2022 SCPS

48TH ANNUAL CONGRESS

ABSTRACTS

DE VERE

EAST MIDLANDS CONFERENCE CENTRE

SCPS

This document will be constantly updated
leading up to the event with further abstract

05 ABSTRACT SCHEDULE NUMBER

Perfusion Based Determinants of Hyperlactatemia for paediatric patients undergoing Cardiopulmonary Bypass.

SPEAKER

Alister Sunderland
Golden Jubilee National Hospital

Introduction: Elevated serum lactate during cardiopulmonary bypass (CPB) results from inadequate tissue oxygenation and is associated with increased postoperative morbidity and mortality. The aim of this study was to identify patient and CPB factors that predict hyperlactaemia in children undergoing cardiac surgery using cardiopulmonary bypass.

Methods: Retrospective data of 160 consecutive paediatric patients [M:F 1.5:1] was collected from the CPB record. Hyperlactaemia during CPB was defined as lactate > 3 mmol/l and/or an increase of > 1mmol/l. Demographic and CPB variables were analysed for their prediction of hyperlactemia using a multi-variate linear regression model.

Results: Hyperlactemia occurred in 39 patients (24%). Gender, age, weight or BSA was not associated with elevated lactate. Significant predictors of increased lactate included: increased glucose during CPB (p=0.001), longer duration of CPB (p=0.04), reduced flow rates, as a % of BSA predicted flow (p=0.025) and lower base excess (p=0.001) Elevated baseline lactate, prior to CPB, also predicted intra operative Lactates of >3.

Conclusion; This study identified the factors associated with increasing lactate during CPB relate primarily to the longer duration of CPB and lower % predicted flow rates during bypass. Because CPB duration relates to the surgical procedure it is therefore a non-modifiable risk factor. However, recalibrating flow rates to increased % predicted flow and control of the stress response (glucose and base excess) may reduce lactate production by enhancing tissue oxygenation.

06 ABSTRACT SCHEDULE NUMBER

Use of Intraoperative Immunoadsorption as a Desensitisation Methodology in Paediatric Heart Transplantation, and the Impact of Incompatible Transplantation on Donor Organ Waiting Times

SPEAKER

Dr. Richard Issit
Great Ormond Street Hospital

R.W Issitt, E Cudworth, M Cortina Borja, A Gupta, DM Kallon, R Crook, M Shaw, A Robertson, V.T Tsang, S Henwood, S Jamal, V Muthurangu, N.J Sebire, M Burch and M Fenton

Departments of Perfusion, Cardiothoracic Surgery, Cardiothoracic Transplantation, Cardiology and Digital Research Informatics and Virtual Environment, Great Ormond Street Hospital, Clinical Transplantation, Barts Health NHS Trust, Centre for Heart Failure, Transplantation and Extracorporeal Support, Institute of Cardiovascular Science and Department of Population, Policy & Practice, Institute of Child Health, University College London.

Background: Anti-human leukocyte antigen (HLA) antibody sensitisation represents a major barrier to cardiac transplantation. Patients with heart failure, supported by Ventricular Assist Devices (VAD), or those who have undergone surgical repair for congenital heart defects are at higher risk of developing anti-HLA antibodies, and thus limiting their compatibility with potential donors. Currently there is no consensus as to how, or when desensitisation should take place, and through what mechanism, meaning that sensitised patient must wait for a compatible donor for many months, if not years. For many this delay in finding a suitable organ results in increased risk of complications from VADs, with poorer waiting-list outcomes. We aimed to determine if it were possible to use immunoadsorption in an ex vivo laboratory setting to provide a potential, intraoperative desensitisation methodology, and what the impact has been of blood group-incompatible transplantation on waiting list times over the past decade.

Methods: Anti-HLA antibody-containing whole blood was obtained from NHS Blood and Transplant and quantified using a Luminex Single Antigen Bead assay. A Cardiopulmonary bypass (CPB) circuit was set up to mimic a 20kg patient undergoing cardiac transplantation, into which a plasma separator was placed. Anti-HLA antibody containing plasma was then diverted to a standalone, secondary immunoadsorption system, with antibody-depleted plasma return to the CPB circuit. A total treatment volume of 3-fold the pseudo-patient's plasma volume (4500ml at 75ml/kg) was treated. Samples for anti-HLA antibody quantification were taking at baseline, when combined with the CPB prime (on bypass), and then every 20 minutes for the duration of treatment (total 3 hours). To determine the impact of incompatible heart transplantation on waiting list times, we analysed ABO-incompatible heart transplants from donor offers and transplant waiting lists between 2010 and 2020. These were compared to next ABO-compatible heart transplant offer, taking into account their blood group, minimum weight and maximum weight ranges and their position on the waiting list.

Results: All 3 experiments demonstrated a reduction in individual bead mean fluorescence intensity (MFI) to below clinically relevant levels (<1000 MFI), and in the majority of cases below the lower detection limit (<500 MFI), even in HLA specificities with a baseline MFI >4000. Reduction occurred in all cases within 120 minutes, demonstrating efficacy in a time period usual for cardiac transplantation. Flow cytometric crossmatching of suitable pseudo-patients demonstrated a flipping from T cell and B cell positive channel shifts to negative, demonstrating a reduction in binding capacity. The mean additional waiting time for an ABO-compatible donor heart was 437, 508, and 860 days, for group A, B and O recipients respectively, compared to the incompatible transplant actually undertaken. Over ten years, 8.5% of all donor hearts were refused due to ABO or HLA incompatibility.

Conclusions: Intraoperative immunoadsorption in an ex vivo setting demonstrates a clinically relevant reduction in anti-HLA antibodies within the normal timeframe for cardiac transplantation. This method represents a potential desensitisation technique that could enable sensitised children to accept a donor organ earlier, even in the presence of donor-specific anti-HLA antibodies. Furthermore, we have demonstrated that incompatible heart transplants greatly reduced waiting times for these children. Almost a tenth of donor hearts are not being utilised for the most urgent person on the waiting list due to ABO/HLA incompatibility. We believe that this problem can be resolved through immunoadsorption-facilitated incompatible heart transplants.

08 ABSTRACT SCHEDULE NUMBER

LivaNova Essenz Patient Monitor "A new era in perfusion monitoring"

SPEAKER

Ed Overdevest
Chief Perfusionist Catharina Hospital

In 2022 LivaNova released the EssenzTM Patient Monitor, their next generation Perfusion Monitoring System that includes a free accessible Goal Directed Perfusion module and a QI Dashboard that supports perfusionists by allowing them to implement an individualized patient care strategy during the case. These improved features allow the user to monitor intra-operative quality parameter thresholds through an intuitive interface.

The recently released evidence-based perfusion guidelines have increased attention for oxygen and carbon-dioxide related parameters. Nevertheless, variation in measurement of GDP parameters drive the discussions on their value in general, and specifically the threshold levels that should be used during bypass.

Variation in measurement of Goal Directed Perfusion parameters and our first experience with the Essenz Perfusion Monitoring System will be shared in this presentation, with a focus on the quality indicator module's potential to relate quality parameters with patient outcome.

Essenz Patient Monitor is not avalable in all geographies. More information on the Essenz Patient Monitor as well as important safety information is available on the LivaNova website.

09 ABSTRACT SCHEDULE NUMBER

A retrospective audit of cardiac surgical patient population one year after the COVID-19 pandemic

SPEAKER

Katrina Zielinski
Nottingham University Hospitals

Introduction: Waiting times across the National Health Service (NHS) have increased since the beginning of the COVID-19 pandemic. This audit aims to identify how our cardiac surgical patient population has changed at Trent Cardiac Centre (TCC) a year after the outbreak of the pandemic.

Methods: Two patient groups were selected from the Dendrite database system. The control group consisted of all cardiac surgical patients seen from May 2019 – February 2020. The test group began a year after the outbreak, from February 2021 - November 2021. The entire patient population was included in this audit with no exclusions. Control group n= 464 patients. Test group n= 424 patients.

Results: The most significant increases have been seen in the number of emergency operations (up by 45%), use of donor red blood cell (RBC) transfusions given whilst on cardiopulmonary bypass (CPB) (up by 30%) and pre op length of stay (LOS) (up by 25%) compared to the patients seen a year before the outbreak of the pandemic. Other increases included cross clamp time (XC) (up by 20%) and average EURII score of patients at time of surgery (up by 16%).

Conclusions: Our patient population is changing after one year of the onset of the pandemic. More investigation is required to reduce RBC requirements as this can impact mortality and morbidity. There is evidence to call for a review of blood conservation techniques. Collaboration between other services may be required to better optimise patient preoperatively to pre- COVID-19 levels.

10 ABSTRACT SCHEDULE NUMBER

Cardiothoracic surgery: 1938-2022

SPEAKER

John Campbell
Nottingham University Hospitals

In Nottingham, the first Thoracic surgeon with a pioneering interest in cardiac surgery was engaged in 1938 by Nottingham county Council to provide consultative expertise for patients at the City Isolation Hospital (Heathfield). The surgeon was Laurence O'Shaughnessy (1900-1940). All surgical personnel can recognise the name instantly, forever linked with the stainless steel curved tip artery forceps with that bears his name. O'Shaughnessy was an exceptionally gifted thoracic surgeon with a pioneering interest in cardiac surgery that has produced a legacy still active today1. He established in 1936 the first cardiovascular clinic at Lambeth Hospital London for the treatment of cardiac ischaemia2. He reported in 1937; 20 cardiac revascularisations (cardio-omentopexy) using a pedicle omental wrap around the heart3. O'Shaughnessy was also the brother in law to George Orwell who he treated for Tuberculosis (TB) following his return from the Spanish Civil war in 1939.

Tragically O'Shaughnessy was killed on active service with the Royal army medical Corp in 1940 during the Dunkirk evacuation. His service obligations to Nottingham were bequeathed to George Mason of Newcastle. Mason had undertaken the GBs first pneumonectomy in 1934 assisted by O'Shaughnessy. As the world recovered from the war whilst tackling the endemic scourge of TB, thoracic surgery continued to develop in Nottingham.

Initially thoracic procedures included Phrenicothlasty to initiate ipsilateral diaphragmatic paralysis and basal lobe collapse to treat TB. As the thoracic repertoire increased closed cardiac procedures were undertake. In the 1950s, these consisted of Aortic Valvuloplastys and Trans-apical Valve Surgery The latter 1950s & early 1960s saw the introduction of Closed Mitral Repairs. In the 1960s off pump procedures were undertaken for relief of RVOT obstruction in Fallot 's tetralogy.

In 1995, the first dedicated cardiac surgery consultants were appointed to the East Midlands second cardiac surgery unit. Initially operating 2 days weekly out of one theatre undertaking three cases per day at the City Hospital. In 2006 the service moved to the Trent Cardiac Centre (TCC) purpose built to facilitate the implementation of the national service framework for coronary heart disease (2000)4. At this time, the City & Queens Hospitals merged to become Nottingham University Hospitals Trust (NUHT).

The service has proceeded to undertake over 15000 cardiac surgery procedures to date. Nottingham cardiac surgery service was amongst the first centres to introduce Port Access Surgery (now known as minimal invasive cardiac surgery) in the late 1990s using the Heart port system with the first generation surgical robots.

Since commencing the service in 1995 patient reported mean Euroscore II has increased by 42% from 5.67 in 1995 to 9.8 (P=0.01), cardiopulmonary bypass times have increased 28% (P=0.01) and cross clamp times increased 32% (P=0.01). In 2021 NACSA NICOR 5,6reported the mean Euroscore in Nottingham patients at 2.35 was 24% greater than the national reported average of 1.8. All indicative of increasing numbers of patients presenting with complex co morbidities, pathology's and exhaustion of available cardiological procedures.

- NUHT waiting list have doubled compared to pre pandemic levels, these levels have not been seen since early 2000s
- NCBC Peer mean waiting list size = 199 (NUH = 224)
- Waiting list to pre pandemic capacity mean percentage in reporting centre is 17% compared to NUHT position of 36%.
- Aortic dissections increasing year on year now accounting for 4.2% of capacity] NUHT

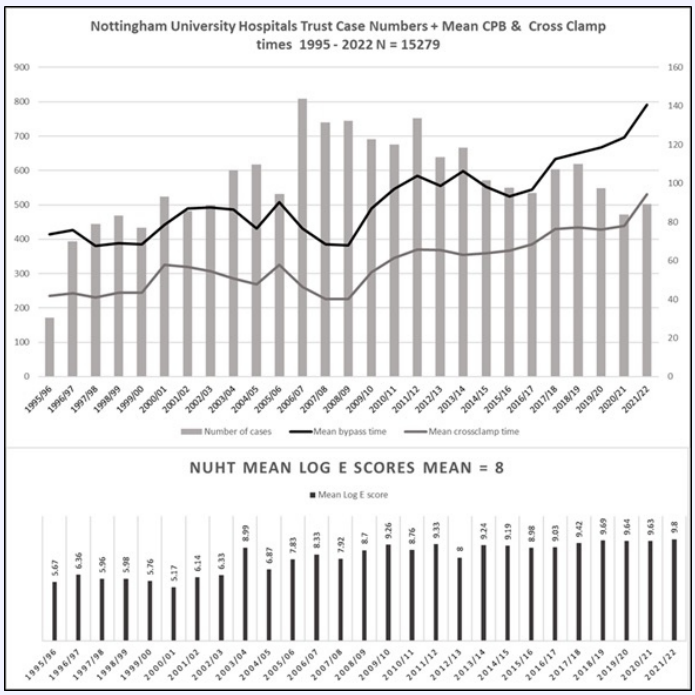
Continued . . .

10 ABSTRACT SCHEDULE NUMBER

Cardiothoracic surgery: 1938-2022

SPEAKER

John Campbell
Nottingham University Hospitals



The impact of COVID 19 has had a deep impact on the shape of our service. Nottingham was instrumental in supporting the maintenance of cardiac surgery in the East Midlands at a time of relentless pressure to release beds level three care beds. This necessitated the utilisation of a surgical prioritisation group with lay representatives to allocated level 3 care beds to the patients most in need whether they be a cardiac or cancer patient. The lessons learned from this collaborative inter speciality forum has ensured that we are now a more inclusive and responsive service. We are certain the lessons of the last 3 years will support our team as we strive to meet future challenges within the early foundations pioneered by O'Shaughnessy.

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5. National Service Framework for Coronary Heart Disease Modern Standards & Service Models. Department of Health 16602 1P 30k Mar 2000 (SWI)

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14 ABSTRACT SCHEDULE NUMBER

Can combination Nafamostat Mesylate and low-dose heparin reduce the incidence of adverse coagulopathic events in COVID-19 patients being treated on VV-ECMO?

SPEAKER

Katherine Ormston
Newly qualified perfusionist - Royal Stoke Hospital

Novel coronavirus SARS-CoV-2 and the resulting disease COVID-19 spread rapidly across the globe attributing to a devastating pandemic. COVID-19 has progressive pathophysiology whereby severe disease causes acute respiratory failure that may require veno-venous extracorporeal membrane oxygenation (VV-ECMO). The use of VV-ECMO is recommended for COVID-19 patients with respiratory failure not responding to optimal conventional treatment. Intense inflammatory responses caused by the pathophysiology of COVID-19 and through initiation of ECMO causes haemostatic imbalance resulting in adverse thrombotic/haemorrhagic complications posing a high mortality risk and is a growing concern for intensive care unit (ICU) management. There are several suggested predictors for outcome, such as D-dimer, that may enable early detection and treatment of COVID-19 associated coagulopathy thus preventing adverse coagulopathic events. Currently there is no optimal systemic anti-coagulant for COVID-19 patients being supported by VV-ECMO. Unfractionated heparin (UFH) is most commonly used however, major bleeding is an inherent risk. Nafamostat mesylate, a serine protease inhibitor, used to treat disseminated intravascular coagulopathy (DIC) and pancreatitis, shows promising emerging evidence for systemic anti-coagulation when combined with UFH for COVID-19 patients on VV-ECMO. This study aims to demonstrate that combination Nafamostat mesylate and UFH can reduce incidence of adverse coagulopathic events during VV-ECMO for the treatment of COVID-19. 236 COVID-19 patients supported by VV-ECMO will be randomised to be conventionally anti-coagulated with UFH alone or a combination of UFH and Nafamostat during ECMO support. A study protocol will be followed where aPTT, anti-Xa, platelets, fibrinogen, D-dimer and activated clotting time are measured as select time intervals (per protocol) to ensure optimal titration of anti-coagulation and facilitate the detection of haemorrhagic/thrombotic complications; a modified overt DIC score will also be recorded every twelve hours. In addition to preventing/reducing adverse coagulopathic events, this study aims to support previous findings that biomarker trajectory can assist mortality prediction.

16 ABSTRACT SCHEDULE NUMBER

Can administering pre-operative intravenous iron to inpatients undergoing cardiac surgery with iron deficiency anaemia, reduce perioperative allogenic blood transfusions, increase haemoglobin and improves patient outcome?

SPEAKER

Ashley Fenton
Basildon University Hospitall

Iron deficiency anaemia is a global health issue, affecting up to 500 million people worldwide. Anaemia is commonly asymptomatic and remains untreated until incidentally diagnosed following blood analysis. When any major surgery is planned with anticipated blood loss exceeding 500mls, anaemia should be treated to reduce the risk of blood transfusion. Whilst blood transfusion is often essential, it increases the risk of transfusion reaction, infection, acute lung injury, length of stay and mortality. Oral iron therapy is commonly prescribed to treat iron deficiency anaemia, which in optimal conditions can take up to 6 weeks to reach the desired effect. If surgery is scheduled for less than 6 weeks or oral iron is ineffective, then intravenous iron should be administered.

Basildon Hospital in East Anglia admits in the region of 350 cardiac patients each year, who require urgent surgery. Over 40% of those cardiac inpatients are anaemic, which is higher than the national average. In the current economic and financial climate, inpatients are experiencing extended surgery wait times. Currently, inpatients with anaemia are not routinely screened for iron deficiency or treated with intravenous iron despite national guidelines and professional consensus. The evidence for treating cardiac surgery patients with iron deficiency anaemia using IV iron therapy has exposed a gap in the literature.

There may be a missed opportunity to treat iron deficiency anaemia for cardiac surgery inpatients, using intravenous iron to increase haemoglobin, reduce transfusion requirements and improve overall morbidity and mortality. The presentation will explore the issues surrounding pre-operative iron deficiency anaemia in cardiac surgery and propose areas of further study.

17 ABSTRACT SCHEDULE NUMBER

Flexible Working And Retirement: Challenging Our Current Practices For A Sustainable Workforce

SPEAKER

Kathryn Chapman BSc (hons) MSc AACP LCCP and
Dr Kyrie Wheeler BSc (hons) BMBS PGDip MSc LCCP

The discussion continues following a new series of articles published in Perfusionist in 2022.

The aim is to discuss a series of working patterns and opinions shared by UK Perfusionists who have taken part in various social surveys covering 2021/2022. Current attitudes and outlooks will be presented including statistics and demographics about current opinions, ages and genders will be explored.

The series of articles in Perfusionist has been written to look at disparity and discrimination within our own workforce. The publications wanted to delve into peer-to-peer opinions to ascertain how to improve our working lives, and how to maintain a sustainable workforce.

18 ABSTRACT SCHEDULE NUMBER

Thoracoabdominal aortic aneurysm repair - Perfusionist perspective

SPEAKER

Bruno Claro
Bart's NHS Trust

Open surgical repair remains the gold standard operation for thoracoabdominal aortic aneurysm (TAAA). Modern surgical approaches balance the need to maximize long-term benefit by replacing as much diseased aorta as possible with limiting ischemia-related risk to the spinal cord and other organs. (1)

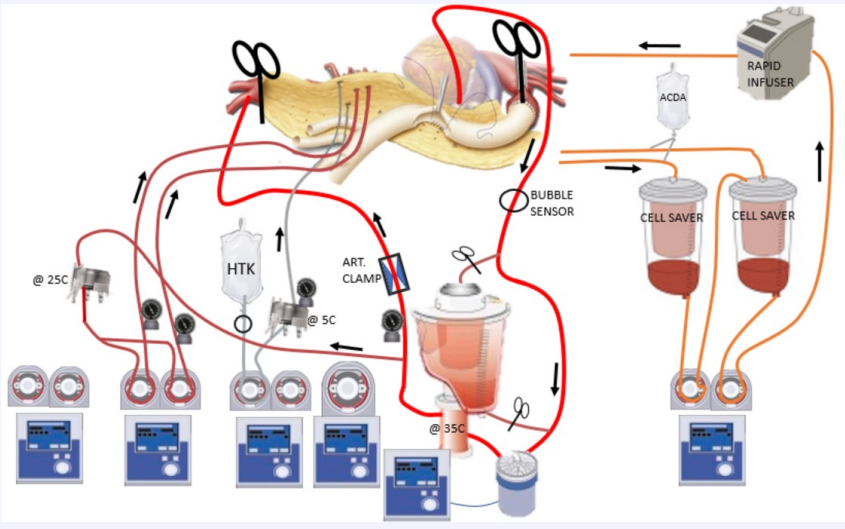
Simple cross-Clamping, no matter how fast the surgeon proceeds, doesn't provide this protection, it produces visceral ischemia, particularly at the level of the spinal cord and the kidneys, and stresses the heart due to an abrupt increase of the afterload. (2)

At St Barts we use Left Heart Bypass (LHB) to reduce end-organ ischemia, to support the heart, and control proximal hypertension. Oxygenated blood is withdrawn from the left atrium (via the left pulmonary vein) and reinfused, using a centrifugal pump, into the distal circulation below the distal aortic clamp. The visceral flow is diverted from this circuit and delivered selectively at 25C with the additional use of two roller pumps and a coated cardioplegia Heat Exchanger.

Since the discontinuation of coated heat-exchangers for high flows on the market that we use a coated oxygenator in the circuit to keep the patient's blood temperature at 35C while keeping the activated clotting time (ACT) around 300s. A hard-shell venous reservoir is connected in parallel to the circuit allowing easy and quick conversion to full bypass if required. Renal protection is achieved administering Custodial solution at 5C with a roller pump via a cardioplegia heat exchanger.

Blood loss is collected via two cell-saver reservoirs and Citrate is used to prevent clotting. To return the volume quickly and preserve the clotting factors, the blood is diverted with two roller pumps to a Belmount Infuser where is rewarmed and transfused via the patient's central catheter.

This study will describe in detail the preparation and management of LHB at St Barts Hospital.



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2. Crawford ES, Crawford JL, Safi HJ, Coselli JS, Hess KR, Brooks B et al. Thoracoabdominal aortic aneurysms: preoperative and intraoperative factors determining immediate and longterm results of operations in 605 patients. J Vasc Surg 1986;3:389-404

19 ABSTRACT SCHEDULE NUMBER

Hemosep® blood ultrafiltration system application in ascending aorta, aortic root and aortic valve replacement in a patient instructing the exclusion of homologous blood products

SPEAKER

Katrina Zielinski
Nottingham University Hospitals

Use of the Hemosep® ultrafiltration system in a patient admitted to NUH City Hospital with 7.4cm ascending aortic aneurysm, 4.7cm aortic root and aortic valve regurgitation. Spiritual beliefs prohibited transfusion of any donated blood products or reinfusion of autologous blood that left the body. Patient preoperative haemoglobin was 157g/L, but platelets were 152 g/L.

Intra Operative Cell Salvage (IOCS) was attached in a continuous loop to the patient but not used to process blood during the procedure. IOCS acted as a continuous loop to which another blood conservation technique could be implemented. Although IOCS provides an excellent method of preserving Red Blood Cells (RBCs) it does not preserve platelets. The use of the Hemosep® (Advancis Medical) ultrafiltration device was favoured as patient preoperative platelet levels were low. In addition to RBCs preservation, this system also retains white blood cells and platelets that would otherwise be lost following IOCS. Following central cannulation the patient underwent 274 minutes of cardiopulmonary bypass (CPB) at a temperature of 32℃. Cross-clamp (XC) time was 237 minutes and myocardial protection was achieved using intermittent antegrade and retrograde blood cardioplegia.

Blood was collected and processed from a central cell saver reservoir, and diverted to the Hemosep® ultrafiltration device. 9 bags were used, with the majority used after the case to concentrate the residual pump volume. After processing, patient Hb was 141g/L and platelets were 130g/L, rising to 189g/L seven days after surgery.

This case demonstrated the ability of the team to adapt their practice to provide a safe outcome whilst accommodating the patients' beliefs. The Hemosep® system is a safe device for use in non-transfusion surgery and can enhance mean platelet count post-surgery compared to conventional cell salvage therapy alone. The patient made a full recovery and was discharged without any complications.