note speaker. In his roles as a

past surgeon, director of ICU, Director of Cardiac Surgical Quality at Hopkins and Chair of the workforce on critical care for the Society of Thoracic Surgery his knowledge and expertise was perfect for the theme of the meeting.

Standards and guidelines, registries, electronic records, checklists and simulation were some of the aspects of each session, along with a number of break out lectures and fireside chats.

A first for the Saturday, was to diverge to provide a one day ECMO course or a blood management course. Both of these sessions were well attended and had many hands-on components to the day.

I hope that this meeting will in the future re-emerge again, as it was a truly informative meeting that always had many take home messages, ideas and ways to make what we do each day better and provide better outcomes for our patients.



AMSECT
LEADERSHIP SYMPOSIUM 2017

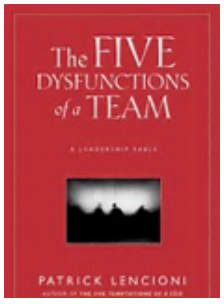
by Molly Oldeen, *CCP*

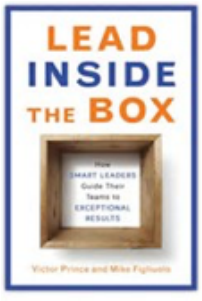
For the first time ever, the American Society of ExtraCorporeal Technology put together a one day Leadership Symposium as part of the most recent Quality and Outcomes conference held in Portland, Oregon. The symposium was geared towards aspiring leaders in the field of perfusion and offered an opportunity to learn from the success of our current leaders—the mentors for the day.

After completing a brief application process, I was fortunate enough to be chosen as one of the ten inaugural participants. Each participant or "mentee" was paired up with a mentor. The mentors and faculty had probably over 300 years of experience combined. I even saw some familiar faces—mentors Rob Baker and Jane Ottens!

It was a full day of didactic presentations and interactive workshops. Four sessions included:

1. Personal Leadership
2. Team Leadership
3. Organizational Leadership
4. Using Data to drive Quality Improvement.





In order to make the day as successful and efficient as possible there were some attendee pre-work requirements for each of the four sessions that included reading various books and articles. As part of the personal leadership session, we were asked to complete a Meyers Briggs Personality assessment, the results of which were incorporated into the talks. We learned to be aware of how to work with different personalities on our team, as well as how people best work with each of us. The team leadership session incorporated the discussion and review of two pre-work books, The Five Dysfunctions of a Team by Patrick Lencioni, and Lead Inside the Box by Victor Prince and Mike Figliuolo.

Throughout the day we discussed strategies to develop a mission, vision and purpose both for oneself and for the team. We were given resources to facilitate effective team communication such as a GroupMe phone app for group messaging, as well as the suggestion to use iBooks to allow access to department protocols at all times.

The afternoon ended with a session on Quality Improvement initiatives. We discovered practical tools to develop QI projects. In addition, each mentor/mentee pair participated in role playing to practice communication strategies that discourage behaviors that inhibit a culture of safety. It allowed time for open dialogue with the mentors.

The purpose of the Leadership Symposium was not only to provide a mentor for the day, but to offer a valuable resource and create a relationship that can last the rest of our careers. This was a fantastic opportunity and was executed really well, given it was the first time. They will be offering the Leadership Symposium again at the next AmSECT International meeting in San Diego, next April 2018 so I encourage anyone new to leadership or aspiring to be a leader someday to apply!

http://www.amsect.org/p/cm/ld/fid=1522

A GLIMPSE OF THE "VIEW FROM THE TOP"

by Jude Clark

A change of perfusion guard has occurred at Auckland City Hospital.

In February of this year I was privileged to take over the reins of the largest perfusion unit in Australasia. Although being well versed with managing the perfusion unit, or so I thought (after waiting years in the wings), there have been a series of challenges keeping both the unit and me busy.

Firstly let me introduce myself. I have been perfusing since the early 80's after stepping up from starting as a physiology technician at Greenlane Hospital. I am a founding member of the ANZCP Society and my passion has been paediatric and ECMO biased but I also perfuse across the entire spectrum. Outside of work I have been a running fanatic, have a love of red wine (a familiar trait in our unit) and own two gorgeous cats!

Our outstanding perfusion team currently comprises of 17 qualified perfusionists, 2 trainee perfusionists and 1 PA/stock management technician. What did this initially mean for me. A lot of yearly individual performance reviews. No wonder Tim bailed!!

I have been kept busy attending mandatory management leadership courses and cardiac governance meetings but a trip to Rome, Italy to attend the "Paediatric Perfusion & Mechanical Life Support" conference gave me a welcome diversion.

The population of Auckland has been exploding at unprecedented levels with the impact on our hospital being a huge increase in both elective and acute cardiac work plus a severe lack of beds. Transplantation (heart, lung & liver) and ECMO have been two thriving areas of growth with the prediction of a further increase of 50% within the next 5 years. Our day therefore starts with roster tweaking to facilitate fluctuating daily operating lists and perfusion staffing.

My biggest headache has come from the global heater chiller units (HCU) contamination issue. Our unit was the first in Australasia to purchase the Sorin Flextherm HCU. Along with the rest of the world we have instigated arduous disinfection processes to deal with the potential aerolization of mycobacterium. This has added significantly to our workload. We have not been let unscathed with several HCU's testing positive to mycobacterium leading to quarantines of machines until clearance was achieved. The Sorin Flextherm was withdrawn and replaced with clean retrofitted Sorin 3T HCU. This has momentarily taken the pressure off us. The ongoing cleaning/testing process has been a nightmare to deal with by perfusion staff and management.

MEETING ANNOUNCEMENT

AUSTRALIAN & NEW ZEALAND COLLEGE OF PERFUSIONISTS 35TH ANNUAL SCIENTIFIC MEETING

FRIDAY 16TH NOVEMBER &
SATURDAY 17TH NOVEMBER 2018

Stamford Grand Hotel
Adelaide, Australia

This year marks the 35th anniversary of the formation of the ANZCP. This meeting is planned to commemorate this milestone through the development of an exceptional scientific program combined with a showcase of unique South Australian food, wine and local experiences.

ANZCP
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International Journal of Obstetric Anesthesia (2017) xxx, xxx–xxx
0959-289X/$ - see front matter
http://dx.doi.org/10.1016/j.ijoa.2017.01.003

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CASE REPORT

Successful provision of inter-hospital extracorporeal cardiopulmonary resuscitation for acute post-partum pulmonary embolism

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ABSTRACT
Mortality during pregnancy in a well-resourced setting is rare, but acute pulmonary embolism is one of the leading causes. We present the successful use of extracorporeal cardiopulmonary resuscitation (eCPR) in a 22-year old woman who experienced cardiopulmonary collapse following urgent caesarean section in the setting of a sub-massive pulmonary embolus. Resources and personnel to perform eCPR were not available at the maternity hospital and were recruited from an adjacent pediatric hospital. Initial care used low blood flow extracorporeal membrane oxygenation (ECMO) with pediatric ECMO circuitry, which was optimized when the team from a nearby adult cardiac hospital arrived. Following ECMO support, the patient experienced massive hemorrhage which was managed with uterotonic agents, targeted transfusion, bilateral uterine artery embolisation and abdominal re-exploration. The patient was transferred to an adult unit where she remained on ECMO for five days. She was discharged home with normal cognitive function. This case highlights the role ECMO plays in providing extracorporeal respiratory or mechanical circulatory support in a high risk obstetric patient.

Keywords: Pulmonary embolism; Extracorporeal membrane oxygenation; Extracorporeal cardiopulmonary resuscitation; Post-partum

Introduction

Severe acute pulmonary disorders, such as thromboembolic disease, aspiration, pulmonary edema and amniotic fluid embolism can occur during pregnancy and the peripartum period.[1–3] Cardiorespiratory failure, refractory to conventional treatment, may arise and lead to cardiac arrest. The incidence of acute respiratory failure during pregnancy is reported as less than 1 in 1000, while cardiac arrest is 1 in 30 000.[1,4] Implementation of timely advanced cardiac life support (ACLS) procedures is paramount but not always sufficient. The use of extracorporeal cardiopulmonary resuscitation (eCPR) may be the only method to establish meaningful cardiorespiratory support until the underlying issues of acute cardiopulmonary failure can be addressed. We report the successful provision of inter-hospital eCPR after prolonged postpartum hemodynamic compromise.

Accepted January 2017
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Case history

A 22-year old pregnant female at 36 weeks of gestation presented to a regional hospital following a two day history of dyspnea. Past medical history included only treated hypothyroidism. She was hypoxic on room air (PaO_2 87%), tachycardic (140 beats/min) with a metabolic acidosis (pH 7.31) and an elevated lactate (3.8 μmol/L) suggestive of tissue hypoperfusion. Transthoracic echocardiography at the referring hospital had indicated significant right to left septal deviation with obvious

Please cite this article in press as: McDonald C et al. Successful provision of inter-hospital extracorporeal cardiopulmonary resuscitation for acute post-partum pulmonary embolism. *Int J Obstet Anesth* (2017), http://dx.doi.org/10.1016/j.ijoa.2017.01.003

right heart strain but no visible left atrial or pulmonary trunk clot. CT pulmonary angiography indicated central pulmonary emboli (PE) with segmental and subsegmental branches bilaterally (Fig. 1). After deliberation the patient was given 8000 IU intravenous heparin and transferred to the tertiary maternity hospital.

Cardiotocography demonstrated fetal tachycardia with shallow decelerations followed by a prolonged bradycardia. This prompted a decision to perform an emergent cesarean delivery under general anesthesia resulting in the delivery of a profoundly acidotic female infant who did not survive. After wound closure hemodynamic instability prompted the start of ACLS, but despite good quality ACLS and sporadic reversion to sinus rhythm and output, spontaneous circulation could not be established. The nearby adult extracorporeal life support (ECLS) centers were unable to provide timely eCPR, and the ECLS team at the neighboring pediatric hospital (located 500 m away) was alerted. Thrombolytic therapy using the recombinant tissue plasminogen activator tenecteplase 50 mg (Metalyse, Boehringer Ingelheim Pty Ltd. North Ryde 2113) was commenced 60 min after initiating cardiopulmonary resuscitation (CPR).

The pediatric surgical and perfusion team arrived 65 min after CPR had started. While CPR continued, surgical exposure of the femoral artery and vein was performed. An 8 mm graft was sewn side to end on the femoral artery and a 21Fr multistage cannula (Medtronic. Minneapolis, MN. USA) was inserted in the femoral vein. Extracorporeal membrane oxygenation (ECMO) support using a pediatric ECMO Permanent Life Support (PLS) circuit (MAQUET Getinge, Rastatt. Germany) began 100 min after CPR commencement and 35 min after the perfusion team had arrived in the OR. Due to the smaller pediatric circuit, initial ECMO circulatory support was limited to approx 2 L/min, and this was changed to an adult ECMO circuit (Maquet PLS and RotaFlow) when the adult ECLS team arrived, permitting ECMO blood flows of 3.6 L/min.

Although transfer to the adult cardiothoracic surgical center for further management was planned, persisting hemodynamic instability prevented early transfer.

Emergency Venoarterial (VA) ECMO restored organ perfusion but unmasked an acquired coagulopathy following prolonged CPR with organ failure, which was worsened by the thrombolytic agent. Attempted correction of coagulopathy was guided using thromboelastography (TEG®), and active management with uterotonic agents, uterine balloon tamponade and bilateral uterine artery embolization via the right brachial artery was performed. Continued bleeding with abdominal distension required transfusion of red cells and other blood products including fibrinogen concentrate (CSL Behring, USA) (see Table 1). A repeat laparotomy evacuated 3 L of fresh blood from the abdominal cavity, which was processed through a cell-saver and returned to the patient. No uterine bleeding source was identified, but bleeding was identified in the rectus muscles and hemostasis was achieved prior to wound closure. Hysterectomy was not performed due to concerns it would precipitate further hemorrhage.

Approximately 14 h after CPR had begun, the patient was transferred by road to the intensive care unit at the local adult cardiothoracic hospital. Pulmonary embolectomy, possibly with an ECMO-based right ventricular device, was planned, but the patient stabilized on VA ECMO and it was not required. Rotational thromboelastometry (ROTEM®) and Multiplate® (Tem Innovations GmbH, Switzerland) were performed on arrival, revealing a lengthened clotting time with low fibrinogen and significant platelet dysfunction. The local transfusion protocol using platelets and cryoprecipitate was followed, which normalized clotting within 24 h. Extracorporeal membrane oxygenation was weaned on day 5.

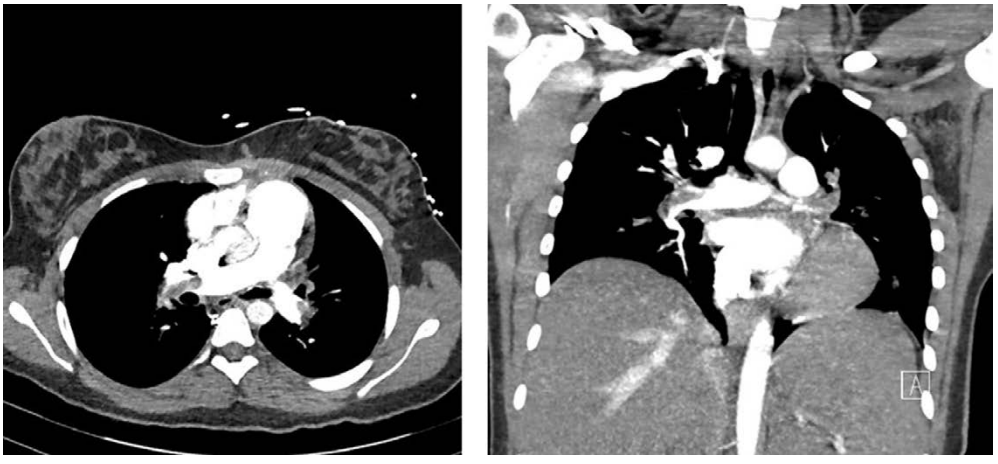

Fig. 1 CT pulmonary angiography (CTPA) depicting central pulmonary emboli

Please cite this article in press as: McDonald C et al. Successful provision of inter-hospital extracorporeal cardiopulmonary resuscitation for acute post-partum pulmonary embolism. *Int J Obstet Anesth* (2017), http://dx.doi.org/10.1016/j.ijoa.2017.01.003

Table 1 Blood product utilization. RBC: red blood cells; FFP: Fresh Frozen Plasma; Cryo: Cryoprecipitate; Plt: Platelets; Proth: Prothrombinex; Fib: Fibrinogen concentrate; ECMO: Extracorporeal Membrane Oxygenation

	RBC	FFP	Cryo	Plt	Proth	Fib
Pre-ECMO	16	9	40	2	500IU	
ECMO	17	0	5	6		1
Total products	33	9	45	8	500IU	1

On day 1 post-ECMO the patient developed a deep vein thrombosis in the right common femoral vein and inferior vena cava (IVC). Deep vein thrombosis prophylaxis was commenced and an IVC filter inserted on day 2 post-ECMO. Additional complications during admission included: right arm compartment syndrome requiring fasciotomy and repair due to brachial artery bleed following removal of arterial sheath, sepsis of unknown origin treated with broad spectrum antibiotics and antifungals, renal and hepatic dysfunction, and repeat laparotomy to evacuate a hematoma. The uterus was found to be intact with no necrosis.

On day 9 post-ECMO the patient was transferred back to the tertiary obstetric hospital. She was subsequently discharged home with normal cognitive function, a persistent right foot drop and a right flexion contracture of the upper limb post fasciotomy. She remained on anticoagulation following IVC filter removal 3 months postpartum and menses returned. Thrombophilia screening was negative.

Discussion

This case describes the successful use of ECMO initiated during CPR (eCPR) in the setting of postpartum PE, complicated further by rapid deterioration of the clinical condition following caesarean delivery, the lack of evidence based guidelines and the provision of inter-hospital eCPR.

Extracorporeal membrane oxygenation has been described for cardiorespiratory support in the peri- and postpartum period, most commonly to treat adult respiratory distress syndrome secondary to influenza A (H1N1).[5,6] Some case studies describe the successful use of ECLS following postpartum cardiovascular collapse.[7–9]

Extracorporeal life support (ECMO and eCPR) is increasingly used to provide extracorporeal respiratory support and/or mechanical circulatory support in patients for whom conventional treatments are inadequate. Extracorporeal membrane oxygenation outcomes for patients at high risk of dying are improving, and a variety of mechanical circulatory support devices exist; detailed information on these devices and perfusion techniques is available elsewhere.[10–12]

The case presented had the hallmarks of a poor outcome, including prolonged CPR (>90 min) and non-availability of ECMO equipment. Survival rates above 70% are reported following use of ECMO in non-pregnant patients, but decrease to 50% if ECMO is initiated for massive PE requiring CPR.[3] Additionally, in the general population the use of eCPR has a poor survivability (<30%), this being dependent on many factors including length of CPR before ECMO and in-hospital vs out-of-hospital CPR.[13,14]

Massive PE with hemodynamic compromise in non-pregnant patients is managed with anticoagulation and thrombolysis.[15] There are few evidence-based guidelines to assist decision making in near term pregnancy with sub-massive PE and subsequent fetal hypoxia.[16] In our patient, thrombolysis was initially avoided due to an anticipated surgical delivery, but was started following delivery. Even when delivery is not anticipated, there is concern that thrombolytic therapy may lead to placental abruption, although this has not been reported. In the absence of clear guidelines the management of PE (including thrombolysis) during pregnancy should be individualized.

Several organisational issues are raised in this report. Extracorporeal life support therapies are resource intense and there may be volume to outcome relationships associated with their use.[17] Extracorporeal life support is generally restricted to specialist hospitals with retrieval services, which stabilize critically ill patients on ECMO prior to transfer to the ECLS center. The use of ECLS is likely to increase and more patients will have access to this technology in future. While it is not practical (and probably ineffective) to provide wide spread ECLS services or to provide an emergency retrieval response, clinicians should consider ECLS for patients with high risk of cardiorespiraory deterioration and liaise early with nearby specialist centers. Patient selection may be difficult with limited evidence for ECLS therapies.

This case highlights that, despite evidence suggesting a likely poor outcome, following the restoration of cardiopulmonary circulation, aggressive control of bleeding and ECMO management at an established center, a favorable outcome was possible.

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UNPLANNED AUTOTRANSPLANTATION FOR COMPLEX CARDIAC REPAIR IN A SUPER MORBID OBESE FEMALE: THE CHALLENGE OF INTRAOPERATIVE DECISION MAKING

by C McDonald[1,2], D Dallimore[1], M Oates[3] , K. Shekar [2,4] and B Thomson[3]

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Abstract

Cardiac Autotransplantation is a rare technique typically reserved for the treatment of malignant tumors of the left atrium and left ventricle. Even when well planned, it conveys a high risk to the patient. This case report discusses the intraoperative progression to an unplanned autotransplant for mitral valve repair and considers briefly some decision making processes cardiac surgeons make.

Introduction

Although cardiac autotransplantation was first reported for the treatment of Prinzmetal's angina[1], the technique is more commonly associated with the planned treatment of malignant tumors of the left atrium and left ventricle.[2] Few reports describe cardiac autotransplantation for other types of cardiac surgeries.[3, 4] Arguably most cardiac surgeons will never have performed this technique or considered it as a reasonable option to expose and repair the mitral valve (MV) when access is suboptimal or totally obscured. This case report describes the unplanned use of cardiac autotransplantation for mitral valve replacement in a super morbid obese female and briefly discusses the intra-operative decision making processes a surgeon must go through when faced with rare or unseen events.

Case Presentation

A 63 year old female was admitted to the emergency department of a non-cardiac regional hospital following a fall and injury to the right knee. At presentation she was hypotensive (systolic blood pressure 55 mmHg) and diaphoretic, with biochemical evidence of hepatic and renal dysfunction. The patient reported a 6 month history of nonspecific unwellness, before acutely deteriorating 3 days prior to presentation. The patient denied any chest pain, syncope or dyspnoea, diagnosis of an underlying cause was complicated by super morbid obesity status (BMI 55). Additional relevant medical history included: type 2 diabetes, hypertension, anemia, hodgkins lymphoma (resolved) and previous cardiac surgery involving mechanical aortic valve replacement (AVR) and aortic root endartarectomy three years prior.

There was no obvious source for septic shock on computed tomography (CT) imaging. A transosoephageal echo (TOE) was performed revealing a 2.5 x 2.5 x 1.5cm vegetation on the posterior mitral valve leaflet (Figure 1) combined with leaflet perforation and severe mitral obstruction. The vegetation appeared multilobar and complex, suggesting a high possibility of embolisation. The mitral valve area was 1.1 cm2. The mechanical aortic valve (a 21mm Tophat Carbiomedics) appeared to be functioning normally. Left ventricular end diastolic volume (LVEDV) was 71.3 ml, left ventricular end systolic volume (LVESV) 22.4 ml and left ventricular ejection fraction (LVEF) was 69%.

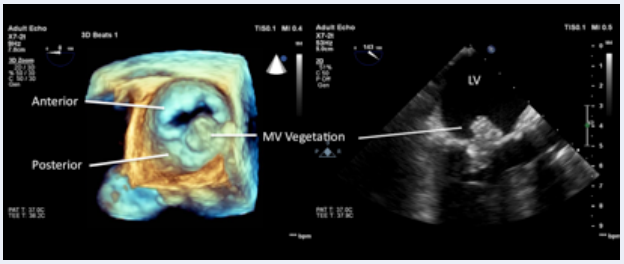

Figure 1: (a) 3-D image of mitral valve showing vegetation on posterior leaflet, (b) 2-D image of vegetation traversing through mitral valve. (LV- Left ventricle)

Broad spectrum intravenous (I.V.) antibiotics were commenced (piperacillin/tazobactam and vancomycin) and later deescalated to benzylpenicillin following positive blood cultures for streptococci. The circulation was supported with vasoactive agents to target a MAP ≥ 65mmHg.

The patient was air transferred to a tertiary level cardiothoracic hospital for consideration of surgical MVR. Despite considerable risk factors the surgical team felt that replacement of the MV was appropriate and achievable and patient was prepared for urgent MVR. Premedication was 300mg ranitidine and 10mg temazepam.

Surgical Management

Anaesthetic induction was uneventful and achieved with midazolam (5mg), fentanyl (250mcg) and rocuronium (100mg). As well as standard lines, a Swann-Ganz catheter was also placed. The initial plan was to place the patient onto peripheral cardiopulmonary bypass (CPB) to both reduce the risk of resternotomy and to declutter the surgical field. The right femoral vessels were exposed and wire placement confirmed on TOE. However, attempted cannulation of the femoral artery resulted in vessel injury and this was abandoned. The decision was made to proceed to sternotomy off cardiopulmonary bypass (CPB) and to place CPB cannulae centrally. A sternotomy was performed and dense adhesions around inferior vena cana, superior vena cava, aorta and pulmonary artery were divided. The heart was deep set within the chest cavity. The aorta was small and short but cannulated proximally with a 22Fr RMI cannula. CPB was commenced using Medtronic Affinity NT, X-coated circuit (Terumo) and blood prime. After achieving full bypass the aorta was clamped and antegrade/retrograde crystalloid cardioplegia given to achieve myocardial arrest. Twenty four minutes into CPB the aortic cannula was accidently displaced, followed by 150 seconds of circulatory arrest while re-inserting the cannula in the aorta at 35° C. The patient was cooled to 28° C and a right to left atriotomy performed to expose the mitral valve. In addition to the vegetation on the posterior leaflet of the mitral valve (Figure 1) an atrioventricular abcess was noted, as well as extensive mitral-annular and aortic root calcification. The decision was made to remove the mechanical aortic valve to improve access to the mitral valve and atrioventricular region. Complete debridement and patching of the atrioventricular component was attempted. Despite successful removal of the aortic valve, the surgeon was not confident that the view for atrioventricular patching was adequate. Approximately 4hr 30 min into the operation the decision was made to perform an autotransplant and the patient was cooled to 25° C in anticipation of a period of circulatory arrest.

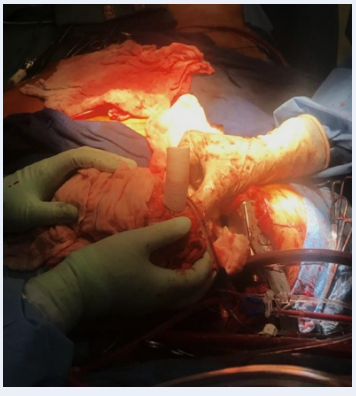

Figure 2. Explanted heart depicting ascending aorta graft prior to re-implantation

Following cardioplegia, cardiectomy was carried out by serial transections of the superior vena cava, inferior vena cava, aorta and pulmonary artery. Once explanted the mitral valve annulus was patched in the area of the abscess with porcine pericardium and a mechanical mitral valve sewn in with individual sutures. A 19mm mechanical aortic valve and a 22mm Gelweave graft were sewn together into the aortic annulus. The right coronary ostia was heavily calcified and deemed unsewable. A single length of saphenous vein graft (SVG) was harvested from the right leg and anastamosed to the right coronary artery. The right atrial cuff and coronary sinus required patching with bovine pericardium. The heart was then reimplanted using 4-0 prolene for the pulmonary artery. The proximal aortic anastamosis and SVG to native aorta was performed under circulatory arrest (20 minutes at 25° C). The patient was slowly rewarmed to 36.8° C and the heart rested on CPB for an extended period of due to the long ischemic time of 297 minutes. Total CPB time was 479 min. Atrial and ventricular pacing wires were attached and the patient weaned off bypass on moderate inotropic support. Considering the difficulty accessing the femoral vessels the decision was made not to place an intra aortic balloon pump (IABP). Packed red blood cells (PRBC) were transfused to maintain a hemoglobin of 80 g/L post pump and ROTEM was used to guide further blood products to achieve hemostasis. In total 29 units of PRBC, 4 x prothrombinex, 4 x platelets, 4 x FFP, 15 x cryoprecipitate and factor VIIa were given during intra- and post-operative care). The sternum was left open post-CPB and patient transferred to intensive care (ICU) haemodynamically stable with a systolic BP 85 mmHg on moderate doses of inotropes.

Post operative Intensive Care Management

The patient survived the first few days and then made slow but steady progress. Renal replacement therapy was required but inotropes were able to be reduced. The chest was closed and a permanent pacemaker was inserted on day 5. Unfortunately her recovery course was complicated by a right groin wound infection, cultures growing streptococcus mitis. The patient became septic despite treatment with appropriate antimicrobials. A tracheostomy was performed on POD-9. However, there was progressive worsening of shock state and multiple organ failure in setting of uncontrolled sepsis. Cardiorespiratory support was discontinued and comfort oriented care was commenced after discussion with family.

Discussion

Cardiac surgeons plan a surgical procedure by having a good understanding of the co-morbidities and strategising a range of possible difficulties and complications they may encounter. However, only a few case reports describe autotransplantation as an option for mitral valve and mitral annular repair [3, 4]. Therefore the option to progress to unplanned autotransplantation peri-procedure is one that few surgeons would normally consider.

The complexity of peri-procedure decision making during high-risk cardiac surgery has not adequately been described in the literature, yet it should be viewed as valuable additional "non-technical" skill.[5] Decision making processes have been incorporated into the training programs of other vocations, such as pilots [6], yet it is not yet recognised as a teachable skill in junior surgical training programs.

Some have suggested that the decision making model adopted by pilots would be appropriate for surgery. These models are based upon (i) problem detection, (ii) situation assessment

(based upon estimation of risk vs time) and (iii) choice of action. [7] An alternative (yet linked) approach suggests that during situations of high uncertainty, inadequate information, shifting goals, high time pressures and high risk, a "naturalistic" decision making strategy may also be beneficial. The "naturalistic" approach can be broken up into 4 main strategies: intuitive; rule based; option comparison and creative. [8]

When approaching a planned cardiac transplant (auto- or orthotopic), cannulation techniques take into consideration planned explantation and implantation of the heart. The situation facing the surgical team in this present case report was unplanned and one that is rarely encountered in a surgical career. The decision making algorithm used by the highly experienced "transplant" surgeon possibly fits into the creative decision making category of the "naturalistic" strategies. The benefit of the surgeon involved in this report having cardiac transplant experience probably allowed for the decision making process to be dynamic, switching between intuition and rule based algorithms (pattern based) and applying the creative aspects to the surgical procedure.

Conclusion

Despite an unsuccessful outcome in this instance, this complex surgery produced a technically successful operation and promising initial post-operative recovery. The decision to perform an autotransplant peri-procedure was made by not only accepting the (exceedingly) high risk to the patient (situational risk assessment) but by acknowledging there were limited alternative options*. There was also a reasonable expectation of a successful outcome (managing risk tolerance), This case report demonstrates the value of appropriate decision making in high risk environments and why non-technical skills should also be developed in junior surgical trainees.

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

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Awarded to the Student member of the College who has made the best presentation at the annual Scientific Meeting.

Awarded to Camilla Hand

ANZCP MERITORIOUS AWARD

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Awarded to: Helen Scarrott

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[1] Guan et al. Evaluation of Membrane Oxygenators and Reservoirs in Terms of Capturing Gaseous Microemboli and Pressure Drops.

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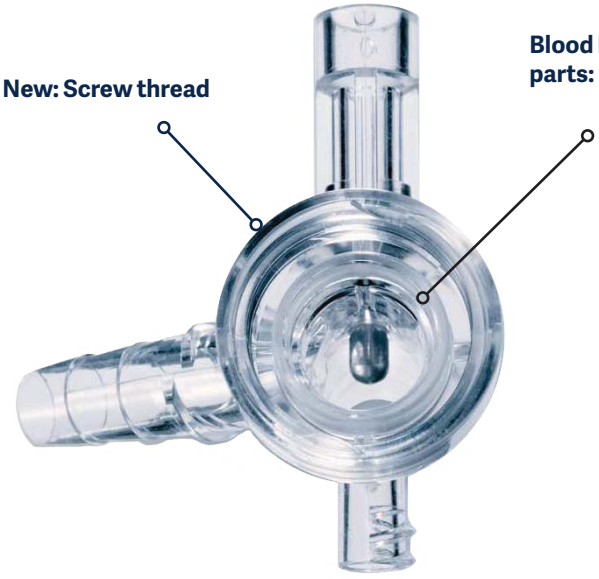

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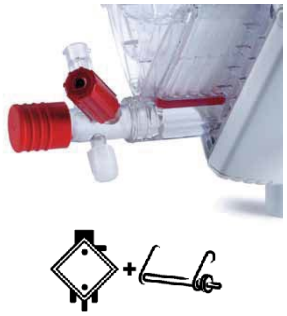
- The threaded fitting has been added to the glued connector.
- The inside dimensions of the connector are unchanged.
- Therefore, no change in performance of the oxygenator.



Current design: additional holding clamp mandatory

New design: no clamp needed

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ABSTRACTS

The following pages contain the abstracts from the 34th Annual Scientific Meeting of Australian and New Zealand College of Perfusionists

FIRESIDE CHATS

Kuljeet Farrar, Flinders Medical Centre

ECPR - Our Experience

Extracorporeal membrane oxygenation assisted cardiopulmonary resuscitations (ECPR) has been available at Flinders Medical Centre from the beginning of 2014. A retrospective review was undertaken from the 1st of January, 2014 to 30th of June, 2017 and ten cases of ECPR were identified. These included patients that had arrested in and out of hospital. The in hospital patients had either arrested in the Catheter Lab, ICU, Operating Theatres, Wards, or the Emergency Department.

Previous literature has shown that ECPR survival rates to be extremely low. Of the ten patients undergoing ECPR, three survived to leave hospital. What were the factors, if any, that these three patients had in common in order for them to survive?

PREPARING FOR PATIENTS AT HIGH RISK OF TRANSFUSION

Jane Ottens* CCP (Aust), Robert A Baker PhD, CCP(Aust) *Chief Perfusionist,
Ashford Hospital, Adelaide, South Australia

Cardiac surgery is one of the largest users of blood and blood products, and evidence shows this is growing with increasing complexity of cardiac surgical procedures, with some reports of in excess of 50% of patients receiving transfusions. (1) Blood transfusion has historically been considered the standard of care for anaemia during and after surgery, with 90% of intraoperative transfusions given for actual or predicted low haematocrit and 43% in the postoperative period (2). Both anaemia and red cell transfusion are independent risk factors in major surgery. (3, 4)

Patients presenting to the operating room anaemic is commonly reported to be up to 30% for cardiac surgery, and is associated with increased complications, ICU and hospital stay, and mortality. (4, 5) Early detection and treatment of anaemia can optimize our patient's operative pathway. Once the patient arrives in the OR, anaemia is worsened by the hemodilution caused by cardiopulmonary bypass and surgical bleeding, which can lead to decreased tissue oxygen delivery and impaired end organ blood flow. Perfusionists need to impact patient management in the period prior to bypass to reduce the likelihood of transfusion. Significant perfusion considerations exist that can help patients at high risk of transfusion and perfusionists have the opportunity to participate in the patient's journey both in the day(s) prior to surgery and in the planning of bypass.

Considerations prior to the day of surgery:

1. Preoperative patient assessment is critical, need to know about patients Hb status as soon as possible prior to the day of surgery
2. Communication with surgical team if HB not optimal to help plan Hb optimisation
    a. Fe supplementation or infusion, erythropoietin, autologous donation, delayed surgery
    b. Rapid change in HB (secondary problem eg GI bleed)
3. Anticoagulation status
    a. INR, APTT
    b. Pharmacotherapy

Preoperative options for perfusion technique:

1. Circuit sizing (tubing, oxygenator)/MiECC
2. Autologous priming
3. Cannulation
4. Cell salvage
5. Ultrafiltration/modified ultrafiltration

As perfusionist's we can choose to actively participate in the patient's cardiac surgical journey and help reduce the morbidity associated with transfusion at every opportunity available to us or we can passively accept patients as they arrive at the operating room. Clinically we will always do what is best for our patients, however the earlier we get involved the more we can achieve.

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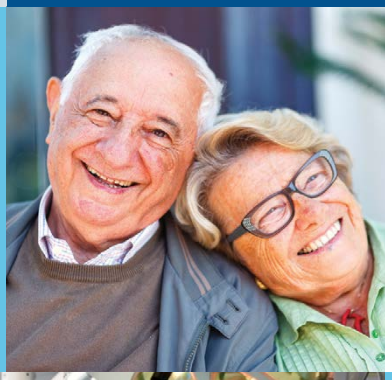

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ALBUMIN PRIMING IMPROVES EFFICIENCY OF THE MINNTECH HPH JR HEMOCONCENTRATOR

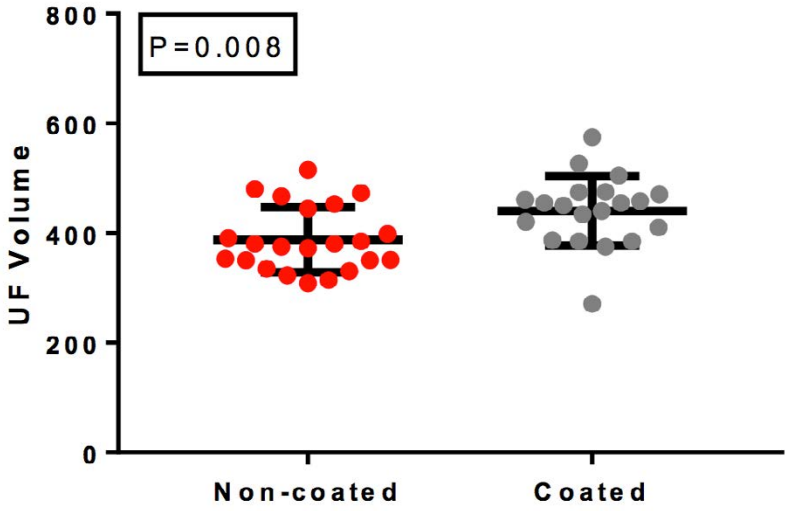
The Heart Center at Nationwide Children's Hospital, Columbus, Ohio
Jeffrey Burnside, Todd Ratliff , Ann Salvator, Ashley Hodge

Desired use of the HPH Jr is optimal due to the low priming volume; however, the lower rate of volume removal necessitates utilization of a larger hemoconcentrator. Larger hemoconcentrators carry a higher prime volume, which is impactful in the pediatric setting. Pediatric cardiac surgery patients, requiring cardiopulmonary bypass under 18 kgs were randomly assigned to one of two study groups. Group 1 (coated) contained a HPH Jr. hemoconcentrator that was primed with the addition of 25% Albumin and Heparin. Group 2 (non-coated) contained a HPH Jr. hemoconcentrator that was primed with only Normosol-R®. After cardioplegia delivery, zero balance ultrafiltration (ZBUF) was initiated and maintained for thirty consecutive minutes. The flow through the hemoconcentrator was standardized at 70 ml/min and the vacuum applied to the effluent line was set at -150 mmHg. Effluent fluid removal was measured at the termination of thirty minutes and compared between groups. Group comparisons between the coated vs non-coated hemoconcentrator groups were assessed using two-sample t-tests or Mann-Whitney U, when appropriate. 42 patients were included in the analysis. There were 22 patients who had the non-coated hemoconcentrator and 20 patients with a coated hemoconcentrator. The differences between the two groups are illustrated in Table 1. There was a statistically significant higher ultrafiltration volume with the coated hemoconcentrator group (p=0.008) (Figure 1). These results illustrate the improved efficiency of the HPH Jr with the addition of 25% Albumin and Heparin during the priming process.

Table 1: Overall Summary of coated vs non-coated Hemofilter groups

VARIABLE	ALL (N=42)		NON-COATED (N=22)		COATED (N=20)		
	MEAN/MEDIAN	SD/IQR	MEAN/MEDIAN	SD/IQR	MEAN/MEDIAN	SD/IQR	P-VALUE
UF Volume	412.83	66.41	387.59	59.29	440.6	63.90	0.008
Height	68.14	18.01	72.07	21.35	63.83	12.58	0.13
Weight	7.72	4.29	8.74	5.10	6.6	2.92	0.49
CPB	128	(84, 181)	128	(86, 153)	138.5	(83, 222)	0.41
XC	50	(35, 89)	51.5	(34, 92)	48	(35.5, 87)	0.89

Figure 1: Differences in UF volume by coated vs non-coated hemofilters



NITRIC OXIDE ON CARDIOPULMONARY BYPASS

A/Prof Luregn Schlapbach

Cardiopulmonary bypass-triggered inflammation has many similarities with severe sepsis, involving profound abnormalities of endothelial function, complement and coagulation. In contrast to previous unsuccessful attempts at immunomodulation , nitric oxide administered into the cardiopulmonary bypass circuit may have the potential to mitigate some of the adverse effects of CPB. Based on two successful pilot studies, a larger multi-centre trial is currently underway in ANZ. In addition to direct effects on short-term outcomes, reducing inflammation and reducing low cardiac output syndrome postoperatively has the potential to improve long term outcomes in particular in infants which are operated during a vulnerable phase of brain developing. Pathophysiology, feasibility and pilot study results will be discussed, and the potential application to other extracorporeal settings will be explored.

A PATIENT'S PERSPECTIVE ON ELECTRONIC RECORDS AND QUALITY IMPROVEMENT

Robert Groom FPP, CCP, Director of Perfusion, ECMO Coordinator, Maine Cardiovascular Institute, Portland, Maine USA
Member- Northern New England Cardiovascular Disease Study Group

A patient undergoing heart surgery puts his heart and his life in the hands of the surgeon and a team comprised of scores of professionals that contribute to his or her care during the hospitalization. Patients bring a burden of risk factors related to their heart disease when they are admitted to the hospital. A host of program- related factors contribute to a heart centers performance. After a career that has spanning more than three decades as a Cardiovascular Perfusionist, in January of this year, I experienced the other side of the heart-lung machine from the hands of my colleagues. I became the benefactor of my teams work over decades to improve the care they provide by learning from each patient in the context of participation in registries, an intramural instrument panel and use of an electronic recording system during cardiopulmonary bypass. Patients that undergo open heart surgery have a lot at stake. They expect professionals to work as a team and to have context knowledge about the care they provide. But most importantly they expect professionals to be completely engaged in minimizing their exposure to unwanted variation and to embrace care which has a foundation on solid evidence and proven results.

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INTRAVENOUS IRON TRIALS IN CARDIAC SURGERY (THE ITACS AND HERROES TRIALS)

Joel Symons

Preoperative anaemia is common (up to 30%) in patients awaiting cardiac surgery. It, together with a resultant increased need for blood transfusion, can lead to an increase in perioperative complications, ICU and hospital stay and mortality.

Preoperative iron deficiency is associated with preoperative anaemia but current studies have been unable to clearly show whether the preoperative administration of intravenous iron to patients undergoing cardiac surgery has any benefit. Two trials are currently underway to investigate the utility of preoperative intravenous iron in cardiac surgery.

The IV iron for Treatment of Anaemia before Cardiac Surgery (ITACS) trial is an international randomised controlled trial in 1000 adults with anaemia having elective cardiac surgery. The primary endpoint is days alive and out of hospital up to day 30. Secondary endpoints include disability-free survival up to six months after surgery, 30-day complications and ICU and hospital stay.

The HEpcidin, Reticulocyte haemoglobin and soluble transferrin Receptors in Reported OutcomEs in cardiac Surgery (HERROES) trial, is a 160 patient substudy of the ITACS trial. The aim of this observational study is to better characterize anaemia and iron deficiency detection in order to identify those who would most benefit from IV iron before cardiac surgery.

HYDROGEN PEROXIDE DEGRADATION IN HEATER-COOLER UNITS: AN INVESTIGATION INTO THE EFFICACY OF MONITORING PROTOCOLS AND STIPULATED PREVENTATIVE MEASURES AGAINST MYCOBACTERIUM CHIMAERA

Reagen Joice*
*The Alfred Hospital, Melbourne

Cases of sterile site Mycobacterium chimaera infection in patients post cardiac surgery have been attributed to exposure to infected heater-cooler units (HCU) used during cardiopulmonary bypass (CPB). Cleaning protocol and disinfection regimens prescribed by the Stöckert 3T HCU manufacture's (LivaNova) IFU have been implemented by our perfusionists accordingly and weekly hydrogen peroxide (H2O2) levels tested. Weekly water sampling (day seven post disinfection) to test the H2O2 level in each HCU (n=4) demonstrated an unanticipated decline in H2O2 to below the IFU's advised minimum concentration for protection against Mycobacterium chimaera survival (>100ppm) at day seven. Subsequently, a pilot study was implemented to evaluate the rate of H2O2 degradation in our hospitals HCUs. Our unit performs over 700 CPB cases every year, treating patients with a host of cardiac pathologies and diseases. A total of four HCUs are rotated weekly for use during CPB. Within the study, water samples were collected from the non-clinical HCUs every twelve hours (equating to a day of operating) under various conditions to mimic clinical conditions including: idle at room temperature; turned on but not circulating at different temperatures; and circulating through a heat exchanger/oxygenator at different temperatures. Samples were tested for hydrogen peroxide concentration levels (ppm) and pH to evaluate and determine appropriate monitoring protocol.

COMPARISON OF HAEMATOCRIT AND BLOOD TRANSFUSION RATE BETWEEN A HYBRID CIRCUIT AND STANDARD CIRCUIT

Kate Rawlings, Auckland City Hospital, New Zealand

Comparison of haematocrit and blood transfusion rate between a hybrid circuit and standard circuit

Background: Many studies have shown that the priming volume from cardiopulmonary bypass results in hemodilution anaemia. Hemodilution anaemia leads to an increase in blood product transfusion. Hemodilution and blood product transfusion have been shown to be correlated with a high incidence of post-operative complications, morbidity and mortality. The aim of my study is to compare if a reduced priming volume using a hybrid circuit helps to reduce hemodilution anaemia and blood product transfusion rate.

Method: Two groups - the hybrid group and the standard circuit group with 10 patients in each group. The hybrid circuit used a prime volume of 800ml compared to a standard circuit with a prime volume of 1100ml. Haematocrit and blood product transfusion was recorded for both groups.

Results: There was no statistical significant difference between the two groups for initial hemodilution drop (p=0.621567), 30 minutes on CPB (p=0.949425), rate of transfusion (p=0.707662) and creatinine change (p=0.486805).

Conclusion: The use of the hybrid circuit to help reduce hemodilution anaemia and reduce blood product transfusion rate did not achieve statistical significance. Although the findings were not significant, there were many limitations to this study which could have contributed to the result. For example - small sample size, differing transfusion thresholds, time constraints. Some of the limitations could be looked at in future research for the role of hybrid circuits in cardiac surgery.

THE EFFECT OF VENOUS RESERVOIR LEVEL ON EMBOLI GENERATION IN NEW GENERATION CARDIOPULMONARY BYPASS CIRCUITS

Camilla Hand

Post-operative neurological damage has been shown to correlate positively with the number of emboli patients are exposed to during cardiac surgery. Gaseous micro emboli (GME) from the cardiopulmonary bypass circuit are known to be a major source of these emboli. The minimum operating level for new generation venous reservoirs has been decreased compared to previous generations with the focus of minimising hemodilution. The aim of this study was to investigate the effect of venous reservoir levels on emboli generation in new generation commercially available cardiopulmonary bypass circuits and to test the minimum level recommendations against the maximum flow rates of these circuits. An in-vitro model was used to test both the Sorin Inspire 6 and the Medtronic Affinity Fusion circuits. Microemboli were measured in the venous line (baseline), post reservoir and post arterial line filter (ALF) using the EDAC quantifier. When decreasing the reservoir level from 1000ml to 150ml (minimum operating level) at 6L/min (maximum flow rate) in the Inspire 6, no significant difference was found in microemboli count post reservoir (p=0.60) and post ALF (p= 0.28), this contrasted to previous studies which have shown a negative correlation between level and microemboli count. In the Affinity Fusion when decreasing the level from 1000ml to 200ml (minimum operating level) at 7L/min (maximum flow rate) the microemboli count was significantly higher post reservoir (p=0.005), however post ALF there was no significant difference (p=0.64). When comparing the Inspire 6 and the Affinity Fusion, the study found no significant difference between any of the sites at 1000mL, however at the minimum operating level for each device there were significantly less microemboli in the Inspire 6 circuit post reservoir (p=0.003) and post ALF (p=0.01). The results suggest that both circuits' minimum level recommendations at their maximum flow rate are safe and that the design modifications for emboli removal in the tested circuits have improved dramatically compared to previous generation circuits.

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ANAEMIC EFFECTS ON KIDNEY WHILE ON BYPASS- A REVIEW

Libin Jose, Cellsaving and Perfusion Resources, Melbourne

Anemia is one of the major risk factors causing Acute Kidney Injury (AKI) in patients undergoing cardiac surgery, especially On-pump. The causes of intraoperative anaemia include modifiable factors like degree of hemodilution, hemolysis, and multiple non-modifiable risk factors. The relation of low haematocrit in cardiac surgery affecting the oxygen delivery into the renal tissue has been well explained by Ghatanatti and colleagues. The patients who developed AKI on cardiopulmonary bypass had an increased mortality of 11.1% compared to .8% of non AKI group in the study by Duque-Sosa and colleagues. This review aims to look into the studies on factors, effects, and management of modifiable risk factors causing anemia in 10 years from 2007 to 2017 using Medline and Embase database. Multiple studies demonstrated the use of mini circuits and vacuum assisted venous drainage in reducing the hemodilution to a greater extent. Limitation of Red Blood transfusion is a modifiable treatment factor in the treatment of anemia to minimize AKI. The identification of intraoperative nadir hematocrit and transfusion threshold is still a matter of study. The multiple approaches to minimize the intraoperative anaemia suggested goal-directed perfusion, prevention and early recognition of modifiable risk-factors, coagulation and hemolysis management, hemoconcentration, minimizing blood transfusion, pre, and intra operative fluid management. Key words: anemia, acute kidney injury, risk factors, and cardiopulmonary bypass.

EVALUATION OF DISINFECTION PROCESSES FOR WATER HEATER DEVICES USED FOR EXTRACORPOREAL LIFE SUPPORT

Nicole YR Shrimpton, Queensland Paediatric Cardiac Service, Lady Cilento Children's Hospital, Brisbane, Queensland Australia

The Maquet Heater Unit 35 (HU35) is widely used to maintain patient body temperature during extracorporeal life support (ECLS). Water is used as a medium for heat transfer though also provides a medium for growth of pathogens. Thus, the use of a heating unit presents a risk for transmission of water-borne pathogens in critically ill patients. Recently M. chimaera outbreak in cardiac surgery has been linked to the production of bioareosols by heater-cooler devices. Consequently, manufacturers have revised cleaning recommendations with significant impact on staff, budget and environment. Heterotrophic plate counts (HPC) and non-tuberculous mycobacterium (NTM) growth were assessed following three cleaning processes over a 16 month period. It was found that water quality was acceptable in HU35's when disinfecting with a lower concentration of Chloramine-T than currently recommended, provided exposure of the device to potential pathogens was minimised by use of a 0.2µm water filter.

THE EFFECTS OF CARDIAC SURGERY AND CARDIOPULMONARY BYPASS ON THE MICROCIRCULATION

Stephen Bottrell, Greta Goldsmith, Johnny Millar, Georgia Brown, Michael Cheung.

The purpose of this study is to observe the microcirculation of children (age 0-12 mths) after cardiac surgery using cardiopulmonary bypass (CPB). The microcirculation consists of the smallest blood vessels in the body (arterioles, capillaries, venules) responsible for delivering oxygen from blood to tissues. CPB induces a systemic inflammatory response and predictable macrocirculatory changes. However the consequences for the microcirculation are not well understood. We have used a camera capable of non-invasively recording real-time images of the sublingual microcirculation. The images were analysed to ascertain the appearance and functional activity of the microcirculation in the first 24 hours after surgery CPB and to test the concept of haemodynamic coherence. We will present interim results of the study.

THE ESTABLISHMENT OF AN ANIMAL CARDIOPULMONARY BYPASS MODEL TO ASSESS THE IMPACT OF A NITRIC OXIDE DONOR ON MYOCARDIAL FUNCTION

M Bennett[1], K Kenna[2], S Bottrell[1], M Cheung[2]
1. Perfusion Unit, The Royal Children's Hospital, Melbourne, Australia
2. The Heart Research Group, Murdoch Children's Research Institute, Melbourne, Australia

Aim: To assess the impact of S-nitrosoglutathione (GNSO), a nitric oxide donor, on low cardiac output syndrome occurring as a result of cardiopulmonary bypass.

Method: Fifteen juvenile pigs where used to establish an animal cardiopulmonary bypass model. This followed initial unsuccessful attempts with a small animal (Rat) CPB model. The pigs were randomised into control and treatment groups with the treatment group receiving an infusion of GSNO prior to bypass while the control group received a saline infusion. Following 90 mins of bypass and 60 min X clamp, haemodynamic and ventilation parameter were measured to assess heart and respiratory function.

Results: All animals were successfully weaned from bypass and survived for the 4 hour measurement phase. Minimal differences were observed between the two groups with no distinct variation between those receiving GNSO and those receiving the saline infusion.

Conclusion: In this preliminary study we were able to establish a robust animal model of cardiopulmonary bypass but no difference was observed between control and treatment groups across a variety of measured parameters. These results demonstrate that GSNO can be safely used on bypass but the consideration of a more acute myocardial injury model and a longer measurement period may be needed to fully assess any potential benefits of the drug.

A PILOT STUDY ON MONITORING VOLATILE ANESTHETICS DELIVERY - UTILIZING DRAGER VAMOS PLUS MONITOR DURING CPB

Vinaykumar S Albal, James McMillan, Michael McDonald, Kamala P Garfield, Mitchell Bago.

Objective: A pilot study was conducted to evaluate the ease and accuracy of a side stream analyser and monitor the efficacy of volatile anaesthetic administration during cardiopulmonary bypass (CPB).

Keywords: Volatile Anaesthetics, Cardiopulmonary bypass, Plenum vaporisers, Drager vamos plus, Spectrum monitor, Arterial blood gas.

Materials and Methods:

- Drager VAMOS PLUS[1] (a side stream analyser was utilised).
- CPB circuit comprising of SORIN-SYNTHESIS[2] (a hollow fiber microporus polypropylene membrane oxygenator with custom made tubing pack, Blood cardioplegia delivery system and centrifugal blood pump.
- SPECTRUM [3]M4 Gas measurement module, ABL800 FLEX RADIOMETER[4]
- ABBOTT LABORATORIES VAPORISERS[5].
- In 15 cases values are recorded at different stages of surgery, Temperature , and changes in haemodynamics.
- Participants are adult patients undergoing cardiac surgery on CPB and with continuous or intermittent use of volatile anaesthetics.
- All the values obtained in VamosPlus, Spectrum Monitor and Arterial blood gas reports are tabled for analysis.

Results: We found that Drager Vamos Plus a side stream analyser is an efficient device which can be used to monitor volatile anaesthetic delivery during CPB. Since it was an observational study in 15 random cases no changes were made to our protocol during testing this device. Significantly more data is required for statistical analysis and to achieve an accurate result. Hence by conducting a large cohort study and correlating data with BIS reading, plasmaHb concentration and considering factors like membrane material, PVC tubing, and interactions with drugs we would achieve a more accurate assessment of this device.

Conclusion: We believe that this device Drager vamos system would assist in measuring the accuracy of volatile anaesthetic delivery. It is a simple system to add to any CPB Oxygenator, its hardware facilitates direct monitoring interface, and inbuilt battery backup. Therefore this device adds another level of safety to the conduct of cardiopulmonary bypass.

1. Drager 8 Acacia Pl, Notting Hill VIC 3168 ,
2. SORIN 16-18 Hydrive Close Dandenong south VIC 3175 ,
3. SPECTRUM M4 Harrier4, Meteor Business Park, Cheltenham Road EastGloucester, GL2 9QL, United Kingdom
4. RADIOMETER 1st Floor, 96 Ricketts Road Mt Waverley Vic3149. 5.ABBOTT 666, Doncaster VIC 3108

REMEMBER SUBMIT TO...

PIRS

Perfusion Incident Reporting System

What is PIRS?

PIRS is a voluntary system for reporting perfusion related incidents and accidents, open to the international perfusion community. Confidentiality is assured by de-identification and anonymity. PIRS data will not be passed to any third party or regulatory body. For further information see www.anzcp.org.

TO SUBMIT TO PIRS VISIT

www.anzcp.org

...and hit the PIRS tab.

PROTAMINE ON ECMO CIRCUITS – A PILOT STUDY

Viji Vincent[1], Melissa Claus[2], Anthea Raisis[2], Warren Pavey[3] and Ed Litton[4]

Background: A simple and safe method to counteract bleeding due to heparin is reversal of heparin by protamine. There is minimal literature or evidence regarding reversal of heparin during ECMO and when using heparin-coated ECMO circuits. Some investigators have suggested that protaminization should totally be avoided during ECMO with heparin coated equipment.

Aim: To examine the interaction of protamine administration to an ECMO bench-top circuit primed with heparinised porcine blood.

Methods: This laboratory based study uses porcine blood in a Maquet ECMO PLS circuit. The response of the ECMO circuit to heparin reversal by protamine, by giving 1/4th of the calculated dose in 30 minute intervals, is by monitoring the change in transmembrane pressures, ECMO flows and visual appearance of the oxygenator; and by comparing the change in anticoagulation parameters and thrombin generation in circuit.

Findings: No significant difference in Fibrinogen level. No visual presence of clot spotted until full reversal. No significant change in transmembrane pressures and ECMO flows until 3/4th of the protamine dose. Anticoagulation parameters near normalised after 3/4th of reversal.

Conclusion: The threshold dose of protamine for reversal of heparin that the ECMO circuit could withstand without clotting the device but neutralising the heparin was found to be 75% of the full dose. Similar bench-top study will be conducted on human blood to translate the findings. This then is followed by the next proposed project, "Protamine on ECMO Patients and Circuits" which will determine the effects of the identified threshold dose of protamine when introduced to the ECMO circuit attached to the animal (pig).

1. Clinical Perfusionist, Fiona Stanley Hospital, WA; Adjunct Associate Lecturer, Murdoch University, WA.
2. Veterinary Anaesthetist, Murdoch Veterinary Hospital, WA; Senior Lecturer, Murdoch University, WA
3. Consultant Cardiac Anaesthetist, Fiona Stanley Hospital, WA; Adjunct Lecturer, Murdoch University, WA
4. Consultant Intensivist, Fiona Stanley Hospital, WA; Adjunct Lecturer, Murdoch University, WA

PULMONARY THROMBOENDARTERECTOMIES; A CASE SERIES FROM SAINT VINCENT'S HOSPITAL SYDNEY

Keith Adkins

Since November 2010 Saint Vincent's hospital in Sydney has performed 46 Pulmonary Endarterectomies (PTE). PTEs are performed for Chronic Thromboembolic pulmonary hypertension (CTEPH).

In CTEPH, thrombus like tissue forms on the walls on pulmonary vessels reducing pulmonary flow thus creating a V/Q mismatch. The pathogenesis of CTEPH is poorly understood. CTEPH begins after pulmonary embolism, although not all sufferers of a pulmonary embolism go on to develop CTEPH. Therefore is has been postulated that there must be some other factors responsible for its development. If left untreated CTEPH can cause right heart failure. Right heart failure is a result of the right ventricle's pressure overload secondary to the increase in PVR. As a result of the right ventricular overload, the tricuspid annulus dilates causing regurgitation. Usually the treatment by PTE reduces the strain on the RV and thus reduces the tricuspid regurgitation therefore tricuspid valve surgery is usually not necessary.

Because the larger proximal and medial vessels are affected, surgical treatment is an effective option because these vessels can be easily visualised and have an effective endarterectomy.

PTEs require deep hypothermic circulatory arrest (DHCA) because of the pulmonary back bleeding that would reduce visibility in the surgical field. Patients are cooled to 20°C. There is no antegrade cerebral perfusion. Periods of circulatory arrest are strictly limited to 20 minutes.

The mean time CPB time is 368 minutes. The mean XC time is 83 minutes. The mean total DHCA was 46 minutes.

GENERATION OF FREE HEMOGLOBIN UTILIZING THE THORATEC CENTRIMAG BLOOD PUMP WITH THE LIVANOVA EOS PMP OXYGENATOR

Ashley Hodge

Hemolysis is a known consequence of extracorporeal membrane oxygenation (ECMO) resulting from shear force within the different components of the extracorporeal circuit. The primary aim of this study was to evaluate the EOS PMP™ oxygenator for generation of plasma free hemoglobin (PfHg) over 24 hours at nominal operating range flow rates. The EOS ECMO™ (LivaNova; formerly Sorin) is equipped with a plasma tight polymethylpentene (PMP) hollow fiberoxygenator. We hypothesized that PfHg generation would be elevated in circuits with higher flow rates, due to the significant pressure drop across the oxygenator according to manufacturer provided flow charts. Generated PfHg concentrations were compared to PfHg concentrations from blood not exposed to an ECMO circuit. A secondary aim was to evaluate circuit flow-rate-induced changes in platelet count and platelet function over 24 hours. Circuits contained a CentriMag® blood pump and an EOS ECMO PMP™ oxygenator. Circuits in triplicate were run continuously for 24 hours at three flow rates [1, 3, and 5 liters per minute (LPM)]. PfHg was analyzed at baseline, 6, 12, 18, and 24 hours. Platelet count and function were measured at baseline and 24 hours. Concentrations of PfHg at baseline for circuits operating at 1, 3, and 5 LPM were 24.4±4.0, 38.4±28.6, and 26.7±6.9 mg/dL, respectively. PfHg concentrations after 24 hours were statistically compared for the three flow rates using ANOVA: PfHg concentrations at 1 LPM (181.4±29.1 mg/dL), 3 LPM (145.9±8.7 mg/dL), and 5 LPM (100.1±111.3 mg/dL) circuits. The F test was not statistically significant (p=0.632), indicating that PfHg generation at 24 hours was similar among the 3 flow rates. Despite the comparatively high-pressure drop across the EOS PMP™ membrane due in part to its long blood pathway, excessive hemolysis and subsequent increased PfHg levels were not observed.

PERI-OPERATIVE LEVOSIMENDAN IN PATIENTS UNDERGOING CARDIAC SURGERY: AN OVERVIEW OF THE EVIDENCE

Shi WY[1], Li S[2], Collins N[3], Cottee DB[4], Bastian BC[3], James AN[2], Mejia R[2].

Levosimendan, a calcium sensitiser, has recently emerged as a valuable agent in the peri-operative management of cardiac surgery patients. Levosimendan is a calcium-sensitising ionodilator. By binding to cardiac troponin C and reducing its calcium-binding co-efficient, it enhances myofilament responsiveness to calcium and thus enhances myocardial contractility without increasing oxygen demand. Current evidence suggests that levosimendan enhances cardiac function after cardiopulmonary bypass in patients with both normal and reduced left ventricular function. In addition to being used as post-operative rescue therapy for low cardiac output syndrome, a pre-operative levosimendan infusion in high risk patients with poor cardiac function may reduce inotropic requirements, the need for mechanical support, the duration of intensive care admissions as well as post-operative mortality. Indeed, it is these higher-risk patients who may experience a greater degree of benefit. Larger, multicentre randomised trials in cardiac surgery will help to elucidate the full potential of this agent.

THE AUSTRALIAN AND NEW ZEALAND COLLABORATIVE PERFUSION REGISTRY

Robert A Baker, PhD, CCP (Aust), Richard F Newland, BSc, CCP (Aust).
Flinders Medical Centre and Flinders University, on behalf of the Australian and New Zealand Collaborative Perfusion Registry.

The Australian and New Zealand Collaborative Perfusion Registry (ANZCPR) aims to empower cardiac surgical team members through the collection and reporting of data relevant to the practice of cardiopulmonary bypass to improve cardiac surgical patient outcomes. This is achieved through utilization of the data to understand clinical practice, encourage evidence based practices, facilitate quality improvement, and to provide a foundation for research . Formed in 2007, the registry has collected data in more than 28,000 procedures in 9 hospitals throughout Australia and New Zealand.

The ANZCPR currently provides three comprehensive reports to each site to facilitate practice evaluation. The "Executive Summary Report" was shared for the first time in 2017 and allows teams to share their data vertically within institutions. The second and third reports allow for comparison with other sites within the collaboration for the current data harvest year and the third allows sites to compare their practice over time. In 2011 the ANZCPR implemented a prospective quality improvement initiative to focus on temperature, blood glucose and pCO2 management during CPB. Benchmarking of quality indicators has been used to monitor compliance at each registry site in a continuous manner. Initial benchmarks of compliance at best performing sites was arterial outlet temperature <37oC; 94%, blood glucose between 4 and 10 mmol/l; 90% and pCO2 between 35 and 45 mmHg; 80%. Since the introduction of the benchmarking process, the benchmarks have been maintained, and overall variation between sites has been reduced. Importantly registries promote evidence based practice through reporting by enabling participating hospitals the opportunity to compare their practice against published standards and guidelines.

Registries can play an important role in evidence based medicine. Historically registries have provided a lower evidence-level than randomized controlled trials (RCT), however the contribution of observational studies to the evidence base has recently been upgraded. Non randomized high quality registry data is now able to be used as level A evidence when corroborating RCT data and moderate quality evidence from 1 or more well designed and well executed studies as level B-NR evidence (Bakaeen et al 2017). Registries document the treatment and outcomes for consecutive patients in clinical practice; data are gained from a 'real-world' selection of patients, many of whom would be excluded from RCTs, particularly high-risk patients. Therefore observational registry studies provide a link between RCTs and the 'real-world' situation, by evaluating whether the results of RCT's are able to be reproduced in broader patient populations. Focus areas for ANZCPR observational studies have been rewarming temperature and influence on acute kidney injury (AKI), impact of red blood cell transfusion independent of anaemia, oxygen delivery and acute kidney injury, and management of glycaemia.

Participation in a multi-centre registry should be a goal for all perfusion units to help them provide the best level of care for their patients.

Bakaeen FG, Svensson LG, Mitchell JD, Keshavjee S,, Patterson, GA Weisel RD. The American Association for Thoracic Surgery/Society of Thoracic Surgeons position statement on developing clinical practice documents. J Thorac Cardiovasc Surg 2017;153:999-1005

THE NEW HEALTHCARE ENVIRONMENT – WHAT YOU NEED TO KNOW TO BE SUCCESSFUL AND TO SURVIVE

Richard J. Mullaly GAICD, MBA, B Sc. (Hons) (and formerly CCP Aust.)

Healthcare has evolved dramatically in the past 20 years. Contemporary healthcare is provided in a very different way and in a very different environment compared to the late 1990s.

Practitioners, providers, funders and health services must now account for:

- The role of the community – in decisions, choices and healthcare policy
- The need for efficiency
- The role of evidence in decision-making
- The critical need for clarity in communications
- A sharp focus on workplace culture
- A welcome focus on workplace health

Influenced by nearly 20 years as a healthcare manager, CEO, consultant and Board member, this paper examines the extent of the changes with a focus on how the changes must determine behaviour and practice

Late 1990s is almost a generation ago.
It is when I left clinical practice.
Why did I leave?
What did I do?
What have I learned?

- Change is omnipresent and constant

Take home messages
Protocols
Employee reviews
QC their machines
Policy and protocols
Embrace this
Assessment of depts.
FTE for safety
Spares of equipment
FoI
google

ADVERSE OUTCOMES AND PERFUSION STRESS – HOW ARE YOU COPING?

Michelle Epstein

Dr Epstein will create a safe environment where we can explore the psychological impacts associated with perfusion. The stress of long hours, working with life-threatening situations, frequently ending in adverse outcomes, is an important reality that must be acknowledged. It is incumbent on all health professionals to monitor their stress and the impact on their work and well being. Providing forums for constructive, non-judgemental and compassionate supervision is essential and ethical.

Dr Epstein will begin by explaining the clinical supervision model used by psychologists to prevent, monitor and address occupational hazards such as burn out, vicarious trauma and compassion fatigue. Rather than viewing these conditions as "problems", they will be will be understood within the framework of inevitable transference phenomenon in helping professions. These transference phenomena are largely unconscious and can have a significant impact on how we understand and react to our experiences at work.

There are many factors that influence how we interpret and attribute adverse outcomes and mistakes. Our personal histories can unconsciously bias our thinking and will also dictate the kinds of coping strategies we employ. When each individual's reactions are being driven by powerful unconscious forces, multidisciplinary teams can mimic the dynamics of dysfunctional families.

In the second part of the presentation, a clinical supervision session will be conducted; stimulating discussion around two case presentations that embody the kinds of professional and personal stresses routinely faced by perfusionists.

SURGERY IN PATIENTS WITH ADULT CONGENITAL HEART DISEASE – A CHANGING SPECTRUM OF SURGERY

Marco Larobina

The evolution of paediatric cardiac surgery mirrored the evolution of cardiac surgical techniques. The advent of cardiopulmonary bypass allowed an increasingly complex spectrum of congenital lesions to be corrected creating a cohort of survivors thought to be cured of their congenital afflictions.

There are now more adults with corrected congenital heart disease than children, creating a new specialty in cardiology and cardiac surgery. Many of the corrected congenital lesions require further intervention in adulthood and require specialised care.

Adult congenital heart surgery encompasses newly diagnosed congenital lesions in adults, and the long term consequences of surgical correction of lesions in children. The correction of secundum Atrial Septal defects was once common in adult surgical practice, but has been overtaken by pulmonary valve replacement, re-replacement of pulmonary valved conduits and more recently surgery for aneurysms of the aorta in patients with corrected conotruncal defects. Further challenges lie ahead as more patients with single ventricle physiology reach adulthood.

PERFUSION TRAINING, EDUCATION AND SIMULATION IN EUROPE AND USA

Christiaan Matheve, Training & Education Manager Extracorporeal Therapies Europe & Canada

Acquired knowledge and scientific evidence of superior therapies, products or protocols without implementation in the daily strategies of patient's treatment is a terrible loss of investment, human potential and progress.

Taken into account this statement, both perfusion-societies and industry have the moral duty to invest in education-programs and continuous education. Assessments of skills using perfusion-simulators have proven to be a great tool when introducing new therapies or products.

A NEW BIDIRECTIONAL PERFUSION CANNULA FOR THE PREVENTION OF LEG ISCHEMIA. FUNCTION, DESIGN AND THE COMMERCIALISATION PROCESS

Elli Tutungi

Leg ischemia is a common problem with femoral cannulation for ECMO and CPB. The major morbidity and mortality following femoral cannula induced leg ischemia has resulted in numerous strategies to mitigate this complication. There is no easy dependable strategy for managing this complication available today. This lecture will present a new femoral cannula design that mitigates this problem and will be available on the market next year. It was designed and developed in Australia. The lecture will also touch on what is required to successfully commercialise a new technology.

INCREASING COMMUNICATION DURING CT SURGERY THROUGH HEALTH: KEEPING FAMILIES AT EASE

Ashely Hodge

Introduction: Waiting while a loved one is in surgery can be a very stressful time. Current processes for updating families vary from institution to institution. Providing timely and relevant updates, while important to the family, may strain a surgical team's operational system. In our initial experience with the Electronic Access for Surgical Events (EASE) application (app), we tested the extent to which its implementation improved communication with patient families. Methods: We compared compliance data collected pre-EASE (December 2013 through September 2014) and post-EASE implementation (October 2014 until December 2015).Results: While the pre-EASE compliance rate for bi-hourly updates was 31% (78/255) of cases, post-EASE implementation, we achieved a compliance rate of 97% (171/176). A two-sample test of proportions confirmed significant improvement in compliance after EASE technology was introduced ($p<0.001$). Analysis of the 177 non-compliant cases in the pre-EASE period indicated non-compliance occurred most frequently at the end of the case (97/177, 55%), when the patient remained in the OR >2 hours after the last update to the family; and at the beginning of the case (46/177, 26%), when the patient arrived in the OR >2 hours before the time of the first update. Family satisfaction scores rating their experience during surgery as "Very Good" improved from 80% pre-EASE implementation to 97% post-implementation and has sustained for one year.

Conclusions: A mobile technology app (EASE) improved both frequency and compliance with surgical updates to families, which resulted in statistical increases in family satisfaction scores.

ORIGIN, EVIDENCE AND APPLICATION OF GOAL DIRECTED PERFUSION

Robert Groom FPP, CCP, Director of Perfusion, ECMO Coordinator, Maine Cardiovascular Institute, Portland, Maine USA
Member- Northern New England Cardiovascular Disease Study Group

Goal Directed Perfusion (GDP0 is a perfusion management strategy that has been gaining momentum in recent years. In 2014 and 2015 the Fellowship Award, the award given for the best scientific paper, at the AmSECT International Convention both years was given for research papers on Goal Directed Perfusion. In 2016 a Symposium on GDP was a highlight of our International Convention.

The term "goal directed therapy" has it orgin in critical medicine first published in 1992 by Shoemaker and colleagues. A landmark paper that evaluated treatment strategies for patients with septic shock was published in 2002. This work published by Emanuel Rivers advanced the hypothesis that timely restoration of perfusion aimed at addressing metabolic needs at the cellular level got the attention of emergency and critical care providers. Marco Ranucci adapted this idea to cardiopulmonary bypass and studied the effects of nadir oxygen delivery and hematocrit level on postoperative kidney function. Subsequent work in a multicenter trial supported Ranucci's findings. A broader multicenter trial, GIFT was completed last year and results should be published soon.

The aim of this lecture is to review the origin of the goal directed therapy concept and some of the scientific underpinnings, recent evidence of GDP therapy, and practical application of GDP.

THE EFFECT OF GOAL-DIRECTED PERFUSION ON POSTOPERATIVE ACUTE KIDNEY INJURY IN ADULT CARDIAC SURGERY PATIENTS. A MULTICENTER RANDOMIZED CONTROLLED TRIAL

Marco Ranucci, MD, FESC[1], Ian Johnson, CCP[2], Seema Agarwal, FRCA[2], Timothy Wilcox, CCP[3], Rachael Parke, MD[3], Robert A. Baker, PhD, CCP[4], Richard F. Newland, CCP[4]; Christa Boer, MD, PhD[5], Renard G. Haumann,CCP[5], Andreas Baumann, MD[6] ,Dirk Buchwald,Phd,CCP[6], George A. Justison, CCP[7], Nathaen Weitzel, MD[7]; Filip de Somer, CCP[8], Paul Exton, BSc (Hon) ACP[9], Rajamiyer Venkateswaran, MD FRCS(Cth)[9], and Valeria Pistuddi[1]

[1]Dept. of Cardiothoracic and Vascular Anesthesia and ICU, IRCCS Policlinico San Donato, San Donato Milanese, Milan, Italy; [2]Dept. of Perfusion and Dept. of Anaesthesia, Liverpool Heart & Chest Hospital, Liverpool, UK; [3]GreenLane Cardiothoracic Unit and Cardiovascular Intensive Care, Auckland City Hospital, Auckland New Zealand, and Dept of Anaesthesiology, Faculty of Medical and Health Sciences, University of Auckland, Auckland New Zealand; [4]Cardiac Research and Perfusion, Cardiac and Thoracic Surgical Unit, Flinders Medical Centre and Flinders University, Adelaide, South Australia; [5]Depts. of Anesthesiology and Cardio-thoracic surgery, Institute for Cardiovascular Research, VU University Medical Center, Amsterdam, the Netherlands; [6]Dept. of Anaesthesiology, Intensive Care, Palliative Care and Pain Medicine and Dept. of Cardiac and Thoracic Surgery, BG University Hospital Bergmannsheil, Ruhr-University Bochum, Germany; [7]Dept. of Perfusion and Dept. of Anesthesiology, University of Colorado Denver, Aurora, CO, USA; [8]Heart Centre, University Hospital Ghent, Ghent, Belgium; [9]Department of Cardiothoracic Surgery, University Hospital of South Manchester NHS Foundation Trust, Manchester, UK.

Abstract: Importance. No cardiopulmonary bypass techniques have demonstrated the ability to reduce the risk of acute kidney injury following cardiac surgery

Objective: To determine whether a goal-directed perfusion strategy, aimed to maintain an oxygen delivery above 280 mL.min-1.m-2 reduces the incidence of acute kidney injury.

Design, setting, and participants: This multicenter randomized trial enrolled 350 patients undergoing cardiac surgery in nine institutions. Patients were randomized to receive either goal-directed or conventional perfusion. Three hundred and twenty-six patients completed the study and were analyzed according to the intention-to-treat principle.

Interventions: Patients in the treated arm received a pump flow during cardiopulmonary bypass aimed to reach and maintain an oxygen delivery ≥ 280 mL.min-1.m-2. Patients in the control arm were treated at a conventional pump flow of 2.4 L.min-1.m-2.

Main outcome and measures: The primary endpoint was the rate of acute kidney injury defined according to the Acute Kidney Injury Network Criteria. Secondary endpoints included intensive care unit stay; major morbidity; rate of patients receiving packed red cells and number of units transfused; operative mortality (in-hospital or within 30 days from surgery after discharge).

Results. Acute kidney injury stage 1 was reduced in patients treated with goal-directed perfusion (relative risk 0.45, 95% CI 0.25-0.83, P = 0.01. Acute kidney injury stage 2-3 did not differ between groups (relative risk 1.66, 95% CI 0.46-6.0, P = 0.528. There were no significant differences in secondary outcomes. In a pre-specified analysis on patients with a pump run between 1 hour and 178 minutes the differences in favor of the treatment arm were more pronounced, with a relative risk for acute kidney injury stage 1 of 0.39 (95% CI 0.21-0.75, P = 0.004) and a relative risk for acute kidney injury of any kind of 0.49 (95% CI 0.27-0.89, P = 0.017).

Conclusions and relevance: A goal-directed perfusion aiming to preserve oxygen delivery during cardiopulmonary bypass is effective in reducing minor degrees of postoperative acute kidney injury.

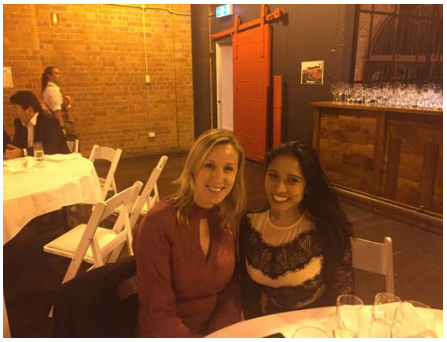
Trial registration: clinicaltrials.gov identifier: NCT02250131

ASM 2017
PHOTOS

Kate Rawlings and Mark Ambrose – ANZCP Meritorious Award

Camilla Hand and Steve Krithinakis (Liva Nova) – Sid Yarrow Award

Arthur Preovolos, Viji Vincent, Cheryl – Medtronic Encouragement Award



Kieran McNally (Abbott) and Charles Macdonald

Vanessa Perafan and Brett Goodbun

Mark Ambrose and Rebecca Cortiula (Terumo)

Beer Delux Social Event Friday evening

Fox Classic Museum Cars

Clarke Thuys

CALENDAR OF EVENTS
2018

JANUARY
7th-10th
Winter Park Perfusion Conference
Vintage Hotel
Winter Park, Colorado
http://www.hatravel.com/Page/WPPC2018MainPage

17th-20th
39th Annual Seminar American Academy of Cardiovascular Perfusion
New Orleans Marriot Hotel
New Orleans, Louisiana USA
http://www.theaacp.com/

FEBRUARY
21st-25th
Cardiology 2018 & Pediatric Cardiac Surgery Update
Hyatt Regency Scottsdale Resort at Gainey Ranch
Scottsdale, Arizona USA
http://www.chop.edu/events/cardiology-2018

25th-March 1st
34th Annual Children's National Symposium: ECMO and the Advanced Therapies for Respiratory Failure
Keystone, Colorado USA
http://www.cvent.com/events/34th-annual-cnhs-symposium-ecmo-the-advanced-therapies-for-respiratory-failure/event-summary-4af5755b16434ae8aff219bee07adb8e.aspx

MARCH
16th-18th
Tongariro Cardiac Surgery Meeting
Novatel Hotel Rotorua
Rotorua, New Zealand
https://www.obex.co.nz/events/tongariro-cardiac-surgery-meeting-2018/

19th-20th
23rd World Cardiology Conference
JW Marriot
Dubai UAE

22nd-23rd
Australasian Simulation and Perfusion Meeting, APEC Medtronic Education and Training Center, Macquarie Park, NSW Australia
anzcp.org

APRIL
4th-7th
Sanibel Symposium 2018
Sanibel Harbor Resort & Spa
Fort Myers, FL
http://sanibelsymposium.com

28th-May 1st
AmSECT 56th International Conference in collaboration with the American Association for Thoracic Surgery (AATS)
San Diego, California USA
http://www.amsect.org/p/cm/ld/fid=1522

MAY
3rd-5th
14th International Conference on Pediatric Mechanical Circulatory Support Systems and Pediatric Cardiopulmonary Perfusion
Ann & Robert H. Lurie Children's Hospital of Chicago
Chicago, IL USA
https://www.ispmcs.org/annual-conference/

23rd-26th
7th EuroELSO Congress on ECMO-ECLS
Prague Congress Center
Prague, Czech Republic
http://www.prague-euroelso2018.com/venue.page

JUNE
13th-16th
ASAIO 65th Annual Conference
The Washington Hilton
Washington, DC USA
https://asaio.com/annual-conference/wash-2018-64th-annual-conference/

22nd-23rd
3rd MiECT Symposium
Bern, Switzerland
https://www.scps.org.uk/pdfs/3rd%20MiECT%20Symposium_Save_the_Date.pdf

AUGUST
9th-11th
Perfusion Down Under Winter Meeting
The Heritage Hotel - Queenstown
Queenstown, New Zealand
https://perfusiondownunder.com

SEPTEMBER
6th-9th
38th Annual Cardiothoracic Surgery Symposium
Westin San Diego Gaslamp Quarter
San Diego, California USA
https://crefmeeting.com

13th-16th
29th Annual ELSO Conference
Scottsdale, Arizona USA

13th-15th
Case Reports in the Sun
Margaritaville Hollywood Beach Resort
Hollywood, Florida USA
http://floridaperfusion.org/latest-news/case-reports-in-the-sun-x/

OCTOBER
3rd-6th
Pediatric American Society of ExtraCorporeal Technology Meeting
EPIC Hotel
Miami, Florida USA

11th-12th
1st Latin American Perfusion Conference
Bogota, Columbia
https://www.asociacionalap.com

18th-20th
European Association for Cardio-Thoracic Surgery
Milan, Italy
http://www.eacts.org/educational-events/eacts-annual-meeting/

NOVEMBER
16th-17th
Australian & New Zealand College of Perfusionists 35th Annual Scientific Meeting
Stamford Grand Hotel
Adelaide, Australia

INVITATION
AUSTRALASIAN SIMULATION AND PERFUSION (ASAP) MEETING 2018

You are invited to attend the **ASaP Meeting 2018**, specially designed for trainee and certified perfusionists. This year's meeting will take place in the newly appointed, state-of-the-art, **Asia Pacific Experience Centre (APEC)** at Medtronic, Sydney.

EVENT DETAILS:

Faculty: Jane Ottens, Darryl McMillan, and Arthur Preovolos

Date: 22 -23 March 2018

Venue: APEC | Medtronic Education and Training Centre
5 Alma Road, Macquarie Park NSW 2133

Time: 08:30 - 16:00

Cost: $300 (two-day workshop)

RSVP: Thursday 1 March 2018
Darryl McMillan | McMillan@med.usyd.edu.au
Jane Ottens | Jane.Ottens@acha.org.au
Places are strictly limited.

MORE INFORMATION:

Jane Ottens Jane.Ottens@acha.org.au
Darryl McMillan McMillan@med.usyd.edu.au
Website www.anzcp.org

Australasian Simulation and Perfusion

ANZCP
Australian and New Zealand College of Perfusionists

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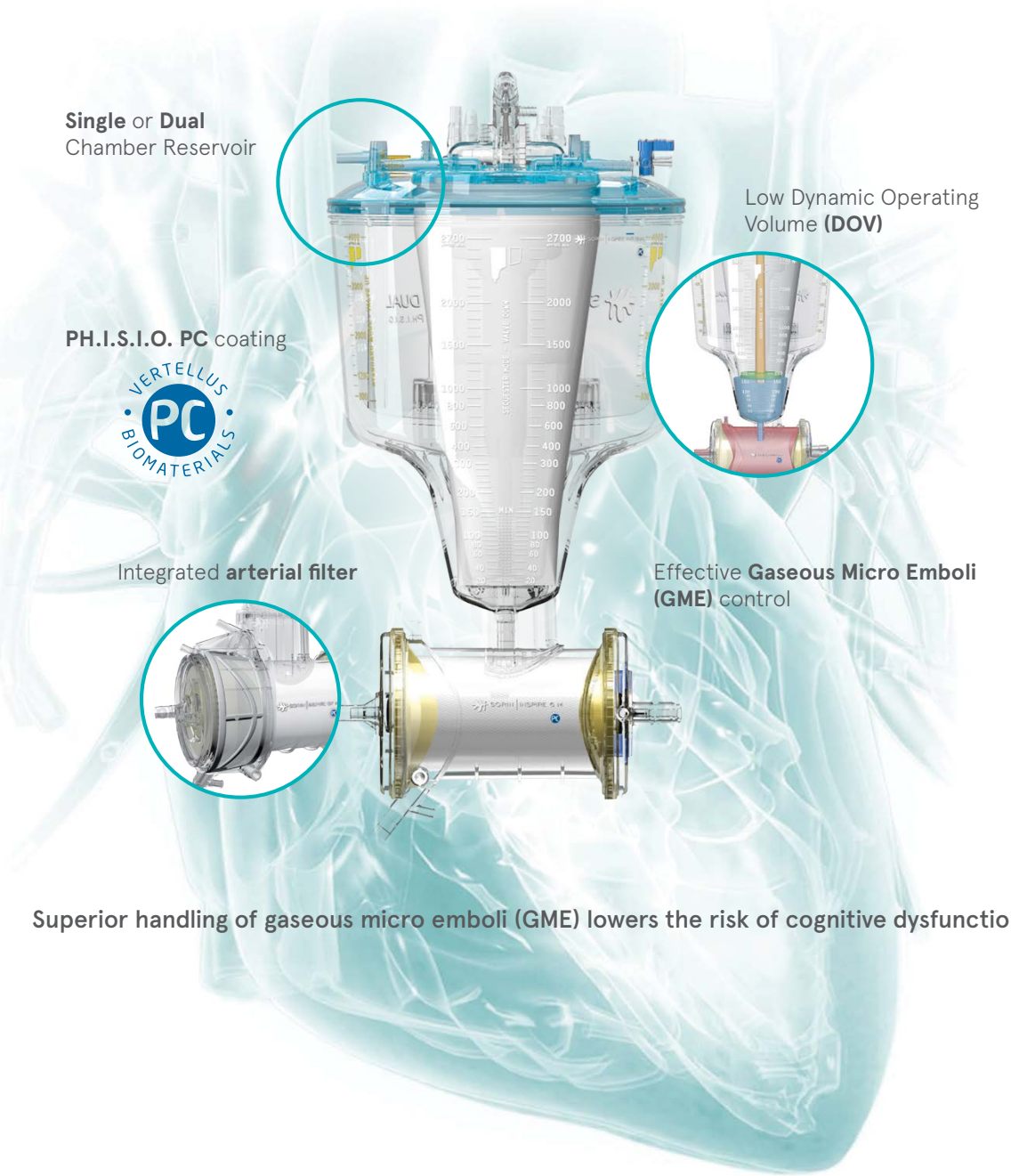
INSPIRE™ is part of the integrated **HeartLink™ System** and offers a low (DOV) Dynamic Operating Volume to reduce hemodilution and (AKI) Acute Kidney Injury occurrence.



Superior handling of gaseous micro emboli (GME) lowers the risk of cognitive dysfunctions.

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