Perfusionist

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Editorial

John Campbell, *Editor*

Our July & August 2018 summer edition of the *Perfusionist* has been produced as we enjoy our most wonderful summer for many years. As we head towards the consequential hose pipe ban and water shortages, signs that truly indicate a summer has met the requirements to be classed as outstanding. So despite the challenges of the heatwave conditions our contributors both national and international have delivered a wide selection and range of articles that I hope you will find of interest.

Claus Preusse Professor at the Department of Cardiac Surgery in Bonn University has written an article titled Time to Reconsider the 'Cardioplegia Paradigm'. The article focusses on the uses of Custodiol cardioplegia that has recently become the essential method of protecting the myocardium amongst centres performing minimal invasive procedures in GB & Ireland.

Mette Larsen of the University Hospitals Plymouth NHS Trust has written a report on the 3rd MiECT Symposium of the Minimal Invasive Extra Corporeal Technologies International Society in Bern, Switzerland that took place in June 2018. Mette describes in detail the proceedings of this informative meeting as well as the intricacies of Swiss national customs. Here in the UK we may need to take note for post March 29th 2019.

Gareth Owens, Chair of the Aortic Dissection Awareness campaign in the UK & Ireland has submitted a fascinating and telling article on his experiences as a patient. Gareth kindly agreed to write the article after I met him following his inspiring presentation at the SCTS meeting in Glasgow earlier this year. Describing both his experiences and his association with the great work of the Aortic Dissection Awareness campaign.

Colin Green our resident correspondent from Denmark has produced an informative article on Bubble Oxygenators titled "A little bit of history and some of the bubblers used in the UK between about 1960 and 1985". This work describes the staple of oxygen delivery until the arrival of the membranes that we know today.

Our Andalusian correspondent Señor Richard Mason has written for us from the equally sunny climes of the Iberian Peninsula. Richard recounts his recent experiences on the periphery of the Sistema Nacional de Salud. We also have an insight to his adventures consisting of navigating the legal system, retirement, Kippers in the East End and his contributions to exacerbate the Euro wide CO_2 shortage with representatives of the Perfusion communities' ex-Chairman's club.

There are also some very over generous comments regarding the recent fortuitous efforts of my tenure as Editor. Richard reflects also rather too harshly on his own marathon Editorship. The consistency of his own efforts in that period ensured that the *Perfusionist* still exists today.

This year's Perfusion Congress and AGM is fast approaching. We have a final call for abstracts to be submitted for the scientific sessions. The scientific sessions are the core of the congress. Please support the Congress and submit any work that you may be undertaking. This year sees the challenge of the new format introduced to ensure ethical compliance with industry requirements. All necessary AGM registration documentation is available on the SCPS webpage. This has been a colossal challenge for the Meetings and Seminars committee that have worked so hard to get this compliant system in place.

Nomination papers have been mailed for proposals for committee members. Please give this rewarding opportunity careful consideration. Our Chairman Andy Heggie has written in detail on these opportunities in his update article.

Ian Harvey has delved back to 1986 in the Oxford archive and has reproduced an original classic from the Brook Hospitals Fisher era, "The comparison of three techniques of concentrating the blood remaining in the pump circuit post bypass". The article was produced during the infancy of Cell Salvage technology that has now become a routine part of our practice. Tony has also kindly submitted comments surrounding the investigation and relevance of the work undertaken.

The NHS in GB has reached its anticipated 70th birthday virtually intact, though a little frayed around the edges. Celebrations have been held nationwide to mark this momentous occasion and the Government announced its intended gift of some increased funding.

In this intervening 70-year period the Perfusion profession was created and developed. It has seen seen the dawn of cardiac surgery on these Islands beginning 65 years ago on April 17th1953 in London with the first bypass procedure using a heart lung machine for a closed valvotomy for aortic stenosis in a 30-year-old woman. The procedure using support bypass was undertaken by "Melrose, Bentall & Cleland together with a group of keen technicians and devoted nurses"[1]. This milestone contained within the history of the NHS has taken us into the cutting edge of the modern era that includes advances in transplantation and the emergence of minimal invasive cardiac surgery using robotics. It is difficult to imagine what Perfusion as a profession will look like in the next ten to twenty years let alone the next seventy.

The increasing complexity of procedures in today's NHS on an aging adult population with multiple comorbidities, especially in cardiac surgery, can only be regarded as the NHSs greatest success is becoming for Perfusionists our greatest challenge. However, "the greatness of any nation can be measured by the health of its people", often misquoted and misappropriated but accurate. We have to hope that the values of the above quote will help support the continued evolution of the NHS and its associated core principles.

On behalf of the *Perfusionist* production team we hope you enjoy the rest of the stunning summer weather that we are enjoying and hope that you have the opportunity to have a restful holiday period.

[1] Towards safer cardiac surgery, Longmire D.B (Ed) Springer; 1980

Aortic Dissection: A Patient Perspective

Gareth Owens, MSc. (Oxon), MBCS, CITP
Chair, Aortic Dissection Awareness (UK & Ireland)

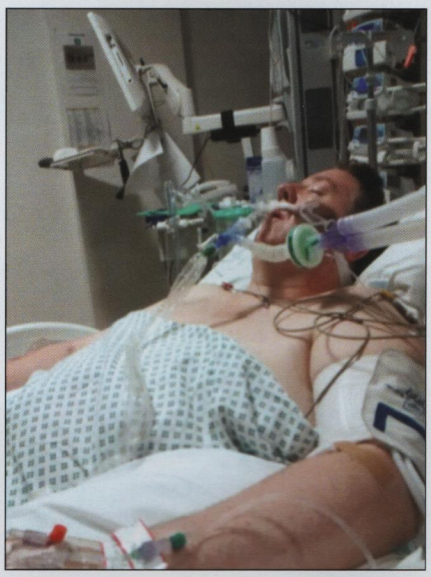
'Perfusion' was not a regular part of my vocabulary for the first 50 years of my life. Neither had I required the services of a Clinical Perfusionist. All that changed on 23rd March 2016. While away from my home in North Yorkshire on business in the City, I experienced an Aortic Dissection (AD).

The events that led to my encounter with the profession were not entirely unexpected. My father died of an AD aged 49 caused by Marfan Syndrome – an inherited disorder of connective tissue which affects the eyes, joints, lungs and heart. Patients with Marfan Syndrome have a weakened Aortic wall and this often leads to Aortic aneurysm and dissection. I inherited Marfan Syndrome from my father, so when my Aorta dissected, I was aware of the condition and was able to say to my friend in the pub: 'Call an ambulance, tell them I have Marfan Syndrome and that I'm having an Aortic Dissection'.

There are approximately 3,900 Aortic Dissection incidents like mine in the UK each year[1]. Aortic Dissection is a life-threatening medical emergency, yet only around 1,200 of these patients are admitted to hospital[2] and less than 500 go on to receive surgery[3]. This last statistic creates the impression that AD is a very rare condition, when actually in the UK our problem is not the rarity of the condition, but lack of awareness, misdiagnosis in the emergency setting and delay in the transfer of patients to specialist Aortic centres for treatment. A recent national study by the Department of Cardiovascular Sciences at the University of Leicester also showed that there is an unwarranted regional variation in the provision of care for Thoracic Aortic Disease across the UK[4].

I had no idea about any of this while, by sheer good fortune, I followed the best clinical pathway for Aortic Dissection that I could possibly have wished for. I was blue-lighted to a nearby major Trauma centre and was immediately assessed by the on-call consultant vascular surgeon, who is an expert in AD. Within 30 minutes of arrival I had a CT-scan of my Aorta, the only definitive diagnosis for AD. Meanwhile, the specialist Aortic surgery multi-disciplinary team (including a Perfusionist) were on standby to intervene and save my life.

There are two basic types of AD. Type A dissection, where the primary tear occurs in the ascending aorta or the aortic arch, is associated with a mortality of 1% per hour[5] and requires immediate surgery. Type B dissection, where the primary tear occurs at or below the left sub-clavial artery, can be managed medically in simple cases, but in complex cases it also requires surgery, although there is often more time to plan the intervention[6].



My CT scan showed that I had a Type B dissection from the left sub-clavial artery down into the iliac arteries bilaterally, with a 6cm aneurysm in my chest and a 4.5cm aneurysm in my abdomen. I was transferred from the Royal London Hospital to Barts Heart Centre, where the Aortic MDT discussed my case and decided on a strategy of 'staged replacement of the aortic tree'. This would involve two major open surgeries. In the first procedure, a team led by Professor Rakesh Uppal at Barts Heart Centre replaced my descending thoracic aorta from left sub-clavial artery to approximately the level of T6 with a Dacron graft, during a period of left-heart bypass. I don't remember meeting my Perfusionist, but I am grateful to him/her for the success of the left-heart bypass and for the 6 units of blood I required, which seemed like a lot at the time.

In most centres, that would have been it. The cardiothoracic surgeons would have done their work and any future problems distal to the initial graft, for example in the infrarenal aorta, would mean a separate referral to the vascular surgeons. However, the great teamwork in the Barts MDT model meant that, from the outset, the approach was to care for my whole aorta and work together as a multi-disciplinary team to deliver the best possible outcome for me, the patient. There is plenty of evidence in the literature that multi-disciplinary teamwork delivers better outcomes in Aortic Dissection[7, 8]. It was my good fortune to be treated at one of the few centres in the UK which has already re-organised Aortic services and implemented this model.

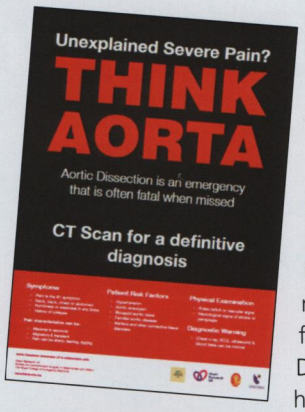
Unsurprisingly, tightening up my descending thoracic Aorta by replacing my 6cm diameter aneurysm with a 2.6cm diameter Dacron tube altered the blood flow somewhat, which had consequences for the distal Aorta. My infrarenal AAA grew from 4.5cm to 6cm over the next 6 months, meaning that it was time for stage 2 of the surgery. In May 2017, a team led by Mr Paul Flora and Mr Sandip Sarkar at the Royal London Hospital performed an open repair of my infrarenal Aorta and iliac arteries, using a Dacron 'trouser' graft. This was a very challenging procedure,

both for the team and for me. Massive blood loss was the biggest risk and despite the use of cell salvage, I needed a 30-litre blood transfusion. The 6 units required during my first procedure didn't seem like much anymore! By comparison, my second operation was a very close call. After 10 hours of surgery, the team stopped and shipped me off to ICU, still open but with my abdomen packed. The wonderful Critical Care team at the Royal London Hospital were able to keep me alive and stabilise me, so that I could return to theatre the next morning for the surgery to be completed. Once again, I did not meet my Perfusionist, but it sounds as though they may have had their work cut out on this occasion. If you are reading this at the Royal London Hospital and you remember the big case on 11th May 2017, thank you so much!

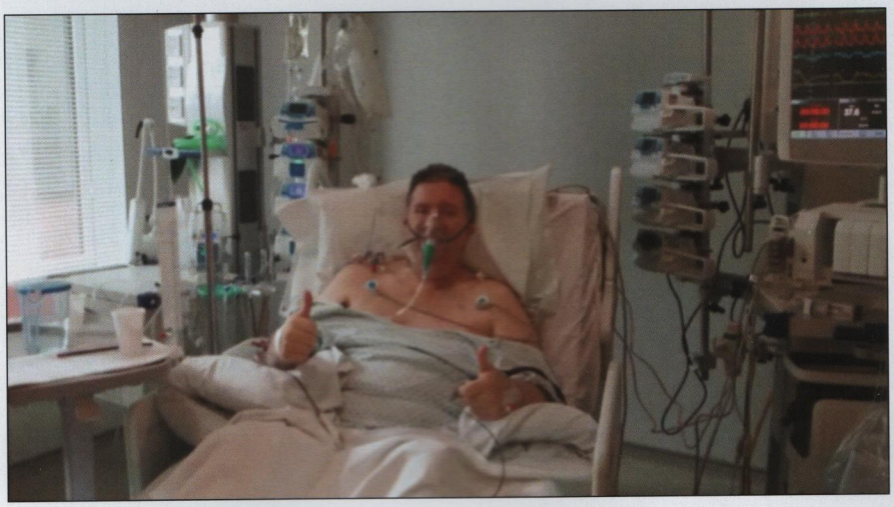
I presented as a complex and challenging set of clinical circumstances – a patient with extensive, acute, Type B Aortic Dissection, with Marfans Syndrome making the Aorta fragile and difficult to repair. What I needed and was lucky enough to find was a multi-disciplinary team that would care for my whole Aorta. As a direct result of this team approach, I'm alive, I have no paralysis, no cardiac deficit, no neurological deficit, no organ ischaemia, no limb ischaemia, I'm a candidate for minimally-invasive Aortic surgery in the future should it be required and in the meantime, I have annual cardiology follow-up with Echo and MRI. I am living proof that multi-disciplinary teamwork delivers better outcomes for AD patients.

As Chair of our national Patient Association, Aortic Dissection Awareness (UK & Ireland), I want every patient affected by AD to benefit from the same standard of care and treatment that I was fortunate enough to receive. As the Government sets out to tackle healthcare inequalities, I think it's time to end the unwarranted regional variation in the provision of care for Thoracic Aortic Disease. What the UK needs is a national network of specialist Aortic Centres, where true multi-disciplinary teamwork and dedicated Aortic expertise, available 24x7, are the norm. If we create a network of 8-10 such centres, with no patient living more than 2 hours away from one, many lives can be saved. We at Aortic Dissection Awareness (UK & Ireland) are working with clinicians, with the professional societies and with NHS England to raise awareness of Aortic Dissection in the emergency setting and to improve diagnosis and treatment through education and through the re-organisation of services.

With the Royal College of Emergency Medicine, we recently released an educational podcast and poster about Aortic Dissection that can be downloaded from our campaign website here: www.thinkaorta.org. Later this year, NHS England will publish a new service specification for Thoracic Aortic Dissection on which we have been collaborating. We expect that implementation of these two initiatives will start to change the landscape in the UK for the diagnosis and treatment of Aortic Dissection and will save the lives of many patients who are currently dying unnecessarily.



Clinical Perfusionists are key members of the multi-disciplinary teams that are the most effective way to treat Aortic Dissection. Most patients do not get the opportunity to meet their Perfusionist while awake. Therefore, on behalf of AD Awareness (UK & Ireland), I would like to pass on the thanks of all AD survivors for the role that you play in saving our lives. We hope to create more business for you in the future!



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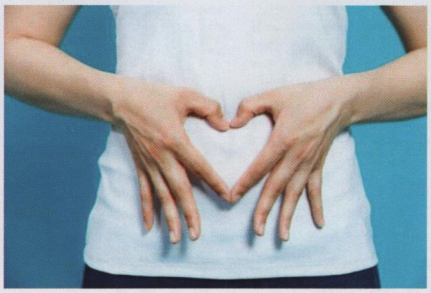


When the team gave the affected mice a probiotic treatment of *Lactobacillus murinus*, alongside the high salt diet, their blood pressure returned to normal, decreased the number of TH17 cells and minimised the symptoms of the encephalomyelitis.

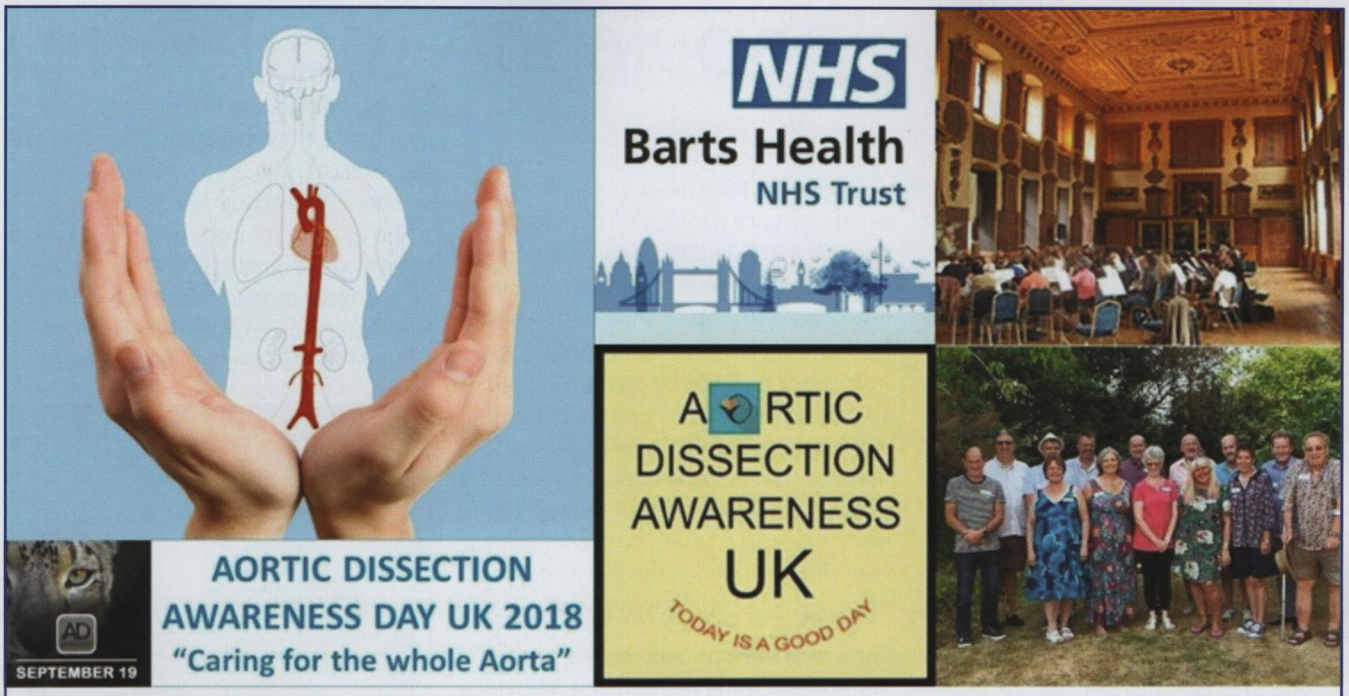
They took the next steps and gave twelve healthy men six extra grams of salt every day for a fortnight — doubling their salt intake. It wouldn't be ethical to continue this long term but at the end of this short trial period, the men's *Lactobacillus* was so low it wasn't detectable in most of them, their blood pressure was higher and they had more TH17 cells in their blood. So it looks like the research stands up in humans, too. Professor Dominik N. Müller said: "We should start to see our gut microbiome as a viable target for treating conditions that we know are aggravated by salt, such as high blood pressure and inflammation.

"We can't exclude the possibility that there are other salt-sensitive bacteria that are just as important as *Lactobacillus* — this could be the tip of the iceberg in targeting gut bacteria for treating serious illnesses."

Our Associate Medical Director, Professor Metin Avkiran said: "We need more research to better understand the links between gut health and cardiovascular health and to determine if probiotics might be useful supplementary treatments for serious conditions such as high blood pressure."

At the BHF we've also recently funded a breakthrough that linked the level of diversity of the 'good bacteria' in our gut to the hardening of the arteries — so it's definitely on our radar, or perhaps that should be under our microscope.

Further information on other BHF related material can be accessed at https://blog.bhf.org.uk/



Aortic Dissection Awareness Day UK 2018

Patient association Aortic Dissection Awareness (UK & Ireland) has awarded Barts Health NHS Trust the honour of hosting Aortic Dissection Awareness Day UK 2018 on 19th September. This flagship event will bring together patients, family members and medical professionals from across the UK and Ireland to discuss and raise awareness of Aortic Dissection – a life-threatening medical emergency which affects approximately 4,000 people in the UK every year.

Attendance is completely free to patients, family members and carers affected by Aortic Dissection and to healthcare professionals with an interest in the field. Numbers are limited, so registration is essential (http://thinkaorta.org)

Hosts: **Mr. Harpaul Flora** and **Prof. Aung Oo** of Barts Health NHS Trust.
Keynote speaker: **Mr. Richard Page**, *President of SCTS.*

PERFUSION CALENDAR

30th to 31st August, 2018
10th Joint Scandinavian Conference in Cardiothoracic Surgery
Copenhagen, Denmark

6th to 9th September, 2018
38th Annual Cardiothoracic Surgery Symposium CREF 2018
San Diego, California, USA

12th to 15th September, 2018
45th ESAO and 7th Biennial IFAO Congress
Madrid, Spain

19th to 21st September 2018
33rd European Association for Cardiothoracic Anaesthetists (EACTA) Annual Congress
Manchester Central UK

5th to 6th October 2018
16th International Symposium on Perfusion of BelSECT
Hotel Le Plaza, Brussels

18th to 20th October, 2018
32nd European Association for Cardiothoracic Surgery (EACTS) Annual Meeting
Milan, Italy

20th October, 2018
18th European Conference on Perfusion Education The European Board of Cardiovascular Perfusionists (EBCP) and Training
Milan, Italy

11th November, 2018
Society of Clinical Perfusion Scientists of Great Britain & Ireland 44th Congress & Annual General Meeting
Warwickshire, UK

6th to 7th December, 2018
British & Irish Society for Minimally Invasive Cardiac Surgery Meeting
Dublin, Ireland

10th to 12th March, 2019
Society for Cardiothoracic Surgery (SCTS) Annual Meeting
QE Centre, London

12th to 14th June 2019
18th European Congress on Extracorporeal Circulation Technology
Grand Hotel Salerno, Salerno, Italy