FRIDAY 16 AUGUST

7:30pm - 10:30pm  **TRAINEES DINNER (TICKETED EVENT)**  
*Venue: Georges on Waymouth*

*Proudly supported by W. L. Gore*

SATURDAY 17 AUGUST

8:30am - 10:00am  **VASCULAR MISCELLANEA: STRATEGIES FOR RARE CASES & RADIATION SAFETY FOR SURGEONS**  
*Hall M*  
*Chairs: Andrew Hill (Auckland) and Nadia Wise (Adelaide)*

8:30am  Welcome  
Conor Marron (Adelaide) and Nadia Wise (Adelaide)

8:35am  Carotid body tumours - my experience and lessons learned  
Paul Blair (Belfast, Ireland)

8:43am  Surgical Management of Paediatric Renovascular Hypertension  
Dawn Coleman (Michigan, USA)

8:51am  Claudication in the young patient - popliteal entrapment or exercise-induced compartment syndrome?  
Pecky De Silva (Sydney)

8:59am  Questions

9:04am  Percutaneous intra-operative veno-venous bypass facilitating resection of retroperitoneal sarcoma involving the inferior vena cava (IVC)  
VA005  
Ryan Cohen (Perth)

9:12am  Surgical management of developmental aorto-mesenteric diseases and aneurysms  
Dawn Coleman (Michigan, USA)

9:20am  Questions

9:26am  'No-Lo' Imaging in Vascular Surgery: A Systematic Review of Innovative No-Radiation and Low-Radiation Imaging Techniques  
VA006  
Li Yu (Adelaide)

9:34am  Radiation safety in vascular surgery - Can we do better?  
Joseph Dawson (Adelaide)

9:42am  Reducing radiation and procedure times for endovascular aortic repair with fusion imaging using a modern hybrid OR  
Robert Rhee (New York, USA)

9:50am  Discussion
10:00am - 10:30am MORNING TEA - SATURDAY
Hall N/O

10:30am - 12:30pm DEEP VENOUS DISEASE
Hall M
Chairs: Peter Subramaniam (Adelaide) and Laurencia Villalba (Wollongong)

10:30am Advanced understanding of deep venous anatomy is critical for planning interventions
Jean Bismuth (Houston, USA)

10:38am Optimising imaging in iliocaval disease
Ewan Macaulay (Adelaide)

10:46am Improving outcomes for patients with leg swelling - What is the evidence for venous intervention?
Lupe Taumoepeau (Wellington)

10:54am Incidence of Asymptomatic Iliac Vein Occlusive lesions in patients with advanced chronic venous insufficiency (C5, C6) and its predictive role in ulcer healing
VA007 Albert Kota (Vellore, India)

11:02am Questions

11:10am Critical components of and technical tips for iliocaval reconstruction
VA008 Toby Richards (Perth)

11:18am Stent design is critical in treating specific venous pathologies
Ewan Macaulay (Adelaide)

11:26am Anticoagulation strategies for management of venous stents
Chris Delaney (Adelaide)

11:34am Early results of a clinical feasibility study for endovenous deep vein valve formation to treat chronic venous insufficiency
VA009 David Robinson (Sydney)

11:42am Endophlebectomy - A discussion of technique
Tim Wagner (Melbourne)

11:50am Questions

11:58am What is the current role of vessel clearance in the management of acute iliocaval thrombosis
VA010 Laurencia Villalba (Wollongong)

12:06pm Factors that Influence the Decision to Place an Inferior Vena Cava Filter
VA011 Elizabeth Lun (Sydney)

12:14pm Management of massive pulmonary embolus - vascular surgeon involvement is critical
VA012 Laurencia Villalba (Wollongong)

12:22pm Questions

12:30pm - 1:30pm LUNCH - SATURDAY
Hall N/O
12:30pm - 1:30pm  
**LUNCHTIME SYMPOSIUM: GREAT AORTIC ENDOGRAFTING QUESTIONS: WHAT DOES THE DATA REVEAL (TICKETED EVENT)**  
Hall M  
Proudly supported by W. L. Gore

1:30pm - 3:00pm  
**ACHIEVING BEST RESULTS IN PERIPHERAL VASCULAR RECONSTRUCTION**  
Hall M  
**Chairs:** Robert Fitridge (Adelaide) and Juanita Muller (Brisbane)

1:30pm  
Peripheral vascular disease: Does being on a tablet mean it is working?  
**VA013**  
Jana-Lee Moss (Perth)

1:38pm  
Antiplatelet strategies in PVD - What we can learn from cardiology  
**VA013**  
Derek Chew (Adelaide)

1:46pm  
Questions

1:50pm  
Crossing CTOs: Technology vs technique  
**Catherine Thoo (Hobart)**

1:58pm  
Australian single-centre outcomes using HawkOneT directional Atherectomy and drug coated balloon for femoro-popliteal peripheral arterial disease  
**VA014**  
Angie Arnold (Adelaide)

2:06pm  
Drug coated balloon angioplasty: What can be learned from a prospective analysis of patients undergoing femoro-popliteal interventions  
**Robert Rhee (New York, USA)**

2:14pm  
Drug eluting stents - a vital tool in our armamentarium  
**Thodur Vasudevan (Hamilton)**

2:22pm  
Questions

2:30pm  
Too old for a bypass?  
**VA015**  
Sinead Gormley (Wellington)

2:38pm  
What is the role of hybrid revascularisation in peripheral vascular reconstruction?  
**Juanita Muller (Brisbane)**

2:46pm  
Endovascular management of lower limb aneurysms in a tertiary vascular centre.  
**VA016**  
Magnus Cheesman (Hamilton)

2:54pm  
Discussion

3:00pm - 3:30pm  
**AFTERNOON TEA - SATURDAY**  
Hall N/O

3:30pm - 5:30pm  
**JUNCTIONAL AORTIC PATHOLOGY**  
Hall M  
**Chairs:** Catherine Thoo (Hobart) and Tim Wagner (Melbourne)

3:30pm  
How is technology improving our creep across the arch? Branched thoracic devices and their design limitations  
**Jean Bismuth (Houston, USA)**

3:38pm  
Contemporary management of TAA  
**Thodur Vasudevan (Hamilton)**
3:46pm  Stent design has improved options for management of Type 4 TAA  

Cherrie Abraham (Portland, USA)

3:54pm  Questions

4:02pm  Stents for the management of branch vessels - What are the critical aspects of design and performance?  

Jean Bismuth (Houston, USA)

4:10pm  Fenestrated repair remains the gold standard for the short aortic neck  

Cherrie Abraham (Portland, USA)

4:18pm  Heli-FX in the management of complex aortic disease - midterm results from the Anchor registry  

Brant Ullery (Portland, USA)

4:26pm  Challenging aortic neck anatomy - Update on the US IDE clinical trial on the new Gore conformable Excluder AAA device  

Robert Rhee (New York, USA)

4:34pm  Questions

4:42pm  Preservation of the hypogastric artery - Has technology improved outcomes?  

Sukgu Han (Los Angeles, USA)

4:50pm  Epidemiology of fatal ruptured aortic aneurysms in the United States (1999-2016)  

Ross Milner (Chicago, USA)

VA017

4:58pm  *Serum miRNAs associated with the presence and rapid expansion of abdominal aortic aneurysms  

Vikram Iyer (Christchurch)

VA018

5:06pm  Aorto-iliac occlusive disease - Limitations of stent design for solving the problem  

Jean Bismuth (Houston, USA)

5:14pm  Aorto-iliac occlusive disease - Complete coverage with AFX is of benefit  

Phillip Puckridge (Adelaide)

5:22pm  Discussion

5:30pm - 6:30pm  WELCOME RECEPTION (TICKETED EVENT)  

Hall N/O

The inaugural Shark Tank, supported by the ANZSVS, will be held during the welcome reception. This is a special session introduced this year to showcase innovation in vascular surgery. Evaluated by four experts (the Sharks) and presented in front of a live audience of voters, cash prizes will be awarded to the winning proposal(s).

SUNDAY 18 AUGUST

8:30am - 10:00am  CRITICAL ISSUES FOR ANZSVS MEMBERS - SERVICE PROVISION AND WORKFORCE  

Hall M  

Chairs: Pecky De Silva (Sydney) and Andrew Hill (Auckland)

8:30am  Re-configuring Vascular Services - what are the critical issues and what lessons can we learn?  

Paul Blair (Belfast, Ireland)
8:38am State-wide vascular services: The WA experience
    Nishath Altaf (Perth)

8:46am Run away.. Moving away from run-based angiography remuneration and the MBS review
    Roxanne Wu (Cairns)

8:54am Questions

9:00am What do younger fellows need from the society?
    Sarah Aitken (Sydney) and Pecky De Silva (Sydney)

9:08am Establishing a vascular-surgical specific continuing professional development program
    Anthony Freeman (Sydney)

9:16am Training in complex aortic endovascular procedures
    Sukgu Han (Los Angeles, USA)

9:24am Questions

9:30am Burnout among vascular surgeons: A report from the SVS Wellness Committee
    Dawn Coleman (Michigan, USA)

9:38am Dealing with Professional Misconduct
    Paul Blair (Belfast, Ireland)

9:46am The industry experience of clinical engagement - What is critical?
    Kyle Marr

9:54am Questions

10:00am - 10:30am MORNING TEA - SUNDAY
    Hall N/O

10:30am - 12:30pm AORTIC CONTROVERSIES
    Hall M
    Chairs: Jean Bismuth (Houston, USA) and Juanita Muller (Brisbane)

10:30am Acute thoracic aortic pathologies - Which patients require surgical intervention?
    Catherine Thoo (Hobart)

10:38am Imaging to predict outcomes in Type B aortic dissection
    Jean Bismuth (Houston, USA)

10:46am Uncomplicated type B aortic Dissection - Identifying the 'at risk' uncomplicated patient
    Vik Puttaswamy (Sydney)

10:54am Questions

11:02am The use of branched endografts for the aortic arch in the endovascular era
    Cherrie Abraham (Portland, USA)

11:10am New Generation TEVAR device - How Navion is designed to improve overall TEVAR
    therapy while on a low-profile platform
    Brant Ullery (Portland, USA)

11:18am New generation TEVAR devices - Avoiding windsocking and birdbeaking with new stage
    deployment control
    Jean Bismuth (Houston, USA)

11:26am Type B Aortic dissection - management of the false lumen - technique versus technology
    Cherrie Abraham (Portland, USA)
11:34am  Type B Aortic dissection - chronic dissection management - critical technology advances in improving outcomes  
          Sukgu Han (Los Angeles, USA)

11:42am  Questions

11:50am  Classification of endoleaks after endovascular treatment of Stanford Type-B aortic dissections  
          VA019  Ross Milner (Chicago, USA)

11:58am  How the AAA endurant device improves EVAR’s value: Treating more challenging infrarenal patients with excellent long-term outcomes  
          Brant Ullery (Portland, USA)

12:06pm  Type 2 endoleaks and their influence on long-term outcomes: Insights from the ENGAGE global registry  
          Brant Ullery (Portland, USA)

12:14pm  Image guided translumbar embolisation of type 2 endoleaks: the results of multicentre experience  
          Robert Rhee (New York, USA)

12:22pm  Questions

12:30pm - 1:30pm  LUNCHTIME SYMPOSIUM: THE FREEDOM TO DO MORE WITH A NEXT GENERATION CONFORMABLE AND LOW-PROFILE THORACIC ENDOGRAFT (TICKETED EVENT)  
          Hall M  Chair:  Phillip Puckridge (Adelaide)

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Behind the Design  
Randy Bassett

Managing the Fragile Aorta  
Brant Ullery (Portland, USA)

Q&A with the Panel

12:30pm - 1:30pm  THE BOARD OF VASCULAR SURGERY - SUPERVISORS AND TRAINERS MEETING  
          City Suite 4

12:30pm - 1:30pm  LUNCH - SUNDAY  
          Hall N/O

1:30pm - 3:00pm  TRAINEES RESEARCH PAPER SESSION AND PLENARY LECTURE  
          Hall M  Chairs:  Tim Wagner (Melbourne) and Roxanne Wu (Cairns)

Judge panel: Chris Delaney, Sarah Aitken and Anthony Freeman

Presentations marked with an asterisk are eligible for trainee research paper prize consideration.

1:30pm  Trainee research collaboratives in improving vascular academic output in ANZ  
          Sarah Aitken (Sydney)
1:45pm  *Non-iatrogenic vascular injuries in children - A 12-year experience from a single paediatric tertiary trauma centre  
VA020  Imran Kader (Canberra)

1:53pm  *The short-term effects of treadmill exercise on circulating sub-populations of monocytes in patients with intermittent claudication  
VA021  Simon Vun (Sydney)

2:01pm  *Histopathology of venous in-stent restenosis  
VA022  Cameron Robertson (Brisbane)

2:09pm  *The impact of marital status on mortality in a cohort of aortic aneurysm patients.  
VA023  Zoheb Williams (Hamilton)

2:17pm  *Does major lower limb amputation in Australia and New Zealand occur in seasonal peaks?  
VA024  Samantha Khoo (Sydney)

2:25pm  Prolonged persistent hypotension following carotid artery stenting: A real-world experience  
VA025  Olufemi Oshin (Perth)

2:33pm  Plenary: The role of the vascular surgeon in modern management of vascular trauma  
Paul Blair (Belfast, Ireland)

3:00pm - 3:30pm  AFTERNOON TEA - SUNDAY  
Hall N/O

3:30pm - 5:30pm  THE DESERT FOOT AND COMPLEX TIBIAL DISEASE  
(Combined with: Nursing)  
Hall M  
Chairs:  Miguel Montero-Baker (Houston, USA) and Catherine Thoo (Hobart)

3:30pm  Are there differences in outcomes between diabetic and non-diabetic patients in CLTI?  
Robert Fitridge (Adelaide)

3:38pm  WIfI staging versus direct revascularisation as a predictor of wound healing  
Miguel Montero-Baker (Houston, USA)

3:46pm  Angiosome based revascularisation strategies in the modern vascular era  
Conor Marron (Adelaide)

3:54pm  Contemporary assessment of perfusion - Are conventional methods outdated?  
Pecky De Silva (Sydney)

4:02pm  How do we know when we have enough perfusion?  
Miguel Montero-Baker (Houston, USA)

4:10pm  Questions

4:18pm  Atherectomy in the tibials can reduce amputation rates in CLTI patients  
Vik Puttaswamy (Sydney)

4:26pm  Reconstruction of the pedal arch - Respect it or lose it  
Tim Wagner (Melbourne)

4:34pm  Deep Venous Arterialisation - Who, when and how?  
Miguel Montero-Baker (Houston, USA)

4:42pm  Endovascular Case Quotas - Are these sufficient for training in complex endovascular procedures  
Tim Wagner (Melbourne)

4:50pm  Questions
4:58pm  Gene therapy in PVD  
Joseph Dawson (Adelaide)  

5:06pm  Are DCBs relevant in the tibial space?  
Phillip Puckridge (Adelaide)  

5:14pm  The Paclitaxel controversy - the final word?  
Vik Puttaswamy (Sydney)  

5:22pm  Questions  

5:30pm - 6:30pm  THE ANZSVS ANNUAL GENERAL MEETING  
Hall M  

7:30pm - 10:30pm  CONFERENCE DINNER (TICKETED EVENT)  
Venue: Adelaide Oval  

MONDAY 19 AUGUST  

7:00am - 8:20am  WOMEN IN VASCULAR SURGERY BREAKFAST SESSION  
River Bank Room 5  

8:30am - 10:00am  RESEARCH PAPERS AND POSTER PRIZE PRESENTATIONS  
City Room 2  
Chairs: Robert Fitridge (Adelaide) and Lupe Taumoepeau (Wellington)  

8:30am  The risk of MR-detected carotid plaque hemorrhage on recurrent or first-time stroke: a meta-analysis of individual participant data  
VA027  
Nishath Altaf (Perth)  

8:38am  Hydrogen peroxide production and atherosclerotic plaque stability in symptomatic and asymptomatic carotid artery stenosis  
VA029  
Margarete Mueglich (Adelaide)  

8:46am  Carotid artery stenting and carotid endarterectomy - A comparison of long-term outcomes from a moderate volume centre  
VA031  
Edward Wang (Perth)  

8:54am  Combined carotid endarterectomy and coronary artery bypass - Outcomes from a single tertiary Australian centre  
VA032  
Abraham Rizkalla (Sydney)  

9:02am  Development and validation of a multivariable prediction model of perioperative mortality in vascular surgery: The New Zealand vascular surgical risk tool (NZRISK-VASC)  
VA033  
Jee-Young Kim (Auckland)  

9:10am  Gentamicin-impregnated collagen may reduce deep space infections after open arterial revascularisation  
VA035  
Adam Zhao (Perth)  

9:18am  av-Guardian in haemodialysis: First in man trial for self-needling  
VA037  
Thodur Vasudevan (Hamilton)  

9:26am  Functional movement training as a novel treatment for functional popliteal entrapment syndrome  
VA039  
Kam Fai Ho (Brisbane)
The effect of foot orthoses on foot biomechanics and gait in patients with intermittent claudication

VA041
Annelize Ebeid (Adelaide)

8:30am - 10:00am

RESEARCH PAPERS
City Room 1
Chairs: Sarah Aitken (Sydney) and Richard Ward-Harvey (Gold Coast)

8:30am
Survival following intact abdominal aortic aneurysm repair: Contemporary analysis by treatment method

VA026
Zoe Vincent (Auckland)

8:38am
A large single-centre covariate adjustment analysis of short term and 5-year outcomes after EVAR in female and male patients

VA028
Rebekah Tan (Perth)

8:46am
Gender defines abdominal aortic aneurysm outcomes post endovascular aneurysm repair (EVAR)

VA030
Tahmina Anwari (Perth)

8:54am
Acute aortic syndrome assessment in a tertiary emergency department

Ian Barry (Perth)

9:02am
Biomechanical method predicts clinical events in patients with abdominal aortic aneurysm: A prospective multicentre study

VA034
Barry Doyle (Perth)

9:10am
Using a discrete event-simulation model to predict survival of patients with an abdominal aortic aneurysm

VA036
Manar Khashram (Hamilton)

9:18am
Results of the endurant stent graft system in challenging abdominal aortic aneurysm anatomy

VA038
Oliver Ash (Perth)

9:26am
Predicting complication in acute Type B aortic dissection: A surgical perspective

VA042
Bijit Munshi (Perth)

9:34am
Predicting complication in acute Type B aortic dissection: An engineer’s perspective

VA040
Louis PARKER (Perth)

9:42am
The relationship between operative volume and perioperative mortality after non-elective aortic aneurysm repair in Australia

VA043
Michael Sawang (Sydney)

9:50am
A technique to produce 3D printed guides for backtable physician modified stent grafts

VA044
Jasamine Coles-Black (Melbourne)

10:00am - 10:30am

MORNING TEA - MONDAY
Hall N/O

10:30am - 12:30pm

CHALLENGE THE EXPERTS
City Room 1/2
Chairs: Anthony Freeman (Sydney) and Nadia Wise (Adelaide)

Panel A: Dawn Coleman, Tim Wagner, Paul Blair and Sarah Aitken

10:30am
Looks can Kill

Damen Fagg (Gold Coast)

10:45am
Come here, you!

Simon Vun (Sydney)
11:00am  Not so common after all  
     Angie Arnold (Adelaide)
11:15am  Young and ?free  
     Albert Kota (Vellore, India)

Panel B: Sugku Han, Phil Puckridge, Roxanne Wu and Laurencia Villalba

11:30am  Yuk!  
     Samiul Islam (Sydney)
11:45am  That lady needs a hand!  
     Ina Liang (Gosford)
12noon  Gut Wrenching  
     Vivienne Moul (Brisbane)
12:15pm  I need a knife – STAT  
     Rohan McLachlan (Sydney)

12:30pm - 1:30pm  LUNCH - MONDAY  
     Hall N/O

1:30pm - 3:00pm  SUPERFICIAL VENOUS DISEASE  
     City Room 1/2  
     Chairs:  Ewan Macaulay (Adelaide) and Laurencia Villalba (Wollongong)

1:30pm  Pelvic congestion syndrome - An untapped potential for venous treatment  
     Laurencia Villalba (Wollongong)
1:38pm  Management of Pelvic Congestion Syndrome - Which devices should we use? 
     VA045  Michael Wilks (Adelaide)
1:46pm  Balancing income with outcomes in varicose vein management 
     Pecky De Silva (Sydney)
1:54pm  Questions

2:00pm  Training in varicose vein surgery  
     Ben Thurston (Adelaide)
2:08pm  What is the optimal treatment for venous ulcers in light of the EVRA trial 
     Dawn Coleman (Michigan, USA)
2:16pm  Neovascularization after endovenous laser ablation, a cause of truncal recurrence 
     VA046  Samantha Khoo (Sydney)
2:24pm  Management of varicose veins in the setting of deep venous insufficiency 
     Dawn Coleman (Michigan, USA)
2:32pm  Questions

2:40pm  The fate of deep veins below the knee after ultrasound guided foam sclerotherapy for incompetent venous tributaries 
     VA047  Irwin Mohan (Sydney)
2:48pm  Multi-slice strain gauge plethysmography 
     VA048  Albert Kota (Vellore, India)
2:56pm  Questions
POSTERS ABSTRACTS

These posters may be viewed on the screens in the Exhibition area.

VA090P  Systematic review and meta-analysis of the association between intra-luminal thrombus volume and abdominal aortic aneurysm rupture.
         Tejas Singh (Townsville)

VA099P  Vascular Surgeons and Social Media: the future of collaboration, education and awareness.
         Michael Smits (Melbourne)

VA093P  The Relationship Between Procedural Volume and Perioperative Outcome After Carotid Revascularisation in Australia and New Zealand
         Mary Giurgius (Sydney)

VA076P  IVC Tumours Masquerading as Thrombus
         Damen Fagg (Gold Coast)

VA096P  Timing is everything: Time from symptoms to carotid surgery in New Zealand and Australia
         Kari Clifford (Dunedin)

VA053P  A novel use for AFX endoluminal stent graft in the treatment of "shaggy aorta"
         Vincent Chong (Perth)

VA089P  SuperHeROR, an approach to renal access in end stage renal failure - the Australasian experience.
         Magnus Cheesman (Hamilton)

VA049P  Plasma DNA levels as diagnostic biomarker in deep vein thrombosis (DVT)
         Albert Kota (Vellore, India)

VA092P  The measurement of range of ankle movements and foot arch in patients with chronic venous disease (ROAM CVI study).
         Albert Kota (Vellore, India)

VA084P  Preserving the aortic bifurcation after EVAR
         Aman Berry Williams (Townsville)

VA057P  A single surgeon, 11-year experience in the treatment of 180 consecutive infra-renal aortic aneurysms with the endurant stent graft system
         Richard Tjahjono (Sydney)

VA100P  Wound complications in amputation surgery
         Ian Barry (Perth)

VA091P  The endovascular repair of non-iatrogenic penetrating peripheral arterial trauma: A literature review
         Cheyaanthan Haran (Wellington)

VA101P  Wound complications post vascular groin exposure surgery
         Ian Barry (Perth)

VA071P  Getting a Grip: Steps to Produce an Endothelium-lined 3D-printed AAA Phantom
         Jasamine Coles-Black (Melbourne)

VA069P  Fully robotic retroperitoneal lymph node dissection- a fusion of technologies
         Jasamine Coles-Black (Melbourne)

VA097P  Twenty Years of Vascular Surgery Research in Australasia- Defining Future Directions
         Jasamine Coles-Black (Melbourne)

VA070P  Getting a Grip - Producing an Endothelium-lined 3D-printed AAA Phantom
         Jasamine Coles-Black (Melbourne)

VA054P  A potential new classification for iliac artery aneurysms
         Louis Parker (Perth)
VA051P A 5-Year Longitudinal Study of Temporal Artery Biopsies: Diagnosis and Treatment
Christo Creffier (Hamilton)

VA080P Medical management of blood pressure and heart rate in acute type b aortic dissections - a single quaternary centre perspective
Quoc Tran (Sydney)

VA087P Re-intervention rates of endovascular vs. open repair of ruptured abdominal aortic aneurysms - a single quaternary centre perspective
Quoc Tran (Sydney)

VA077P Kidney transplantation using donors with single and multiple renal arteries - Is there a difference?
Quoc Tran (Sydney)

VA072P Incidence and outcomes of thoracic aortic trauma: experience in a New Zealand Level 1 trauma centre
Rossi Holloway (Auckland)

VA067P Estimating the natural growth of popliteal artery aneurysms
Magnus Cheesman (Hamilton)

VA062P Ballerina study - a retrospective review of crossed limbed EVARs
Tishanthan Pathmarajah (Perth)

VA060P An Identification Key for Endovascular Stent Grafts for treatment in Abdominal Aortic Aneurysms
Samantha Khoo (Sydney)

VA078P Low morbidity anatomical revascularisation for infected aorto- bifemoral graft using a staged hybrid procedure.
Joel Ding (Melbourne)

VA085P Prosthetic graft infection and primary mycotic aneurysms - comparison of surgical techniques, an Australian experience
Rohan Arasu (Brisbane)

VA058P Acute and Chronic Venous Obstruction: How we started the service and early results
Judy Wang (Melbourne)

VA082P Mycotic aortic aneurysms and infected vascular grafts: the Northern regional experience
Amy OKAMURA-KHO (Auckland)

VA074P Interim re-analysis of the Katsanos et al Paclitaxel vs. POBA all-cause mortality meta-analysis
Quoc Tran (Sydney)

VA052P A knot in a Pulmonary artery catheter: A simple technique for removal.
Theresa Muwanga-Magoye (Palmerston North)

VA081P Mortality of Paclitaxel Patients in an Australian Vascular Surgical Centre
David Herlihy (Sydney)

VA055P A protocol for Alteplase in Arterial Catheter Directed Thrombolysis: A response to urokinase shortage
Samantha Khoo (Sydney)

VA061P Arch Repair Followed by Completion TEVAR
Sinead Gormley (Wellington)

VA063P Do PD-1 checkpoint inhibitors increase the risk of arterial thromboembolism?
Scarlett Olasope (Wellington)

VA068P Frailty in patients with Critical Limb Ischaemia correlates to functional impairment, dependency and reduced quality of life
Sophie James (Sydney)

VA064P Duplex derived flow measurements of femoral and popliteal arteries
Interrupted deployment of Gore Excluder EVAR main body due to broken deployment strings - 2 cases requiring explantation after failed endovascular salvage.
**David Herlihy (Sydney)**

The role of Open AAA repair in modern surgery: An Audit of the last 100 elective Open AAA repairs at a regional tertiary Australian Hospital.
**Qaasim Dollie (Gold Coast)**

Psoas Muscle Area Does Not Predict Immediate Postoperative Survival, Complications, Length of Stay or Healthcare Cost in Patients with Critical Limb Ischaemia Undergoing Vascular Interventions
**Li Yu (Adelaide)**

The use of vascular closure devices for the management of the arterially placed central line - a single centre experience
**Anantha Narayanan (Wellington)**

A retrospective review of the safety and complications of urokinase and alteplase for catheter-directed thrombolysis in acute peripheral arterial occlusion.
**Bryan McManus (Brisbane)**

Open vs EVAR repair - the Wellington Experience
**Anantha Narayanan (Wellington)**

Endovascular aneurysm repair in octogenarians is safe and effective: propensity matched analysis of mid-term outcomes from the ENGAGE registry
**Joseph Faraj (Perth)**

Reducing radiation exposure in endovascular surgery
**Tishanthan Pathmarajah (Perth)**

Utilisation of TEVAR in the treatment of aortic dissection; An Australian and New Zealand experience.
**Ian Barry (Perth)**

Incraft Graft; Early Experience of a personal series.
**Rebekah Tan (Perth)**

Acute Saddle Aortic Occlusion Treated with Endovascular AngioJetT Peripheral Thrombectomy System
**Chi Lap Nicholas Tsang (Wollongong)**

Endovascular Management of Acute Saddle Pulmonary Embolism Following Lumbar Laminection
**Chi Lap Nicholas Tsang (Wollongong)**

Management of Type 1B Endoleak due to migration of EVAR limb into aneurysm sac, while ensuring preservation of the internal iliac artery
**Lucy Guazzo (Townsville)**
VA005
PERCUTANEOUS INTRA-OPERATIVE VENO-VENOUS BYPASS FACILITATING RESECTION OF RETROPERITONEAL SARCOMA INVOLVING THE INFERIOR VENA CAVA (IVC)

RYAN COHEN, SIMON PARYS, EMMA SIM, SHIRLEY JANSEN, RUPERT HODDER AND JOSEPH HOCKLEY

Sir Charles Gairdner Hospital, Western Australia

Purpose
Resection of retroperitoneal sarcoma (RPS) involving the inferior vena cava (IVC) is a technically challenging procedure associated with significant peri-operative morbidity and mortality. The intraoperative haemodynamic compromise secondary to IVC clamping can be reduced through the utilisation of veno-venous bypass (VVB). Percutaneous placement of catheters for VVB has been shown to have comparable flow rates to open placement without the additional risk of groin complications in early liver transplantation. Our aim is to report the peri-operative outcomes following percutaneous approach for VVB in the context of RPS and IVC resection.

Methodology
An observational study was conducted using a prospectively maintained institutional database of all patients undergoing RPS and IVC en-bloc resection with percutaneous VVB. All procedures were performed at Sir Charles Gairdner Hospital, the Western Australian State Centre for RPS management. Percutaneous access for VVB was established via ultrasound-guided cannulation of common femoral and internal jugular veins following the administration of 5000 units of intravenous heparin.

Results
Five cases were identified between December 2017 and January 2019 where percutaneous VVB support was used for combined RPS and IVC resection. Three IVC resections occurred at an infra-renal level, one supra-renal, and one infra-hepatic. The maximum IVC cross-clamp duration was four hours with a mean duration of 157(+72) minutes. The mean ICU length of stay was 2.7(+1.1) days. There were no intra-operative mortalities or significant peri-operative complications, including cardiovascular events, renal or hepatic failure, graft infections, thrombosis or leaks.

Conclusion
This study describes the first documented use of percutaneous VVB for en-bloc resection of RPS involving the IVC. Our early experience has shown percutaneous VVB to be safe whilst resulting in marked improvement in cardiovascular stability during periods of IVC clamping.

VA006
‘NO-LO’ IMAGING IN VASCULAR SURGERY: A SYSTEMATIC REVIEW OF INNOVATIVE NO-RADIATION AND LOW-RADIATION IMAGING TECHNIQUES

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Purpose
The rapid expansion in endovascular techniques has placed vascular surgeons amongst the most exposed physicians to occupational radiation. Conventional imaging modalities that avoid ionising radiation are largely limited to diagnostic purposes, and as such fail to reduce interventional occupational radiation exposure. However, there are a number of novel no-radiation and low-radiation (‘No-Lo’) imaging techniques in various stages of development within vascular surgery which may significantly reduce occupational radiation exposure during endovascular procedures in the future.

Methodology
We performed a systematic review conforming to PRISMA criteria of No-Lo imaging techniques: novel radiation-free and radiation-reduction vascular imaging techniques published over the last 10 years. Well-established modalities such as MRI and IVUS were not included.

Results
We identified 39 articles reporting 'No-Lo' techniques. We categorised these into 8 groups according to the predominant technology involved: (i) Adaptive Exposure, (ii) Movement Tracking, (iii) Augmented Reality, (iv) Fusion Imaging, (v) Electromagnetic Location Tracking, (vi) Optical Coherence Tomography, (vii) Magnetic Particle Imaging and (viii) Robotics. These techniques are in varying iterations of commercial development but have all been shown to reduce or
eliminate occupational radiation exposure while achieving an acceptable level of imaging and workflow integration into endovascular procedures.

Conclusion
Although promising, most of the ‘No-Lo’ techniques are still in various stages of trial and will need results from real clinical settings to better appreciate their full potential and possible limitations. However, their emergence in clinical use in the near future may have profound implications. It is hoped that ongoing innovation and development of ‘No-Lo’ technologies may one day unshackle endovascular surgery from the unwanted, but currently necessary, dependence on ionising radiation.

VA007
INCIDENCE OF ASYMPOTOMATIC ILIAC VEIN OCCLUSIVE LESIONS IN PATIENTS WITH ADVANCED CHRONIC VENOUS INSUFFICIENCY (C5, C6) AND ITS PREDICTIVE ROLE IN ULCER HEALING

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Purpose
To study the incidence of asymptomatic iliac vein occlusive lesions in patients with advanced chronic venous insufficiency (C5, C6) and to correlate with the wound healing rate in patients with C6 disease.

Methods
This prospective study was done from July 2015 to June 2016. Patients underwent ascending venogram through a femoral vein cannulation via GSV puncture at the commencement of endovenous ablation. The findings considered abnormal on venogram were presence of collaterals, splaying of veins, reflux of contrast into the internal iliac vein, narrowing of the veins compared to the adjacent normal vein or contra lateral normal side and presence of occlusion. The patients were reviewed at 12 weeks to assess for wound healing. Analysis was done to correlate the rate of wound healing in patients with positive findings venogram.

Results
Total numbers of 104 patients were included in the study. There were 94 males and 10 females. 70 patients had symptoms on the left leg and 34 patients on the right leg. There were 33 patients with healed ulcer and 71 patients with active ulcer. 66% of patients with active ulcers and 70% of patients with healed ulcers had positive venogram findings. On follow-up at 12 weeks, among patients with persistent ulcers 90% had abnormal findings on the venogram, while patients who had healed ulcers only 40% had abnormal venogram. The difference was statistically significant.

Conclusion
The incidence of non-occlusive iliac vein pathology as indicated by an abnormal venogram is high in patients with advanced chronic venous insufficiency. The ulcers of patients with abnormal venogram are less likely to heal at 12 weeks duration. Ascending venogram is a valuable and cost-effective investigation for patients undergoing endovenous ablation for C5 and C6 disease.

VA008
CRITICAL COMPONENTS OF AND TECHNICAL TIPS FOR ILIOCAVAL RECONSTRUCTION

TOBY RICHARDS

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Intervention for deep venous disease is increasing. Techniques for diagnosis, intervention and management are different to those in arterial disease. We discuss some top tips:

1. The indication for intervention is based on the patients symptoms. XR compression is common and not an indication.

2. Intravascular Ultrasound is essential for diagnosis, intervention and long-term management.

3. Think laterally; when crossing an occlusive lesion the vertebral plexus and spinal collaterals are to be avoided & stents to the CIV must lie flat from the EIV.
4. Beware of roll over; in May Thurner the artery will roll proximally over a stent so stents should be 1 cm proximal to the compression point, often into the IVC (Kissing stents not needed).

5. Treat the whole patient; we need 10-year outcome data so consider implications of anticoagulation, need for follow up, also advancing technology: You can always stent another day but you can’t unblock a blocked stent.

VA009
EARLY RESULTS OF A CLINICAL FEASIBILITY STUDY FOR ENDOVENOUS DEEP VEIN VALVE FORMATION TO TREAT CHRONIC VENOUS INSUFFICIENCY

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Background
Chronic Venous Insufficiency (CVI), due to superficial and deep vein reflux (DVR) and venous obstruction, is widespread and associated with significant morbidity. Historically, therapeutic approaches to DVR involved difficult and morbid surgical procedures, or unsuccessful attempts to implant valves. This study is to assess the safety and effectiveness of endovenous formation of autogenous deep vein valves in subjects with DVR and associated symptoms. Results are presented for the first 12 treated subjects.

Methods
Subjects with DVR and correlating symptoms were treated with an endovenous autogenous valve formation system in 5 centers in New Zealand, Australia and Canada. Retrograde percutaneous access was obtained through the common femoral vein, and contrast venography and intravascular ultrasound (IVUS) were used to assess reflux and to identify potential treatment sites. If the subject was deemed eligible, the study device was introduced and used to form monocuspid valves in femoropopliteal vein segments. IVUS and venography were used to assess valve functionality. Follow-up included duplex ultrasound, physical examination and questionnaires.

Results
The subjects were clinical class C4 (n=2), C5 (n=5) and C6 (n=5). One or more moncuspid valves were successfully formed in 11/12 subjects. Follow-up ranged from 30 days to 1 year. No occlusive DVT were reported, and adverse events related to the device or procedure included access site related events (n=8) and mural thrombus (n=3). All mural thrombi resolved by 90-days. Of those subjects reaching 210-day fu, 7/9 subjects had a ≥ 4-point improvement in the venous clinical severity score.

Conclusion
Endovenous valve formation in the deep venous system is feasible, and initial experience suggests it may be safe and effective treatment for chronic venous insufficiency.

VA010
WHAT IS THE CURRENT ROLE OF VESSEL CLEARANCE IN THE MANAGEMENT OF ACUTE ILIOCAVAL THROMBOSIS

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We know that the risk of developing PTS after a DVT in ALL comers is 50% according to recent data from the Attract trial. This is unacceptably high in 2019. We also know that this risk is even higher in the subgroup of ilio-femoral DVT with some reports suggesting that 95% develop ambulatory venous hypertension and skin changes within 5 years and venous ulceration in 15%. A further 15% report symptoms of venous claudication. Others have reported venous ulceration in nearly 80% of patients within 5 years. There is good clinical evidence that clot removal is beneficial in terms of preservation of endothelial and valve function, preventing further thrombosis and improving both the short- and long-term clinical outcomes. Early clot removal enables the recognition of possible underlying factors that may have led to the thrombosis such as the May-Thurner syndrome. However, this decision has to be weighed against the potential complications of the procedure. The Attract trial investigators have suggested caution when considering treatment of acute DVTs. Here we present our contemporary series of ilio-femoral DVTs treated with a single session of
thrombolysis/thrombectomy over the last 4 years. Technique, results and outcomes.

**VA011**

**FACTORS THAT INFLUENCE THE DECISION TO PLACE AN INFERIOR VENA CAVA FILTER**

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**Purpose**
The use of inferior vena cava filters (IVCF) is controversial. However, the procedure is widely performed for secondary prophylaxis in patients with severe PE, including those treated by pulmonary embolism response teams (PERTs). In this study, we analyzed patient factors associated with the clinical decision to place an IVCF in PERT patients.

**Methodology**
Data were collected on all patients who had a PERT activation from 10/2012-12/2018. Data describing demographics, medical history, PE characteristics and treatment were collected at the time of PERT activation and prospectively for one year after PERT activation. Univariate and multivariable regression analyses were performed to determine factors associated with IVCF placement.

**Results**
We identified 1086 patients, 67 (61.5%) male, 42 (38.5%) female, mean age 59 years old, of whom 109 (10.0%) had an IVCF placed in the first 7 days after PERT activation. Patients receiving an IVCF were less likely to have had an ED (p<0.001) PERT referral but more likely to have had an ICU PERT referral (p<0.001) compared to a floor referral. Patients presenting with syncope (p=0.046), a history of recent trauma (p=0.001), intracranial hemorrhage (p=0.002) a recent invasive procedure (p=0.016), recent surgery (p=0.003), and recent hospitalization (p=0.011) were more likely to have an IVCF placed. Patients receiving IVCF were also more likely to have evidence of right heart strain on CTPA (p<0.001) and echocardiogram (p=0.005) as well as right ventricular dilatation (p=0.013) and hypokinesis (p=0.015). They were more likely to require ventilation support (p=0.012). The 30-day VTE recurrence rate was higher (11.0% vs. 0.1%) in IVCF patients (p=0.023), where 8.3% experienced DVT and 1.8% PE.

**Conclusion**
Factors associated with VTE severity (e.g. ED or ICU patient location, right ventricular hypokinesis) and elevated bleeding risk (e.g. recent surgery or trauma) were associated with IVCF placement among PERT patients.

**VA012**

**MANAGEMENT OF MASSIVE PULMONARY EMBOLUS - VASCULAR SURGEON INVOLVEMENT IS CRITICAL**

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Pulmonary embolism (PE) is the third most common cause of cardiovascular death in the world and remains the most common preventable cause of in-hospital death. Forty percent or more of cases of iliofemoral venous thrombosis have associated PE. Vena cava thrombosis or tumours may present with PE.

Saving a patient with an acute PE through catheter-directed lysis and debulking represents an opportunity to save lives using techniques that lie within the skill set of the contemporarily trained vascular surgeon. As rewarding as a successful management of a ruptured aneurysm is, most of those patients are elderly with multiple comorbidities, while PE patients tend to be younger with a productive life ahead. In our case, it was our established involvement in major venous interventions that followed a natural progression to PE intervention.

Management of PE may be challenging, patients with acute PE are underserved because specialized care is frequently unavailable or PE programs non-existent. In communities and hospitals where vascular surgeons represent the lead interventionalists, involvement in this field might even be considered a responsibility. Failure to be involved in the PE movement deprives patients of the experience of vascular surgeons and potentially threatens the venous intervention practice of nonparticipating surgeons.
VA013
PERIPHERAL VASCULAR DISEASE: DOES BEING ON A TABLET MEAN IT IS WORKING?

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Background/Purpose
Medical therapies; anti-platelets, antihypertensives, and statins, reduce the risk of future cardiovascular events in patients with Peripheral Vascular Disease (PVD). As an intervention, these medications are often prescribed but, it is not clear if they are working. International standards recommend; LDL <1.8 g/dL, serum cholesterol < 4.0 g/dL, and Systolic Blood Pressure (SBP) < 130. We aimed to assess the effectiveness of treatment for modifiable risk factors in patients with known PVD.

Methods
Patients with PVD admitted to a major Western Australian tertiary hospital were reviewed. Documentation included demographics, risk factors and current medication which were compared to the European (ESC & EAS) UK (NICE) Guidelines for Cardiovascular Disease. Cardiovascular risk was calculated by network metanalysis of existing clinical trials https://www.u-prevent.com/en-GB.

Results
In a four-month registered audit (Geko Activity Number 32966) 45 patients with known PVD were reviewed. The average age was 72 years (SD±13, range 20-90), 32 were male.

Audit standards were met with 35 (83%) prescribed an antiplatelet
Cholesterol control was poor: 34 (81%) were prescribed a statin with only three on high dose therapy. Of those on a statin 16 had an LDL-C g/dL above 1.8 and 14 had a Cholesterol >4.0 g/dL.
Blood pressure control was poor with 36 (80%) having a SBP > 130.

The overall mean 10-year and annual risk prediction for this patient group was 48% (SD ±15%, range 19-79%) and 63% (SD±10%, range 43-82%).
If patients had met audit standards it would lead to a 10-year and lifetime absolute risk reduction of 15% (SD ±12%, range 0-50%) and 16% (SD±13%, range 0-50%).

Conclusion
There is a need for vascular patients to be better optimised and being on aspirin, statin, and an ace inhibitor does not mean they are being appropriately treated.

VA014
AUSTRALIAN SINGLE-CENTRE OUTCOMES USING HAWKONE™ DIRECTIONAL AHERECTOMY AND DRUG COATED BALLOON FOR FEMORO-POPLITEAL PERIPHERAL ARTERIAL DISEASE

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Purpose
The HawkOne™ atherectomy system is a directional atherectomy device used for debulking peripheral atherosclerotic and restenotic lesions. It improves luminal gain and combined with the anti-proliferate effects of drug coated balloon (DCB) reduces restenosis rates. Presented is a single centre experience with this device combined with DCB technology for the treatment of femoro-popliteal disease.

Methodology
A prospective case series of patients who underwent HawkOne™ atherectomy with DCB angioplasty between September 2017 and July 2018 was collected. Demographic and clinical data were recorded and follow up was performed at 3, 6 and 12 months using duplex ultrasound and/or CT angiography. The primary endpoint was 12-month freedom from target lesions revascularization (fTLR) with secondary endpoints of assisted primary patency, amputation-free survival and mortality.
Results
Data was collected for 34 patients with an average age of 72.5 years. 18 (53%) were female, 14 (41%) were diabetic with 28 (82%) having a smoking history. 15 (44%) had critical limb ischemia and 14 (41%) were diabetic with 28 (82%) having a smoking history. 15 (44%) had critical limb ischemia and 19 (56%) short distance claudication (<50 metres). Mean lesion length was 142mm +/- 106 with 5 (15%) denovo lesions and 29 (85%) restenotic lesions of which 8 (23%) were in-stent restenosis (ISR). Mean length of follow up was 314 days with 19 patients reaching 12 months. There were 5 cases of TLR in these 19 patients with a fTLR rate of 73.75% (14/19). 12 month assisted primary patency was 100%. There were no major limb amputations or mortalities in the cohort.

Conclusion
Directional Atherectomy with anti-restenotic therapy is associated with higher patency than atherectomy or DCB angioplasty alone. This real-world prospective cohort with predominantly longer lesions and more advanced disease demonstrates acceptable fTLR which is comparative to or better than DCB alone. Longer term follow-up is required with larger numbers to further substantiate this claim.

VA015
TOO OLD FOR A BYPASS?

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Objective
Surgical revascularisation remains a cornerstone of treatment for advanced symptomatic peripheral arterial disease. There is controversy surrounding performing femoral popliteal bypass surgery in the elderly provided that a successful bypass procedure is likely to save the leg and improve the quality of life of these patients by maintaining ambulatory function and independent living. The decision whether to undertake risky bypass revascularizing versus alternative treatment should be on an individualised basis. We aim to document the outcomes of octogenarians undergoing peripheral revascularization in the form of bypass surgery compared to their younger counterparts.

Methods
Single center retrospective review Jan 2012 – Jan 2018 of all patients who underwent femoral popliteal bypass surgery. All patients case notes were reviewed and their demographics, risk factors, surgery, 30-day readmission and complication rates, reintervention rates, amputation rates and mortality rates were documented.

Results
348 patients were found who underwent bypass surgery; 264 patients under the age of 80, and 84 octogenarians were found. Indications for surgery included elective admission for claudication, critical ischaemia and acute ischaemia. Our finding were that here was no difference in amputation rates in the octogenarians versus their younger counterparts (6.4% vs 5.9%); lower reintervention rates in the octogenarians group (37.12% vs 20.3%). We do note a slight tendency towards a higher all-cause mortality rates at 1 year which did not reach statistical significance (7.1% vs 10.7%).

Conclusions
Age alone should not be a factor to exclude our elderly population from bypass surgery. Carefully selected patients have excellent amputation free survival rates, complication rates and acceptable 1-year mortality rates when compared to the general population. We conclude that surgery seems to be a viable treatment option in this population which may be underutilized.

VA016
ENDOVASCULAR MANAGEMENT OF LOWER LIMB ANEURYSMS IN A TERTIARY VASCULAR CENTRE.

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Purpose
Complications of lower limb aneurysm are, to a vascular surgeon, a familiar presenting complaint requiring intervention. Prophylactic endovascular treatment of high-risk patients may reduce morbidity.

The aim of this study was to report the outcomes of lower limb aneurysms treated with endovascular stent in a tertiary vascular centre.
Methodology
Data was collected for consecutive patients attending for treatment of lower limb aneurysm at a single centre, between January 2010 and January 2019. Patient demographics, indication for intervention, type of stent used, complications, as well as primary and primary-assisted patency were recorded for analysis. Patency of stents were confirmed using duplex ultrasound.

Results
Twenty-two patients (32 legs) had a covered stent during the study period. The median age of patients at time of repair was 77 (range: 73 - 88), and one was female. Twenty-seven repairs (85%) were performed using Viabahn stents, prior to this Anacoda stents were used for five patients (15%). Indications for stenting included four distal superficial femoral artery aneurysms (12.5%), three popliteal artery pseudoaneurysms (9.5%), and twenty-five popliteal artery aneurysms (78%).

The primary patency rates at 30 days, 1 year, and 2 years were 97%, 87%, and 85% respectively. Six patients died during the study period, and one was lost to follow up. Three patients had emergency open bypass procedures after stent occlusion, one required salvage by thrombolysis, one had a major amputation within 24 hours of stenting, and one patient was managed conservatively after stent occlusion.

Conclusion
Endovascular management of peripheral lower limb aneurysms is acceptable in this high-risk group of patients with a low amputation risk. The fact that a fifth of the patients died with 2 years highlights the better understanding of popliteal aneurysm natural history to assist in clinical decision-making.

VA017
EPIDEMIOLOGY OF FATAL RUPTURED AORTIC ANEURYSMS IN THE UNITED STATES (1999-2016)

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Objective
Ruptured aortic aneurysms (rAAAs) are associated with high mortality. The purpose of this study was to describe the trends of deaths due to rAA in the United States.

Methods
A retrospective review of the national death certificate data from the U.S. National Vital Statistics System was done to identify deaths due to rAAAs in the United States between 1999 and 2016. Patients aged 15 years or older with rAA as the underlying cause of death as defined by International Classification of Diseases, Tenth Revision codes I71.1 (ruptured thoracic aortic aneurysm [rTAA]), I71.3 (ruptured abdominal aortic aneurysm [rAAA]), I71.5 (ruptured thoracoabdominal aortic aneurysm), and I71.8 (rAA of unspecified site) were included and standardized to U.S. Census data.

Results
A total of 104,458 deaths due to rAAAs occurred during the study period. The overall age-adjusted incidence of fatal rAA was 23.3 per 1 million (rAAA, 15.1; rTAA, 3.1; thoracoabdominal, 0.4; and unspecified site, 4.8). The annual incidence of rAA decreased by 68% from 40.0 (1999) to 12.8 (2016) per 1 million (rTAA by 67% from 5.5 to 1.8 and rAAA by 70% from 26.3 to 7.89 per 1 million; P < .001 for all comparisons). These trends were consistent across age groups, sexes, and races. There was a significant seasonal variation in rAA mortality, with higher deaths in winter months compared with summer months. The incidence of rAA is highest in Midwest states (27.1 per 1 million), followed by Northeast (23.8 per 1 million) and West (14 per 1 million) states, and lowest in Southern states (13.6 per 1 million). Only 57% of rAAA deaths occurred in men $65 years.

Conclusions
The incidence of fatal rAA, rTAA, and rAAA drastically decreased in the United States between 1999 and 2016, a trend that was consistent across age groups, sexes, and races. A significant percentage of fatal rAAAs occurred inpatients who are not eligible for the current screening program.
VA018
*SERUM MIRNAS ASSOCIATED WITH THE PRESENCE AND RAPID EXPANSION OF ABDOMINAL AORTIC ANEURYSMS

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Purpose
Abdominal aortic aneurysms (AAA) are pathological dilatations of the abdominal aorta which have a tendency to progressively enlarge and potentially rupture. There is increasing interest in using non-coding RNAs such as miRNAs as novel biomarkers for AAA diagnosis as well as potential therapeutic targets. This study aimed to identify serum microRNAs associated with the presence and rapid expansion of AAA.

Methodology
Serum miRNA profiles were investigated using a nanoString miRNA assay in three groups of age- and sex-matched participants (n=36): patients with AAA, peripheral artery disease, and healthy controls. Validation was performed using the same assay in a larger AAA cohort (n=107). Similarly, serum microRNA profiles were investigated in a cohort of AAA patients (n=106) whose maximum AAA diameter was serially recorded from CT scans performed over a 12-24-month period.

Results
When analysing serum miRNAs associated with AAA presence, only let-7b-5p was significantly differentially expressed after validation (1.388-fold upregulated in AAA, p < 0.001, AUC 0.918 for AAA diagnosis). In the growth cohort analysis, miR-1268a was significantly downregulated in the fast-growing AAA group compared to the slow-growing AAA group when divided by median annual AAA growth (0.707-fold, p=0.043, AUC 0.618). Predicted targets of both miRNAs functionally implicated them in AAA pathogenesis and progression.

Conclusions
In this study, serum let-7b-5p was associated with AAA diagnosis, while serum miR-1268a was associated with fast-growing AAA. let-7b-5p demonstrates promise as a biomarker for AAA diagnosis, while miR-1268a was not suitably sensitive or specific in predicting AAA progression in our cohort for use as a biomarker for AAA growth.

VA019
CLASSIFICATION OF ENDOLEAKS AFTER ENDOVASCULAR TREATMENT OF STANFORD TYPE-B AORTIC DISSECTIONS

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Objective
Despite two decades of experience, no dedicated classification system exists to document and prognosticate patterns of endoleak encountered after endovascular therapy of type-B aortic dissection (TBAD). This nomenclature gap has led to inconsistent management and underreporting of significant findings associated with adverse outcomes after endovascular treatment of TBAD. Our goal was to propose a clinically-relevant classification of endoleaks and other pertinent finding after endovascular management of TBAD.

Methods
A multidisciplinary team of seven experienced open and endovascular aortic surgeons was assembled to provide consensus opinion. Critical review of the published literature on the endovascular treatment of TBAD was conducted from 2008 to present. Deficiencies in the current classification approach of the various patterns of persistent filling of false lumen (FL) after endovascular therapy were identified, and their relevance to continued aneurysm growth, need for reintervention or aneurysm-related events were noted.

Results
Our focus was to define and better categorize high-risk and low-risk subgroups within endoleaks encountered after endovascular treatment of TBAD. We concluded that a FL-based schema is essential for a reproducible and relevant classification. A key part of this system is classification of distal entry tears as FL-based type Ib endoleaks, which were further subclassified into b1 (large branch related tears), and b2 (multiple small branches related tears). Two additional
type-I endoleak categories were introduced, with classification of retrograde ascending aortic dissection (RAAD) as type-Ir, and stent graft-induced new entry (SINE) as type-Is.

Conclusions
We propose a new clinically-relevant classification system of endoleaks occurring after endovascular therapy of TBAD.

VA020
*NON-IATROGENIC VASCULAR INJURIES IN CHILDREN – A 12-YEAR EXPERIENCE FROM A SINGLE PAEDIATRIC TERTIARY TRAUMA CENTRE

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Aim
Traumatic vascular injuries in children are very rare, contributing to 1% of all paediatric trauma, but can cause significant morbidity. This study aims to describe our experience with these complex injuries, pattern of injury, management challenges and outcomes.

Methods
During the study period from 2004 to 2016, medical records of all children with traumatic vascular injuries aged 0 – 17 from a tertiary trauma centre were retrospectively reviewed. Demographic data, injury mechanism, management and outcome data was extracted. Vascular injury (VI) data was compared and analysed.

Results
13197 children were admitted with trauma, of which, 120 children had a VI. Upper limb VI was the most common (n=89) injury, followed by lower limb (n=22), abdomen (n=4), head and neck (n=3) and thorax (n=2). The median patient age was 14 years (Range 2–17). There were 89 males and 31 females. The mechanism of injury that produced the highest average trauma index severity score was motor vehicle accidents. 65% of injuries were due to penetrating trauma. 9% of upper limb vascular injuries were associated with a supracondylar fracture of the humerus. Primary repair of the vessel was performed in 84 cases; interposition graft in 15 cases, ligation or selective endovascular embolization of the vessel was performed in seven cases and amputation was necessary in five cases. Three patients underwent bypass graft of injuries and six injuries required endarterectomy and patch repair. Three injuries were managed non-operatively. There was associated major nerve injury in 8 cases. There were 4 mortalities.

Conclusion
Penetrating injuries are the most common mechanism of trauma. Upper limb vascular injuries are the most common vascular injuries in children. A high index of suspicion is required when dealing with vascular injuries and operative intervention is commonly required. Primary repair of the vessel is safe and effective in most cases.

VA021
*THE SHORT-TERM EFFECTS OF TREADMILL EXERCISE ON CIRCULATING SUB-POPULATIONS OF MONOCYTES IN PATIENTS WITH INTERMITTENT CLAUDICATION

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Purpose
The ability to modify the chronic inflammatory state of PAD through exercise may improve outcomes. Acting as a scavenger receptor, monocyte CD16 is thought to play a role in foam cell formation. CD16 also defines monocyte subtypes (classical CD14+/CD16-, intermediate CD14+/CD16+, non-classical CD14+/CD16++) of which, the later are considered pro-inflammatory. The aim of this study was to measure the effect of supervised exercise program (SEP) on proinflammatory monocyte subtypes and CD16 expression in patients with intermittent claudication (IC).

Methodology
Patients with IC were recruited into a treadmill-based SEP. Before and at the completion of a 12-week exercise program, patients had peripheral blood drawn to measure monocyte subtypes using flow-cytometry, white cell count and CRP. A convenience sample of healthy non-matched controls was included for comparison at baseline.
Results
Twenty-six patients with IC and twenty healthy controls had monocyte analysis completed at baseline. Patients (compared to controls) had higher levels of inflammatory markers CRP and WCC, but also greater total monocyte count (p=0.01) and numbers of pro-inflammatory intermediate monocytes (p=0.03). Additionally, monocyte CD16 expression was significantly greater in patients versus controls (p=0.009). Following the SEP, there was no change detected in numbers of monocyte subtypes, however, monocyte CD16 expression decreased (p=0.03).

Conclusion
Consistent with the known pro-inflammatory state of atherosclerosis, patients with IC appear to have greater numbers of total and pro-inflammatory monocytes. SEP for 12-weeks does not appear to alter the number or proportions of monocyte subtypes. The monocytes of patients, however, appear to express greater levels of CD16, compared to controls, and this decreased following a 12-week SEP. This change may reflect a clinically important anti-inflammatory effect of exercise training.

VA022
*HISTOPATHOLOGY OF VENOUS IN-STENT RESTENOSIS

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Purpose
This case report describes the histopathological analysis of in-stent restenosis tissue from within an iliofemoral venous stent. This is the first use of directional atherectomy to treat venous in-stent restenosis (ISR). It also describes the first histopathological analysis of tissue retrieved from within a iliofemoral venous stent using directional atherectomy.

Methodology
A 55-year-old man with a left sided iliofemoral venous stent presented with recurrence of symptoms of venous congestion. Imaging demonstrated in-stent restenosis within the iliofemoral stent. Directional atherectomy was used to recanalize his iliofemoral venous stents which provided him with significant symptom relief. Tissue retrieved from within the stent was studied to determine the underlying cellular elements leading to the in-stent restenosis.

Results
The tissue sampled demonstrated spindled and stellate cells with a myxoid material containing a high proteoglycan content. There were numerous smooth muscle cells within the tissue sampled. These findings were indistinguishable from the typical intimal hyperplasia seen in arterial in-stent restenosis.

Conclusions
The histopathology of venous ISR demonstrates similar cellular changes as arterial ISR. Understanding the cellular composition of venous ISR tissue may help guide treatment of venous ISR.

VA023
*THE IMPACT OF MARITAL STATUS ON MORTALITY IN A COHORT OF AORTIC ANEURYSM PATIENTS.

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Purpose
We aim to identify the impact of marital status on mortality in a cohort of aortic aneurysm patients. As a secondary objective we describe the rate of aneurysm rupture as it relates to marital status. To our knowledge, this is the first epidemiological study of its kind regarding aortic aneurysms.

Methodology
Within the Hunter New England Area Health Service, all patients presenting with a principal diagnosis of aortic aneurysm were de-identified and included in a database. The database was then linked with the New South Wales Registry of Births, Deaths and Marriages to obtain mortality data. This yielded a cohort of 780 patient encounters over a period of 9 years. Demographic and clinical data were also recorded, including age, sex, suburb postcode, marital status, presence of rupture and relevant comorbidities. Participants were grouped by marital status (married, separated/divorced, widowed, never married) and group
comparisons were conducted using the above information. Regression and survival analyses were performed.

Results
Preliminary results suggest that those who are widowed are more likely to present with rupture than other patient subgroups. Participants who have married, been separated (or divorced), or never married, present with equal rates of rupture. Similarly, the median survival time, in days, was lower in those who were left as the sole living spouse.

Conclusion
It is common to focus on controlling biological factors which may cause morbidity and mortality. While the home situation can easily be taken for granted, it may have a reasonable impact on patient survival.

VA024
*DOES MAJOR LOWER LIMB AMPUTATION IN AUSTRALIA AND NEW ZEALAND OCCUR IN SEASONAL PEAKS?

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Purpose:
Seasonal peaks in major lower limb amputation rates have been described. These peaks are often associated with temperature extremes and hypothesised to be causally linked to climate exacerbation of underlying peripheral arterial or diabetic foot disease. Australia and New Zealand experience relatively temperate climates, it is unknown if significant variation in major lower limb amputation occurs in these countries.

Methodology:
Using the prospectively acquired Australian Vascular Audit data, retrospective analysis of major lower limb amputations January 2011-December 2018 was performed. Associations between surgical indication and season were estimated using percentages and Pearson’s χ2. Variables included month, season, clinical indication for amputation (critical limb ischemia (CLI), infection, acute ischaemia, trauma, malignancy).

Results:
Over 8 years, 9584 lower limbs were amputated in 145 hospitals. There were 7743 limbs in Australia and 1841 in New Zealand. Patients were older (mean 69 (SD 14.17), male (females 29.4%), with comorbidities of diabetes (63%), ischaemic heart disease (61%) and current or ex-smokers (79%). There was even distribution between limb side. More amputations were trans-tibial (57%) compared to trans-femoral (42%). October was the most frequent month (n=863, 9%). The most amputations were in Spring, with a 2.3% increase in frequency (P<.0001) compared to the lowest season, Autumn. Amputations for CLI were more frequent in Spring (27.5%), whilst acute ischaemia more common in Winter (27%). There was significant variation in trauma with Winter (18%) vs Autumn (32%).

Conclusion:
Seasonal variation in lower limb amputation exists and it is affected by indications for surgery. Further exploration of temporal spikes is warranted to explain patterns in health resources and identify potential risk factors for disease progression. The higher incidence in winter amputations for acute ischaemia could be due to temperature related vasospasm.

VA025
PROLONGED PERSISTENT HYPOTENSION FOLLOWING CAROTID ARTERY STENTING: A REAL-WORLD EXPERIENCE

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Purpose
To assess the incidence and predictors of severe persistent post-procedural hypotension after carotid artery stenting (CAS).

Methods
Retrospective analysis of patients who underwent CAS at three vascular centres. The primary end-point was post-
procedural hypotension defined as a >40 mmHg reduction in office systolic blood pressure (SBP) from baseline or a SBP of <90 mmHg sustained for >1 h after CAS. Potential prognostic factors for post-procedural hypotension were identified and subjected to logistic regression analyses.

Results
A total of 160 procedures were performed in 146 patients (mean age, 72.8 years). Post-procedural hypotension developed after 37 CAS procedures in 36 patients; such patients had significantly longer intensive care unit and hospital stays than those who did not develop post-procedural hypotension (p < 0.001). Post-procedural hypotension was associated with severe lesion calcification (odds ratio [OR], 6.28; 95% confidence interval [CI], 1.80-21.98; p = 0.004) and the contrast volume (OR, 1.02; 95% CI, 1.01-1.02; p = 0.0002). A similar trend was also observed in the comparison of the Cordis Precise and Xact carotid stents (OR, 6; 95% CI, 2.08-17.6; p = 0.001). Bootstrapped multivariable modelling identified the Cordis Precise stent and contrast volume as significant predictors of persistent post-procedural hypotension. Further investigation of the contrast volume revealed associations with sex, severe calcification, arch type, previous coronary artery bypass surgery, and primary stenting, suggesting that the contrast volume reflects the complexity of the procedure.

Conclusion
The complexity of the procedure and type of stent may play a role in the development of post-procedural hypotension after CAS.

VA026
SURVIVAL FOLLOWING INTACT ABDOMINAL AORTIC ANEURYSM REPAIR: CONTEMPORARY ANALYSIS BY TREATMENT METHOD

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Introduction
Current treatment guidelines for AAA management are based on landmark trials comparing EVAR and open aneurysm repair (OAR) conducted 20 years ago. Significant advances have been made in perioperative medicine and graft technology since this time, and the impact of EVAR and OAR on long-term patient survival remains controversial.

Purpose
To compare the outcomes of OAR and EVAR in the recent era.

Methodology
This retrospective observational study included all patients undergoing planned AAA repair in New Zealand from January 1st 2010 until December 31st 2014. Data was collected from national administrative and clinical vascular databases and matched using unique identifiers. Death dates were obtained from the national mortality database. OAR and EVAR using 2nd and 3rd generation engrafts were included, trial devices and fenestrated/branched configurations were excluded. Logistic regression models were used to determine predictors of 30-day mortality, and Cox proportional hazards model was used for survival analysis. Data was censored on 31st January 2018. The national ethics committee approved this study.

Results
1220 patients underwent AAA repair, of which 62 patients were excluded. The mean age was 74 years and 218 (18.2%) patients were female. The median AAA diameter was 61mm. 615 (53.1%) patients had EVAR. The EVAR group was on average 3 years older (p<0.01); otherwise baseline demographics were similar. 30-day mortality after OAR and EVAR was 3.5% and 0.7% respectively (adjusted OR: 5.5 [95%CI:1.8-16.4]). Median and maximum follow-up was 4.5 and 8 years respectively. The crude survival curves crossed at 18 months. EVAR had a higher overall mortality (HR 1.5 (95%CI:1.2-1.9) after adjusting for confounders).

Conclusion
Survival outcomes after AAA repair in the current era shows those who underwent EVAR had a lower 30-day mortality, however this benefit disappeared at 2 years. Patients that had an open repair had a higher long-term survival rate.
VA027
THE RISK OF MR-DETECTED CAROTID PLAQUE HEMORRHAGE ON RECURRENT OR FIRST-TIME STROKE: A META-ANALYSIS OF INDIVIDUAL PARTICIPANT DATA

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Background
Carotid plaque MRI may identify subjects with carotid disease at risk of stroke. Our aim was to estimate the precise risk of MR-detected carotid plaque hemorrhage (PH) on recurrent or first-time stroke during follow-up in previously symptomatic and asymptomatic subjects.

Methods
In this meta-analysis we pooled individual participant-level data from seven cohort studies, published until December 2016, inducing 696 subjects investigated with plaque MRI at baseline (symptomatic=80·5%, prevalence of PH at baseline=47·3%). Survival analysis was applied to estimate the risk of first-time or recurrent ischemic stroke after 3, 12, and 24 months in symptomatic and asymptomatic subjects. Independent predictors of outcome were identified by multivariate analysis.

Findings
During 1121 observed person-years 66 strokes (annualized event rate 5·89%) were recorded. The presence of PH increased the risk of future stroke by a factor of 10·2, 7·9, and 11·2 in symptomatic, asymptomatic, and all subjects, respectively. Cumulative risk for stroke after 3, 12, and 24 months was 6·5%, 13·7% and 25·3% in PH+ vs. 0·6%, 0·6%, and 1·7% in PH− subjects. In multivariate analysis, risk for future stroke was significantly increased by presence of PH (HR 10·4, 4·9–21·9; p<0·0001), high grade stenosis (3·0, 1·3–7·2; p=0·01), diabetes (2·0, 1·2–3·5; p=0·01), and lowered in asymptomatic subjects (0·3, 0·1–1·0; p=0·04) while sex, age, and hypertension had no significant effect.

Interpretation
Carotid PH is a strong predictor of ischemic stroke in subjects with carotid disease, independent of clinical risk factors. Our findings warrant clinical trials selecting subjects for treatment on the basis of plaque MRI.

VA028
A LARGE SINGLE-CENTRE COVARIATE ADJUSTMENT ANALYSIS OF SHORT TERM AND 5-YEAR OUTCOMES AFTER EVAR IN FEMALE AND MALE PATIENTS

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Purpose
Several studies report worse outcomes in women compared to men after endovascular aneurysm repair (EVAR). This study aimed to evaluate gender-specific early and 5-year outcomes after EVAR.

Methodology
A total of 409 consecutive patients underwent elective EVAR from 2004 to 2017 at two tertiary hospitals in Western Australia. Baseline, intraoperative, and postoperative variables were examined retrospectively according to gender.

Results
A cohort of 409 patients made up of 57 women (14%) and 352 men (86%) were analysed. Females were older (median age, 76.8 vs 73.5 years; p = 0.017). Men were more likely to be past smokers (40.9% vs. 22.8%, p = 0.005), have a history of CABG (11.2% vs. 3.5%, p = 0.042) and malignancy (23.9% vs.10.7% (p values missing)) than women. No difference in 30-day mortality or composite end-points was demonstrated for women compared with men (3.5% vs. 0.3%; p = 0.052 and 31.6% vs. 27.8%; p = 0.562 respectively). The Kaplan-Meier curves demonstrated similar 5-year mortality outcomes amongst men and women (p = 0.928). Analysis of long-term survival adjusting for covariates demonstrated no significant difference in long-term mortality, composite end-points and re-intervention rate between
genders.

Conclusions
In contrast to previous studies, no significant differences in 30-day and 5-year outcomes were detected between women and men treated with EVAR, thus implying that EVAR remains a safe treatment choice for female patients.

VA029
HYDROGEN PEROXIDE PRODUCTION AND ATHEROSCLEROTIC PLAQUE STABILITY IN SYMPTOMATIC AND ASYMPTOMATIC CAROTID ARTERY STENOSIS

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Ischemic strokes are caused by atherosclerotic lesions in carotid arteries and a large number of patients have a stenosis without showing any symptoms. Stabilization of these plaques in asymptomatic patients is of high interest but requires detailed knowledge on the underlying molecular mechanisms. Low doses of hydrogen peroxide (H2O2) are known to be anti-atherosclerotic and NAD(P)H oxidases (NOX), endothelial and neuronal nitric oxide synthases (eNOS, nNOS) contribute to H2O2 production in the vasculature. However, the sources of H2O2 in atherosclerotic plaques from asymptomatic and symptomatic patients have not been studied in detailed. We therefore analyzed the expression of different enzymes and evaluate their contribution to H2O2 production by inhibitor studies. Atherosclerotic plaques obtained by carotid endarterectomy (symptomatic n=23, asymptomatic n=17) were analyzed for NOX4, NOX2, eNOS and nNOS mRNA expression by qPCR. The release of tissue H2O2 was measured by the Amplex Red assay in the presence of NOX, eNOS and nNOS inhibitors. We found a reduction in eNOS and nNOS mRNA expression in symptomatic stenosis. Contrary, NOX4 mRNA and H2O2 were increased in asymptomatic patients whereas NOX2 trended to be higher in symptomatic patients. Inhibition of all NO synthases reduced H2O2 by 1.4-fold in asymptomatic patients, suggesting a contribution of these enzymes to the H2O2 release. Inhibition of nNOS lowered H2O2 by 3.7-fold whereas unspecific inhibition of NOX enzymes had only a weak effect. We conclude, that H2O2 produced by nNOS and nNOS may contribute to plaque stability in asymptomatic patients but their specific role has to be evaluated in more detail.

VA030
GENDER DEFINES ABDOMINAL AORTIC ANEURYSM OUTCOMES POST ENDOVASCULAR ANEURYSM REPAIR (EVAR)

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Background
A gender difference exists in the outcomes of abdominal aortic aneurysms in both short and long-term morbidity and mortality post repair, in which females have more adverse outcomes. Anatomical, hormonal and greater degree of comorbidities is thought to play a multifactorial role in these outcomes.

Methods
A retrospective analysis of 3758 patients from the Global Registry for Endovascular Aortic Treatment (GREAT), between the period of August 2010 and October 2016, receiving the Gore Excluder stent graft for infrarenal abdominal aortic aneurysm repair were included in the study. Cox multivariate regression analyses were performed for any re-intervention, device-related intervention and aorta related mortality.

Results
Of the 3758 patients, 3220 were male (mean age 73 years) and 538 were female (mean age 75 years). Females had higher levels of comorbidities of chronic obstructive pulmonary disease (p<0.0001) and renal insufficiency (p 0.03), whilst males had higher rates of cardiovascular comorbidities. Females also had anatomical AAA characteristics with larger diameter, shorter and more angulated necks. Females did not have statistically significant adverse outcomes in endoleaks, however had higher rates of re-intervention including device factors. In addition, men had higher proportions of mortality at the 30-day and 3-year postoperative period.

Conclusion
Women presented at an older age and with a more hostile aneurysmal anatomy. Although mortality rates were lower for females, they had significantly higher rates of re-intervention and thus higher morbidity rates post EVAR.

VA031
CAROTID ARTERY STENTING AND CAROTID ENDARTERECTOMY – A COMPARISON OF LONG-TERM OUTCOMES FROM A MODERATE VOLUME CENTRE

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Purpose
Carotid Artery Stenting (CAS) has become an established alternative to carotid endarterectomy (CEA) for the treatment of carotid atherosclerosis. Despite multiple large multicenter randomized controlled trials there remains disagreement as to the equivalence of these procedures and in which patients each procedure is indicated.1–3 Outcomes of both CAS and CEA improve with surgeon learning curves and with increase in yearly volume of procedures.4–7 We report our comparison of CAS and CEA outcomes in a moderate volume centre.

Methodology
A prospective database analysis was conducted for all patients treated with carotid artery stenting or carotid endarterectomy at the institution. Long term follow-up of outcomes including mortality, stroke, myocardial infarction and renal failure were recorded. Statistical analysis was conducted using

Results
225 patients underwent carotid artery stenting and 263 patients underwent carotid endarterectomy from 2005–2019. CAS procedural success was 99% whilst CEA 98%. The primary outcome of procedural stroke for CAS was 2.2% compared with CEA 3.0% with no statistically significant difference (p=0.78). No mortalities were seen in the CEA group whilst one mortality was seen in the CAS group. Major adverse cardiovascular events were seen in 4.4% of CAS patients whilst 3.4% of CEA patients (p=0.64). Five year follow up showed CAS mortality at 13.3% compared with CEA 7.6% however this did not reach statistical significance (p = 0.46).

Conclusion
This study demonstrates that at a moderate volume CAS and CEA centre good outcomes can be achieved for patients undergoing both CAS and CEA. No clear differences between procedural complications were seen suggesting that clinicians can offer patients either strategy of treatment for carotid stenosis.

VA032
COMBINED CAROTID ENDARTERECTOMY AND CORONARY ARTERY BYPASS – OUTCOMES FROM A SINGLE TERTIARY AUSTRALIAN CENTRE

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Purpose
Management of concurrent severe carotid and coronary artery disease is highly variable. Combined and staged interventions have been described; however, management choice remains difficult and sometimes controversial due to high perioperative risk. Older studies have reported staged or conservative approaches to be more favourable. In this series, we report 30-day outcomes of our 10-year experience with combined coronary bypass and carotid endarterectomy from a single tertiary centre.

Methods
58 consecutive patients undergoing coronary artery surgery with concomitant carotid endarterectomy from January 2009 to January 2019 at our institution were retrospectively analysed. Patients who underwent a third procedure such as a valve repair or replacement were excluded. The primary outcome was a composite of death, stroke or myocardial infarction at 30 days and secondary outcomes were 30-day mortality, permanent stroke and myocardial infarction. Patients were preoperatively stratified using the EuroSCORE and the Student’s t-test was used to compare the mean score of those who died with those who did not.
Results
The primary composite outcome occurred in 4 patients (6.9%). 3 (5.2%) died in the postoperative period from 4 to 26 days post procedure. 1 patient (1.7%) experienced stroke and 1 (1.7%) had a post-operative myocardial infarction. The mean EuroSCORE for those who died was significantly higher than those who were alive at 30 days post procedure (45.9±6.0% vs 16.1±9.9%, p < 0.0001). No 30-day fatalities were recorded in last 5 years.

Conclusion
The 3 deaths in our series were at significantly higher preoperative risk, and the incidence of permanent neurovascular complication was comparable to isolated carotid surgery. Combined surgical procedures may be safe with careful patient selection and risk stratification in a centre with appropriate expertise and facilities.

VA033
DEVELOPMENT AND VALIDATION OF A MULTIVARIABLE PREDICTION MODEL OF PERIOPERATIVE MORTALITY IN VASCULAR SURGERY: THE NEW ZEALAND VASCULAR SURGICAL RISK TOOL (NZRISK-VASC)

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Purpose
Risk calculators and prediction models are available to assist clinicians and patients in their peri-operative decision-making to optimise the outcome. In a vascular surgical setting, the majority are based on AAA repair outcomes, and in general their clinical use is limited. The objective of this study was to develop and validate a simple and accurate vascular surgical risk-prediction model.

Methodology
Ethical approval was obtained. National administrative database was accessed to collect information on all adult patients undergoing vascular surgery between 1st of July 2011 and 30th of June 2016 in New Zealand. The primary outcomes were mortality at 30-days, 1-year and 2-years. Previously established covariates including American Society of Anaesthesiologists physical status (ASA-PS), gender, surgical urgency, cancer status and ethnicity were tested, and other covariates such as smoking status, presence of renal failure, diabetes, anatomical site of operation, structure operated, and type of procedures (open or endovascular) were explored. LASSO regression was used to select variables for inclusion in the model.

Results
A total of 21,597 cases formed our final risk-prediction model with covariates including ASA-PS, gender, surgical urgency, cancer status, presence of renal failure, diabetes, anatomical site, structure operated and endovascular procedure. The area under the receiver operating curve (AUC) for the 30-day, 1-year and 2-year mortality using L-min model was 0.87, 0.82 and 0.80 respectively, demonstrating very good discrimination. Calibration was also sufficient with the calibration plot slopes of 0.90, 0.95 and 1.02 respectively. The strongest predictors of mortality included ASA-PS, diabetes, anatomical site and structure.

Conclusion
We have developed and validated a simple and accurate multivariate risk calculator for vascular surgical patients in New Zealand with excellent discrimination and calibration for 30-day, 1-year and 2-year mortality.

VA034
BIOMECHANICAL METHOD PREDICTS CLINICAL EVENTS IN PATIENTS WITH ABDOMINAL AORTIC ANEURYSM: A PROSPECTIVE MULTICENTRE STUDY

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Aim
Improved methods of rupture prediction is a priority in abdominal aortic aneurysm (AAA). Previous work has demonstrated the clinical potential of biomechanical risk analysis in AAA, but there is limited evidence that it adds
clinical value. We aimed to test if the biomechanical rupture potential index (RPI, a dimensionless ratio of wall stress and wall strength) can predict clinical events.

Methods
In a prospective multicentre clinical study (ISRCTN76413758) of 295 patients with AAA (diameter ≥ 40 mm), we used 3D reconstruction from combined CT-MRI and computational biomechanical analyses [1] to compute RPI at baseline. Participants were followed for at least two years and the primary endpoint was the composite of aneurysm rupture or repair.

Results
The majority were male (87%) current or former smokers (86%), most (72%) had hypertension (mean systolic blood pressure of 140±22 mmHg) and mean baseline diameter was 49.0±6.9 mm. Mean RPI was 0.49±0.27. Rupture (n=13) or repair (n=102) occurred in 115 (41%) cases and the number of repairs increased across tertiles of RPI: low (n=24), medium (n=34), high RPI (n=44) (p=0.010). We found rupture or repair to occur more frequently in patients with higher RPI (log rank p=0.009) and RPI was independently predictive of this outcome after adjusting for diameter and other clinical risk factors, including gender and smoking (hazard ratio, 1.41; 95% confidence interval, 1.09-1.83; p=0.010).

Conclusion
Here we have shown for the first time that the biomechanical RPI is a strong independent predictor of AAA rupture or repair in a model incorporating known risk factors, including diameter. RPI could help guide the management of patients with AAA.

VA035
GENTAMICIN-IMPREGNATED COLLAGEN MAY REDUCE DEEP SPACE INFECTIONS AFTER OPEN ARTERIAL REVASCULARISATION

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Purpose
Deep space surgical site infections (SSIs) have significant morbidity and mortality. Gentamicin-impregnated collagen implants (Collatamp®) reduce SSIs in orthopaedic surgery but not in colorectal surgery. The evidence is limited in vascular surgery. This study examines if Collatamp reduces 30-day deep space SSIs following arterial revascularisation.

Method
This retrospective study included all patients at a single tertiary vascular unit undergoing arterial bypass or endarterectomy involving the infrainguinal region from November 2015 to March 2019. Patients of one surgeon had Collatamp placed abutting vasculature. Patients of four other surgeons formed a control group without Collatamp. Patients with negative pressure dressings or silver/antibiotic-impregnated implants (except Collatamp), surgical field infections, surgical wounds reopened within 30 days of operation for non-infective indications, or non-procedural deaths before 30 days were excluded. Risk factors for SSIs were collected from hospital records. A logistic regression model assessed Collatamp’s effect on deep space SSIs within 30 days of operation. Modelling included collatamp, diabetes, chronic renal failure, post-operative anticoagulation, and prosthetic implants as covariates.

Results
In 152 patients (76.3% male, mean age 67.7y, 31.6% diabetic, 15.1% chronic renal failure, 23.7% anticoagulated post-operatively, 32.4% with prosthetic implants), 52 (34.2%) patients received Collatamp. Groups were comparable other than significantly more males in the Collatamp group (86.5% v 69.6%; p=0.02). 6 (4.0%) patients had deep space SSIs – one with Collatamp used. Collatamp reduced deep SSIs (adj OR: 7.5, p=0.06). Post-operative anticoagulation had a statistically significantly higher rate of deep space SSIs (adj OR: 13.4, p<0.01).

Conclusion
This is the largest series of Collatamp use in vascular surgery. Collatamp appears to reduce 30-day post-operative deep space SSIs but further larger studies are required.
VA036
USING A DISCRETE EVENT-SIMULATION MODEL TO PREDICT SURVIVAL OF PATIENTS WITH AN ABDOMINAL AORTIC ANEURYSM

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Introduction
Clinical decision-making surrounding the management of abdominal aortic aneurysms (AAA) can be challenging in some instances. While perioperative models that predict mortality do exist, they are uncommonly used in clinical practice. The aim of this study was to externally validate a predictive model with a cohort of patients with an AAA at size threshold.

Methods:
A previously developed and externally validated discrete event simulation (DES) model was used to predict the survival of consecutive patients with an asymptomatic AAA that has reached a threshold for management from a single tertiary centre over a 4-year period. Patient demographics were recorded from medical charts and death status was obtained from the national mortality database. Patient data were entered into the DES model and predicted 30-day, 1 to 5-year mortality were simulated.

Results
There were 442 patients included with a mean age of 75 years and 79 patients were females. Of these 336 patients underwent aneurysm repair and 106 that were not offered repair due to their medical comorbidities after discussion in a high-risk meeting. The observed 30-day mortality for the patients undergoing AAA repair was 5/336 (1.5%) and the expected (model predicted) mortality was 3.1% (c-statistic 0.86 [95%CI:0.56-0.97]). The model performance for the entire cohort improved over time with a c-statistic 0.74 (95%CI:0.69-0.79) at 4 years and 0.76 (95%CI:0.71-0.80) at 5 years. For the non-repaired group, the expected (model predicted) 1, 2 and 3-year mortality was 20.8%, 37.7% and 50.9% respectively, and the corresponding observed mortality was 16.5%, 33.3% and 50.5%.

Conclusion
This study demonstrates that using this predictive model can accurately estimate survival in patients with a threshold aneurysm and hence personalise clinical decision-making. Further validation in wider clinical settings is required to test the model’s clinical generalisability.

VA037
AV-GUARDIAN IN HEMODIALYSIS: FIRST IN MAN TRIAL FOR SELF NEEDLING

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Purpose
A first in man trial of the av-Guardian device to assist with self-needling in patients undergoing home haemodialysis. av-Guardian device is made of titanium and implanted sub-dermally along the AV fistula to assist in consistent needling of the fistula at home independently.

Methods
Implantation was done under LA at ultrasound guided pre-marked area of the fistula. A mechanical platform for placement allowed accurate positioning and securing of the av-Guardian device parallel to the fistula, without being in contact with the fistula. Temporarily secured in place by sutures, the device is designed to be fixed to the subcutaneous tissues and ready for needle access in 14 days post implantation. Ultrasound was done prior to needling to confirm the positioning. 2 devices were implanted to assist arterial and venous cannulation.

Results
A total of 6 patients had 12 devices implanted over a period of 4 months. They had well established fistulae and were candidates for home dialysis. All devices were implanted successfully. Initial needling was successful through all devices. 5 out of 6 patients completed 40 sessions of needling through the devices. 1 patient received a transplant during the study and did not complete the 40 needling sessions. 455 cannulations (229 arterial) were achieved (91%). Post trial, 1 patient with a neuropathy had a reaction to one device and had this removed and one other patient had the devices
removed due to personal preference. No occlusions or significant changes in the flow rates were identified during the trial.

Conclusion
The av-guardian is a reliable device for assisting patients with self-needling, in centre or at home. The device does not influence flow rates and appears to assist patients to needle fistulae safely. Further clinical trials are needed to test long term safety and efficacy.

VA038
RESULTS OF THE ENDURANT STENT GRAFT SYSTEM IN CHALLENGING ABDOMINAL AORTIC ANEURYSM ANATOMY

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Purpose
The ENGAGE registry was initiated to examine outcomes after endovascular abdominal aortic aneurysm (AAA) repair (EVAR) with the Endurant Stent Graft. Of registrants, 215 were treated outside of the approved indications for use (IFU) based on aneurysmal anatomy. We assessed the effectiveness and safety of the Endurant graft in this cohort.

Methods
The registry enrolled 1263 AAA patients treated with the Endurant stent graft from March 2009-April 2011. Primary outcome measure was 12-month treatment success; successful endograft delivery and deployment, the absence of type I or III endoleak, stent migration or occlusion, late conversion, and AAA diameter increase or rupture. Secondary outcome measures were 30-day and 12-month all-cause mortality, major adverse events, secondary procedures, technical observations, aneurysm-related mortality.

Results
Demographic characteristics of ENGAGE patients treated outside (17%) and within (83%) the IFU were similar except the former group included more females (18.6% vs. 8.9%, p<0.001). The “outside IFU” group had lower rates of coronary artery disease and a larger number of symptomatic patients compared with the “within IFU” group (21.9% vs. 15.0%, p=0.013). Technical success was achieved in over 99% of all patients. The groups showed a comparable occurrence of type III and I endoleak (uncorrected) immediately after device implantation and at 4-year follow-up (1.0% and 2.4%; p=0.374). Stent occlusion estimated overall survival, and freedom from aneurysm-related mortality and endovascular interventions were comparable in both patient groups. The outside IFU group underwent more type III and I endoleak correction procedures than the within IFU group (6.7% vs. 3.1%; p=0.013).

Conclusion
The Endurant device demonstrated promising follow-up outcomes in patients treated outside of IFU, although this cohort experienced increased graft-related complications and secondary interventions to maintain aneurysm exclusion.

VA039
FUNCTIONAL MOVEMENT TRAINING AS A NOVEL TREATMENT FOR FUNCTIONAL POPLITEAL ENTRAPMENT SYNDROME

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Purpose
Functional popliteal entrapment syndrome (FPES) is an uncommon but importance cause of exertional leg pain. Hypertrophy of the gastrocnemius muscle and lateralisation of its medial head is thought to cause overcrowding of the popliteal fossa, which leads to compression of the popliteal vessels. Functional movement training (FMT) is a form of rehabilitation comprised of a standardised exercise regime that increase hamstring strength and decrease gastrocnemius workload. We performed a retrospective analysis on the early outcomes of FMT for FPES.

Methodology
Between March 2018 and February 2019, 7 patients with FPES were enrolled in an 8-week 16-session FMT program in a single rehabilitation centre. The diagnosis was confirmed by two clinicians (a vascular surgeon and a sports physician)
and supported by dynamic Duplex ultrasonography and magnetic resonance imaging. The outcome of the training program was assessed by subjective reports of symptoms on a survey before and after treatment.

Results
Among the 7 patients with FPES, all had bilateral limb involvement. Lifestyle impact was inability to engage in casual sports in 5 patients, and inability to perform at work in 2 patients. 5 patients had botulinum toxin injections as an adjunctive treatment prior to the commencement of FMT program. 6 patients reported improvement of symptoms at the completion of the program. 5 patients returned to sport or work at the time of follow up between 3 to 12 months after treatment.

Conclusion
FPES is an uncommon condition that can be debilitating for otherwise young and well patients. Our results introduces FMT program as a novel treatment for FPES with promising results. Further study will help establish the long-term efficacy of functional movement training, either on its own or in combination with botulinum toxin injections.

VA040
PREDICTING COMPLICATION IN ACUTE TYPE B AORTIC DISSECTION: AN ENGINEER'S PERSPECTIVE

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Harry Perkins Institute of Medical Research, Western Australia

Purpose
We aimed to determine if patient-specific haemodynamic data might aid in the prediction of complication for acute type B aortic dissection. If predictive, we would then integrate this analysis into a new risk score for the disease and compare it with other techniques.

Methodology
Fifteen cases of acute type B aortic dissection were reconstructed into 3D and analysed with computational fluid dynamics (CFD). A risk score was formed that combined traditional morphological risk factors (maximum aortic diameter and false lumen thrombosis) with haemodynamic information (false lumen low and oscillatory shear (LOS) and false lumen pressure index). We analysed the 15 cases using this risk score and then compared its performance to an openly available risk score based on imaging features alone, the Stanford Risk Calculator for Aortic Dissection. All outcome data (i.e. complication event) was blind to the engineering team until after the analyses were complete.

Results
The haemodynamics based risk-score correctly predicted 11/15 outcomes and showed superior sensitivity and specificity to the Stanford tool (AUROC = 0.74 vs. 0.63). Interestingly, high LOS was the most predictive risk factor, even more so than maximum thoracic aortic diameter. False lumen thrombosis and false lumen pressure index were relatively poor indicators of complication.

Conclusion
Our preliminary data are encouraging and a risk score for aortic dissection that includes computational haemodynamics data may be beneficial in predicting the risk of complication in type B aortic dissection. This technique is now being applied to a larger cohort.

VA041
THE EFFECT OF FOOT ORTHOSES ON FOOT BIOMECHANICS AND GAIT IN PATIENTS WITH INTERMITTENT CLAUDICATION

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Purpose
Patients with Intermittent Claudication (IC) have been shown to exhibit an altered gait pattern, relative to healthy controls. This is evident during both pain-free and painful ambulation and may be associated with an ischaemia-induced neuromyopathy. Foot orthoses have successfully corrected gait abnormalities in other chronic disease patterns and may
Therefore be useful in patients with IC. This study aimed to further assess the underlying gait and biomechanical changes evident in IC and to determine the capacity of foot orthoses to correct these gait abnormalities and subsequently improve pain-free walking performance.

**Methodology**

Patients with IC were fitted with customised orthotics for 12 weeks. At baseline, 6 and 12 weeks, assessment of pain-free and total walking distance was performed using a 6-minute walk test (6MWT). At the same time points, patients also underwent 3D gait analysis to determine gait and biomechanical profiles of their walking.

**Results**

13 patients (7F, 6M) with IC were recruited to participate (mean age 67.9 years). At baseline, mean pain-free walking distance (PFWD) and total walking distance (TWD) was 136.4m and 363.3m respectively. Following the intervention with foot orthoses, there was no significant change in PFWD or TWD at 6 and 12 weeks, however, improvements in gait parameters were detected. Specifically, there were significant increases in cadence (P=0.004) and walking speed (P=0.01) with orthotics in the pain-free state. There were also significant reductions in time in stance and time in double support with orthotics, during both pain-free (P=0.00, P=0.001) and painful (P=0.003, P=0.011) ambulation.

**Conclusion**

The use of foot orthoses can improve gait characteristics in patients with IC. No improvements in walking performance were detected in this study, but larger scale studies are warranted to investigate the role of foot orthoses as a novel treatment to complement the current therapies provided to patients with IC.

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**VA042**

**PREDICTING COMPLICATION IN ACUTE TYPE B AORTIC DISSECTION: A SURGICAL PERSPECTIVE**

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**Purpose**

To identify morphological and haemodynamic risk predictors in acute type B aortic dissection using a computational modelling approach. There is uncertainty in the management of initially uncomplicated disease, and it is possible that improved methods of risk prediction will assist vascular surgeons in decision-making.

**Methodology**

10 cases of acute type B aortic dissection were identified by searching the IMPAX database from Fiona Stanley Hospital and Fremantle Hospital in Western Australia. The CTA at time of diagnosis was reconstructed in three dimensions and analysed with computational fluid dynamics. Results were extracted for morphological and haemodynamic parameters. Analysts were blinded to outcome until data had been extracted.

**Results**

5/10 cases became unstable – 4/5 required TEVAR, and 1/5 had sudden death due to aortic rupture. 3/5 complicated cases were predictable using computational modelling alone, Case 8, Case 9 and Case 10. Case 8 suffered from aortic rupture and had a high-risk morphology with 5/7 risk factors, the most out of the 10 cases analysed. Case 9 required TEVAR, had 4/7 morphological risk factors, and had a highly pressurised false lumen with a diastolic pressure of 180mmHg from baseline 80mmHg. Case 10 required TEVAR, had 4/7 morphological risk factors, and had a high LOS (low and oscillatory shear stress) in the false lumen.

**Conclusion**

Three dimensional reconstructions provide more information for vascular surgeons about morphological risk factors. While risk factors have been identified for type B aortic dissection in the clinical literature, haemodynamic factors are not yet considered in existing risk prediction methods. Applying computational fluid dynamics is a way of non-invasively obtaining data about haemodynamic effects such as pressure and wall shear stress. The technique has the potential to be clinically useful, especially in uncomplicated disease, however it requires validation in larger prospective cohorts before being used by vascular surgeons.
VA043
THE RELATIONSHIP BETWEEN OPERATIVE VOLUME AND PERIOPERATIVE MORTALITY AFTER NON-ELECTIVE AORTIC ANEURYSM REPAIR IN AUSTRALIA

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Purpose
Hospital and surgeon operative caseload is thought to be associated with perioperative mortality following the non-elective repair of aortic aneurysms, however whether such an association equists within the Australian healthcare setting is unknown.

Methods
The Australasian Vascular Audit was interrogated to identify patients undergoing non-elective (emergency [EMG] or semi-urgent [URG]) aortic aneurysm repair between 2010-2016, as well as their treating surgeon and hospital. Hierarchal logistic regression modelling was used to assess the impact of caseload (by quintiles) on outcomes after both endovascular (EVAR) and open surgical repair (OSR).

Results
Volume counts were determined from 14,262 patients (4,121 OSR and 10,106 EVAR). After exclusions, 1,153 EVAR (570 EMG and 583 URG) and 1,245 OSR (946 EMG and 299 URG) non-elective cases remained for analysis. Crude mortality was 24.0% following OSR (EMG 29.2%; URG 7.7%) and 7.5% following EVAR (EMG 12.6%; URG 2.4%). Univariate analysis demonstrated an association between OSR and hospital volume (Q1: 25.3%, Q2: 27.8%, Q3: 23.9%, Q4: 27.0%, Q5: 16.2%; p=0.03), but not surgeon (Q1: 25.2%, Q2: 27.4%, Q3: 26.0%, Q4: 21.4%, Q5: 19.5%, p=0.32). Multivariate analysis confirmed this association (OR [95%CI]; Q1 vs 5: 1.91 [1.13-3.21], Q2 vs 5: 2.01 [1.24-3.25], Q3 vs 5: 1.41 [0.86-2.29], Q4 vs 5: 1.92 [1.17-3.15]; p=0.02). The difference was most pronounced in the EMG OSR group (Q1 vs 4-5) (OR 1.63[1.07-2.48]; p=0.02). Mortality after EVAR was not associated with either hospital (Q1: 6.3%, Q2: 10%, Q3: 6.8%, Q4: 4.5%, Q5: 10%; p=0.14) or surgeon volume (Q1: 9.3%, Q2: 5.7%, Q3: 8.1%, Q4: 7.0%, Q5: 7.3%; p=0.67).

Conclusion
There is an inverse correlation between hospital volume and mortality following emergency open repair of aortic aneurysm, suggesting that consideration be given to restructuring Australian pathways of care to maintain optimal surgical outcomes in the endovascular era.

VA044
A TECHNIQUE TO PRODUCE 3D PRINTED GUIDES FOR BACKTABLE PHYSICIAN MODIFIED STENT GRAFTS

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Purpose
Advances in stent graft technology has seen the increase in elective complex endovascular repair including fenestrated and branched stent grafting however the delay to manufacture of custom stent grafts render them unsuitable for urgent or emergency cases. 3D printed stent graft templates for back table stent graft preparation have been described but lack technical detail.

Methodology & Results
Using 3D Slicer (version 4.10; Harvard, US, 2019), CT aortograms acquired for presurgical planning of CAAs are converted to representative models of the patient’s thoracoabdominal region with branches and then extruded outwards by 2mm and subtracted to form a hollow shell surrounding the contrast-enhanced lumen. The openings for the right and left renal arteries were cropped perpendicular to their respective take-offs. For triple or quadruple fenestrated grafts, the SMA and coeliac trunk are likewise cropped. The stent graft guide is cropped to include the proximal aorta and 3D-printed using autoclavable resin. Material costs are approximately AUD$30 and can be manufactured in less than 12 hours using a AUD$5000 Form2 resin 3D printer. The stent graft guides can then be autoclaved and introduced onto the back table during endovascular surgery.

Conclusion
Back-table physician-modified stent grafts are feasible with readily accessible technology and could serve as an alternative to custom fenestrated stent grafts for complex abdominal aortic aneurysm cases. Given the ease and cost-effectiveness of this workflow, further work into validating its potential would be merited.

VA045
MANAGEMENT OF PELVIC CONGESTION SYNDROME - WHICH DEVICES SHOULD WE USE?

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Pelvic Congestion syndrome is a poorly understood and controversial condition that affects multiparous woman. Presented is a discussion on the validity of the condition, a review of the process of triaging these patients, literature review of outcomes, alternative diagnoses, treatment techniques, approaches and a discussion of different devices one can use to treat this condition.

VA046
NEOVASCULARIZATION AFTER ENDOVENOUS LASER ABLATION, A CAUSE OF TRUNCAL RECURRENCE.

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Introduction
Endovenous ablation (EVA) techniques have taken the place of open-surgical treatment for truncal vein incompetence; based on the principle of destruction of the vessel using thermal energy, with local anaesthetic technique. We set out to investigate and identify outcome, complications, and risk of recurrence using clinical and ultrasound technique.

Methods
307 patients (119M/188F) with incompetence of the greater saphenous vein (GSV), were treated with EVA using local and tumescent anaesthesia. A 1470/1520nM, radial-firing laser fibre was used, with energy at 7-8W. Subsequently, patients were placed in compression stockings, and given injectable DVT prophylaxis. Patients were examined for DVT and successful obliteration, and had further ultrasound scanning at 4-days, 2-weeks, 6-weeks, 3-months, 6-months, and 1-year.

Results
Median GSV diameters was 7(range 4.2-12.8) mm, and the median energy (LEED) used for EVA was 49.1(range 32.7 to 86.7) Joules/cm. Overall complications included minor bruising in 20, and transient paresthesia in 34 cases; 1 DVT was noted. Complete truncal occlusion was noted in 301 patients. 6 patients developed truncal recurrence between 6-weeks to 3-months, although GSV occlusion was demonstrated at the initial and 2-week scan. GSV diameters of these patients were, 5.6, 5.6, 7.2, 7.4, 9.5, 10.3 mm, and LEED was 40.9(range 35.6 to 41.7) Joules/cm. No incompetent mid-thigh perforators were noted. We observed multiple tiny arteriovenous (AV) fistulae with arterialized signals in the initially occluded-GSV, that became confluent to result in truncal recurrence.

Conclusion
Venous recannalization occurs as a result of this neovascularization. This takes the form of multiple tiny AV fistulae, that eventually join together to become confluent reflux. The triggers for this phenomenon is unclear, but maybe related to vascular growth factors and LEED, and incomplete transmural destruction of the vein wall; and probably represents the major reason for recannalization after EVA.

VA047
THE FATE OF DEEP VEINS BELOW THE KNEE AFTER ULTRASOUND GUIDED FOAM SCLEROTHERAPY FOR INCOMPETENT VENOUS TRIBUTARIES.

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Introduction
Ultrasound-guided foam-sclerotherapy (SCL) in the management of incompetent venous tributaries (VT) with Sodium-tetradecyl-sulphate (STS) induces obliteration of venous lumen. The superficial VT communicate with the below-knee deep veins (DV) via perforator veins (PV). The aim of this study was to investigate the fate of the DV after ultrasound-guided SCL.

Methods
We treated a total number of 386 legs, with C3-C6 venous disease, using ultrasound guided SCL. All patients had pre-intervention duplex, vein marking, and identification of PV. 3% STS was used in foam (1:5) using the Tessari technique. Post-treatment, compression stockings were worn for 2-weeks, and post-treatment scans performed within 1-week, 2-weeks, 6-weeks, 12-weeks and 6-months. LMWH was given for high risk patients for DVT prophylaxis.

Results
90-patients (23.3% overall) were noted to have non-compressible but patent DV usually without thrombus (Deep Vein Sclerosae, DVS). Median lesion-length were 3(range 1-28) cm. DVT was identified in 2-patients, we identified PV in 27/90 (34.2%) prior to treatment, but PV was identified in a further 44/90 (49%) after treatment; and DVS in of 24 of the 44 (54.5%) of the previously unidentified PV. DVS involved the PV only in 41/90 patients (46%) and considered completed treatment; and DV and at least one PV in 49 cases (54%). The DVS involved DV and 1 PV in 43-patients, and DV and 2 PV in 6. We treated DVS cases with compression stockings for 6-weeks, and aspirin for 12-weeks, and surveillance scanning. No lesions progressed and remained unchanged in 13/49(27%); completely resolved in 25/49(51%); and smaller in 11/49(22%).

Conclusions
Deep Vein Sclerosae (DVS) occurs in almost a quarter of patients having SCL. Lesions are of short length. The course of these lesions appears fairly benign and are adequately treated with stockings and aspirin. The majority of DVS (73%) resolved or decreased in length within 6-12 weeks, and no lesions progressed.

VA048
MULTI-SLICE STRAIN GAUGE PLETHYSMOGRAPHY

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Purpose
To describe a novel stretch sensor used as a strain gauge plethysmograph to measure calf pump venous hemodynamics.

Methods:
We designed the stretch sensor using semiconductor strain gauges and aluminum bar (30 mm x 5 mm x 3 mm) to form a load cell. The load cell in series with an elastic band converts change in limb circumference to a proportional tension. Using arrays of stretch sensors along the calf muscles we recorded calf venous hemodynamics with in-house software.

Results:
Venous volume, venous filling index, ejection fraction and residual venous volume were calculated in 5 subjects.

Conclusion:
A simple, novel, non-invasive, multi-slice stretch sensor has been developed as a strain gauge plethysmograph to provide quantitative information on the calf venous hemodynamics.

VA049P
PLASMA DNA LEVELS AS DIAGNOSTIC BIOMARKER IN DEEP VEIN THROMBOSIS (DVT)

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Purpose
Despite a range of tests like d-dimer, venography and ultrasonography to diagnose deep vein thrombosis each has significant potential limitations. A simple blood test (plasma DNA) has tremendous potential applicability as adjunct for
Methods
We assessed if plasma DNA levels were elevated in patients with deep vein thrombosis as compared to normal controls using a prospective case-control design. This was done in the Department of Vascular Surgery, CMC Vellore from September 2014 to September 2016. The serum samples were centrifuged at 3000g for 15 min, treated with 10mmol/L-EDTA (pH 8) immediately after centrifugation. Plasma was diluted (1:10; v: v) in phosphate-buffered saline. Diluted plasma was then mixed with 50 mL of PBS containing Sytox Green (final concentration 2 mM) to label DNA. Fluorescence was recorded using fluorometer with a 485 excitation and 538-emission filter set. Auto fluorescence was considered as background and determined in samples mixed with PBS without Sytox Green. The amount of captured plasma DNA was proportional to the resulting color development and enabled quantification of levels by use of a calibration curve constructed with known amounts of DNA. Sample size had been calculated with a reported sensitivity and specificity of 81%.

Results
The mean plasma DNA was 2019 in patients with DVT as compared to 732 in controls. The median and IQR (25th and 75th percentile) were used as the summary statistics, since the standard deviation was high in the test group and the comparison revealed that the difference in the two groups was statistically significant (P <0.001).

Conclusions
Plasma DNA is elevated in patients with DVT. It may have a role as an adjunct diagnostic test with utility in patients for whom a duplex scan cannot be performed. The presence of plasma DNA in patients with DVT also points to a possible role of neutrophils in the etiopathogenesis of DVT.

VA051P
A 5-YEAR LONGITUDINAL STUDY OF TEMPORAL ARTERY BIOPSIES: DIAGNOSIS AND TREATMENT

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Purpose
Temporal artery biopsy (TAB) is the gold standard test for the diagnosis of giant cell arteritis (GCA). However, in recent literature, including the European League against Rheumatism’s (EULAR) guidelines, the use of TABs have been questioned due to increased sensitivity of non-invasive imaging techniques. The aim of this study was to determine whether temporal artery biopsies change clinical management of GCA and the role of diagnostic imaging.

Methodology
A retrospective analysis included consecutive TABs performed from January 2014 to January 2019 at a tertiary hospital. Clinical records were used to document demographics, steroid dose (mg/24hrs) at the time of biopsy, 3 months and 12 months post biopsy, and to determine the sensitivity of utility of duplex USS.

Results
There were 124 patients with a mean age of 71.8, 83 (67%) females and a positive TAB rate of 16% (20/124). Of those patients with a positive temporal artery biopsy all were on steroids at the time of surgery (mean dose 57.0mg +/- 3.2mg) and at 3 months post-surgery (22.5mg +/- 4.0mg). At 12 months post-surgery there were 88% of patients on steroids (8.4mg +/- 6.0mg). Of those with a negative temporal artery biopsy 93% were on steroids at the time of surgery (44.6mg +/- 3.7mg), 81% were on steroids at 3 months (12.1mg +/- 2.2mg), and 64% were on steroids at 12 months post-surgery (4.8mg +/- 1.1mg)

Ultrasound was performed on 90% of patients prior to surgery. The sensitivity of ultrasound to detect temporal arteritis was 47% (95%CI 24-71%) with a specificity of 90% (95%CI 82-95%). The positive likelihood ratio was 4.84 (95%CI 2.22-10.57).

Conclusions
This study suggests that ultrasound is not a sensitive screening test for the workup of giant cell arteritis. While ultrasound technology has improved we recommend that temporal artery biopsies continue to be performed if there is a strong clinical suspicion of GCA.
VA052P
A KNOT IN A PULMONARY ARTERY CATHETER: A SIMPLE TECHNIQUE FOR REMOVAL.

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We present cases that were admitted to the intensive care unit, an 81 M admitted post anterior STEMI and a 57 F post bioprosthetic aortic and mitral valve replacement. They both required Swan Ganz/Pulmonary artery (PA) catheter removal but ICU encountered a problem that prompted a request for assistance to the Vascular team. Imaging in both cases revealed that the PA catheter tip was visible in the pulmonary artery however there was also a coil in the right atrium.

A standard PA catheter is 7.5 Fr with 4 lumens externally and its tip sits in the pulmonary artery. It is diagnostic for many parameters that aid evaluation of the critically ill. Karanikas et al reviewed the literature over 50 years and found a total of 113 knotted intravascular catheters devices. 62% were removed with interventional radiological techniques, whilst 32% required surgical removal. In the last two decades 2/3 of the total reported intravascular knots were PA catheters. Tightening the knot so that it can pulled through an introducer through the vein of insertion without trauma was described by Kumar et al in 1980. We placed our patient head down and the knot was pulled to the skin. The external tip of the PA catheter was cut so that a 10Fr sheath, without a dilator, could be introduced over PA catheter. A small incision was made at the skin, to allow a 10Fr sheath through the skin, then the line was pulled through the sheath. Check xray was performed post removal. This technique is offered as a non-surgical technique for removal of knotted PA catheters.

References

VA053P
A NOVEL USE FOR AFX ENDOLUMINAL STENT GRAFT IN THE TREATMENT OF “SHAGGY AORTA”

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Mural thrombus and heterogeneous plaque in the distal aorta and iliac arteries (“shaggy aorta”) is an uncommon but potential source of arterial embolic events. While the mainstay of treatment is optimal medical therapy, intervention to cover the diseased segment can be considered. The best form of endovascular intervention remains debatable. The Endologix (Irvine, CA) AFX device is a unibody aorto-bi-iliac stent-graft indicated for abdominal aortic aneurysms. Its use for treatment for prevention of arterial embolic events is off-label. A key advantage of AFX over other stent-grafts and techniques such as CERAB is the preservation of the aortic bifurcation, enabling re-access in future for distal endovascular interventions. Computation flow-dynamic studies also suggest advantageous restoration of physiological flow dynamics when using the AFX device leading to a theoretical decrease in in-stent restenosis and intraluminal thrombosis rates in contrast to kissing stent configurations.

We present four cases in which we have used AFX to “jail” mural thrombus. All patients suffered ALI from embolic events attributed to “shaggy aortas” and underwent stent-grafting with AFX after initial successful restoration of infragingual lower limb perfusion and limb salvage. In all patients, technical success of AFX implantation was achieved with no 30-day morbidity or mortality. Limb salvage was maintained in all patients at 1 year. Primary patency was 75% at 1 year – 1 patient had stent-graft limb occlusion with no identifiable cause that had successfully endovascular treatment. Secondary patency was 100% at 1 year. No patients had further clinically evident acute lower limb embolic events.

Conclusion: The use of the AFX device to “jail” mural thrombus and heterogeneous plaque in the aorto-iliac system can be an effective solution to prevent acute lower limb ischaemic events.
VA054P

A POTENTIAL NEW CLASSIFICATION FOR ILIAC ARTERY ANEURYSMS

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Purpose
In this work we aimed to identify if there was an association between aortoiliac morphology, haemodynamics and the rupture of common iliac artery aneurysm.

Methodology
A cohort of 25 isolated CIAAs (15 intact, 10 ruptured) in 23 patients were reconstructed into 3D from computed tomography. These were classified by morphology and analysed with computational haemodynamics. Rupture locations for six cases were determined by an experienced radiologist. Key findings were then assessed in an independent validation cohort of 162 patients.

Results
Three distinct isolated CIAA morphologies were identified: saccular, fusiform and kinked, with mean diameters 90.3, 48.3 and 31.7 mm, and mean time-averaged wall shear stress of 0.16, 0.31 and 0.71 Pa, respectively (both ANOVA p<0.001). Kinked cases (n=8), all occurred in the left CIA, had the least calcification and thrombus, the most favourable haemodynamics and did not rupture. Ruptured isolated CIAA were large (mean diameter 87.5mm, range 55.5-138.0mm) and predominantly saccular. Rupture mostly occurred at sites of elevated low and oscillatory shear (LOS). The three morphological variants were applicable to the validation cohort with kinked CIAAs occurring predominantly in the left CIA after a leftward deflection in the abdominal aorta.

Conclusion
A new morphological categorisation of CIAAs is proposed. This is potentially associated with both haemodynamics and clinical course. Further research is required to confirm the presented hypothesis in longitudinal studies.

VA055P

A PROTOCOL FOR ALTEPLASE IN ARTERIAL CATHETER DIRECTED THROMBOLYSIS: A RESPONSE TO UROKINASE SHORTAGE

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Purpose:
Recent shortages of Urokinase in the local health district require alternatives for arterial catheter directed thrombolysis (CDT). Alteplase (rTPA) has been available but no formal protocol in our network was found. Landmark trials performed 25 years ago used a dose of 0.05-0.1mg/kg/hr. A literature search was conducted to establish a contemporary protocol.

Methods
The two authors independently searched and reviewed, Pub Med, Embase, Medline with the Boolean search terms CATHETER and THROMBOLYSIS and ALTEPLASE and ARTERIAL. The results were further restricted to Humans, Adults, and years 2003-2019. Landmark trials, Cochrane reviews and working party recommendations were read. Data was collected on demographics, ischaemia grade, rTPA bolus and infusion, complications and success.

Results:
404 subjects, predominantly male (2.5:1 ratio) aged 37-92 (pooled mean 60.5) with Rutherford limb ischaemia I, IIa-b, had TPA delivered into a catheter via a femoral sheath. 9 studies with a rTPA bolus had a mean of 8.7mg (range 2-20) and mode of 2.5-5mg. Grand mean dose of rTPA was 24mg (16-30). Infusion rate range was 0.5-10mg/hr with 53% receiving 0.5-1.6mg/h, (mode 0.8-1.6mg/hr). Duration of infusion was 0-48hrs. Heparin was infused through the sheath in 7 studies. All studies had an initial angiogram performed at 2-24hrs. 7/11 had infusion monitoring in ICU/HDU. Success was 77% with 20% complication rate and 12% groin haematoma. A 4% risk of a serious bleed causing Intracranial, retroperitoneal, or compartment syndrome was found and 1% mortality.

Conclusion:
Overall rTPA provides a reasonable success rate. High rates of complication and serious bleed remind us the morbidity is not insignificant. Due to large variability it is difficult to assign a protocol. We recommend an initial bolus of 5-10mg of rTPA, infusion rate of 0.5-1mg/hr with check angiograms at 24hrs. Monitoring in an HDU would be prudent.

VA056P
A RETROSPECTIVE REVIEW OF THE SAFETY AND COMPLICATIONS OF UROKINASE AND ALTEPLASE FOR CATHETER-DIRECTED THROMBOLYSIS IN ACUTE PERIPHERAL ARTERIAL OCCLUSION.
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Purpose
To review the outcomes in clinical effect as well as major complications in the transition from urokinase to alteplase as the thrombolytic agent in catheter-directed thrombolysis (CDT) for acute peripheral arterial occlusion.

Method
A retrospective review of all catheter-directed thrombolysis for acute peripheral arterial occlusion was performed from February 2011 until November 2018. The thrombolytic agent of choice was altered from urokinase to alteplase in June 2015 and the clinical effects and adverse outcomes compared.

Results
A total of 105 patients underwent CDT during this time, with 53 (50.4%) undergoing CDT with urokinase, and 52 (49.6%) undergoing CDT with alteplase. The total number of adverse outcomes during the review period was 49 (46.6%) of which 16 (32.6% of all complications) were considered major complications. The major complication rate for each treatment group was 26.9% and 3.7% in the urokinase and alteplase group respectively (P-value <0.05). No deaths were reported in the alteplase group, whilst 2 deaths attributable to CDT were reported in the urokinase group (4%).

Conclusion
An overall reduction in major complications was associated with the transition of thrombolytic agent from urokinase to alteplase. The complication rate associated with the administration rate of urokinase is vastly higher than the published data.

VA057P
A SINGLE SURGEON, 11-YEAR EXPERIENCE IN THE TREATMENT OF 180 CONSECUTIVE INFRA-Renal AORTIC ANEURYSMS WITH THE ENDURANT STENT GRAFT SYSTEM
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Introduction
Several studies from the ENGAGE registry has shown the use of the Endurant stent graft for endovascular abdominal aortic aneurysm repair (EVAR) is associated with low rates of both all-cause and aneurysm-related mortality. It has also demonstrated effectiveness in patients with challenging anatomy which falls outside of the instructions for use (IFU) recommendations.

Objectives
We describe a large, Australian, single-surgeon experience using the Endurant stent graft in simple-through-complex aneurysm anatomy.

Methods
We analysed a cohort of consecutive patients treated for infrarenal abdominal aortic aneurysm (AAA) with EVAR between August 2008 and March 2019.

Results
One hundred and eighty patients (mean age of 76.0±8.6 years, 90% male) with AAA (mean diameter 57.5 ± 10.5mm) underwent EVAR with the Endurant stent graft. Seventy-six patients (42.2%) had anatomy which fell outside the device
IFU. At mean follow-up of 54.9±30.4 months (range 1-126), 51 patients (28.3%) died. Five-year overall- and aneurysm-related-survival were 77.2% and 99.4%, respectively. Lower 5-year survival rates were seen in patients who underwent EVAR that were >80 years (78.3% vs 59.2%; \( P<0.01 \)) or with aneurysm diameter >70mm (73.8% vs 55.6%; \( P=0.03 \)). Thirteen endoleaks (7.2%) were observed on follow-up (mean time following procedure 8.7±4.2 months, range 1–52).

Eleven patients (6.1%) required secondary intervention. Compared to patients treated within the IFU (\( n=104 \)), those with anatomical features outside IFU (\( n=76 \)) have similar endoleak (7 [6.7%] vs 6 [7.9%] patients; \( P=0.76 \)), secondary re-intervention (7 [6.7%] vs 4 [5.3%] patients; \( P=0.74 \)), and overall-survival (72 [69.2%] vs 55 [72.3%] patients; \( P=0.46 \)) rates.

Conclusion
Results from this real-world, single-surgeon 11-year experience using the Endurant stent graft for EVAR demonstrate it is safe and effective, with excellent long-term outcomes for AAA anatomy which falls both inside and outside of IFU recommendations.

VA058P
ACUTE AND CHRONIC VENOUS OBSTRUCTION: HOW WE STARTED THE SERVICE AND EARLY RESULTS

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Purpose
Iliocaval venous obstruction is associated with significant morbidity and mortality. Compression or obstruction of the iliacaval system predisposes to extensive lower extremity deep vein thrombosis (DVT), which may result in a threatened limb or massive pulmonary embolism. Chronically, patients can experience debilitating post-thrombotic syndrome, venous claudication, swelling and leg ulceration. Endovenous treatment via venoplasty and stenting has been shown to be an effective means of alleviating symptoms and improving quality of life, with favourable patency rates reported. We report on the early results of a series of patients with complex venous disease treated at a tertiary vascular centre in Melbourne.

Methodology
A retrospective search of the Australasian Vascular Audit (AVA) and hospital electronic medical records was performed to find all patients who had undergone endovenous procedures between April 2017 and April 2019.

Results
Over the 24-month period, 25 patients underwent endovenous procedures at our institution, with a total of 36 procedures performed. A combination of techniques was utilised, including diagnostic venography, intravascular ultrasound (IVUS), thrombolysis, pharmacomechanical thrombectomy, venoplasty and stenting. Of these, two cases involved total endovenous recanalisation and iliacaval stent reconstruction for inferior vena cava atresia. The most common indication was recurrent DVT, often as a result of May-Thurner compression. Early results show improved venous calibre using IVUS measurements, minimal complications, and a high primary patency rate at 4 weeks (93%).

Conclusion
Iliocaval venous disease can lead to severe thromboembolic consequences with a significant impact on quality of life. We present our early experience of endovenous treatment of patients presenting with a spectrum of complex venous conditions. We hope to encourage further discussion and research in this area between vascular surgeons, haematologists and other involved specialists in Australasia.

VA059P
ACUTE SADDLE AORTIC OCCLUSION TREATED WITH ENDOVASCULAR ANGIOJET™ PERIPHERAL THROMBECTOMY SYSTEM

CHI LAP NICHOLA TSANG, RUI FEITOSA, PRASHANTH GUNANAYAGAM, JERRY CAO AND TAM NGUYEN

The Wollongong Hospital, New South Wales

Sudden development of simultaneous superimposed dissection and thrombosis with complete luminal occlusion is a rare complication of an abdominal aortic aneurysm. We present a previously well and independent 79-year-old male who presented with acute bilateral lower limb paralysis waking him from sleep. He was in extremis on examination, delirious
and unable to follow commands. His lower limbs were mottled and paralysed, with no femoral pulses detectable on doppler signal bilaterally. CT angiogram showed a 3.6cm infrarenal abdominal aortic aneurysm with superimposed dissection and thrombosis, and abrupt cut-off of contrast distally. An emergency angiojet thrombolysis and thrombectomy of abdominal aorta and angioplasty of lower limbs were performed with final digital subtraction angiography showing triple vessel run-off and good peripheral lower limb perfusion clinically. He was admitted to ICU postoperatively and did not require fasciotomies. He underwent a delayed unremarkable endovascular abdominal aortic aneurysm repair due to development of bilateral pneumonia which was treated prior to his aortic repair. Due to significant deconditioning from prolonged hospitalisation, he was eventually discharged 1-month post-presentation to a rehabilitation facility. This is only the second known case in literature of acute aortic occlusion treated using the AngioJet™ Peripheral Thrombectomy System.

VA060P
AN IDENTIFICATION KEY FOR ENDOVASCULAR STENT GRAFTS FOR TREATMENT IN ABDOMINAL AORTIC ANEURYSMS

SAMANTHA KHOO
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Purpose:
Aortic grafts implanted by endovascular means have been in use in Australia since 1994. In Australia 2017/18, 845 medical benefit claims were made for infrarenal aortic repairs. Currently 9 grafts are on the Australian Registry for Therapeutic Goods (ARTG) and available for use. Australia has a mobile population, patients often move from their original treating centres and are lost to follow up. In an emergency presentation, patients do not have graft model information readily available. The purpose of this project is to create an identification flow chart to enable aortic grafts to be radiographically identified and matched to the 9 TGA approved grafts.

Method:
A search of the ARTG was conducted for endovascular grafts available for repair of abdominal aortic aneurysms. Review of the public TGA summary, instructions for use, manufacturers photographs, X-rays and computerised tomography (CT) were used to establish radiological and physical features to identify a graft. A flow chart was created with categorization into infrarenal or suprarenal fixation. The next division involved recognition of radiological markers situated in the neck, main body and limbs of grafts.

Conclusion:
The 9 approved graft do have distinct features in their main bodies and fixation points that can help identification. Plain x-rays have been underutilised in follow up of grafts, however they may provide rapid identification due to clear visualisation of radiopaque markers. CT’s are the most frequently utilised assessment of grafts in an emergency. By matching the radiological features on the graft to the characteristics on the flow chart a clear match to a known graft can be made.

The flow chart will make most grafts identifiable and assist with future intervention and expectant management. Potential creation of smartphone analysis with this flowchart via an App may allow for widespread availability of the identification key and ease of graft recognition.

VA061P
ARCH REPAIR FOLLOWED BY COMPLETION TEVAR

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Conventional surgery for ATAAD involves resection of the primary entry tear, open repair of the ascending aorta and hemi-arch with an open distal anastomosis under deep hypothermic circulatory arrest, aortic valve resuspension and some form of obliteration of the aortic root false lumen. While this is seen to deliver the lowest earliest operative risk, it is associated with high rates of persistent false lumen patency which exposes the patient to risks such as distal malperfusion in the acute setting and aneurysm formation and rupture in the long term.

Total aortic repair consists of branch first total arch repair followed by thoraco-abdominal stenting and balloon rupture of the septum. The current technique was described by Prof Matalanis in Melbourne. The branch first arch replacement technique allows safe and controlled replacement of the arch and provides a long Dacron landing zone away from arch
branches for subsequent thoraco-abdominal stenting. It essentially consists of a sequential short period of clamping and reperfusion of the three arch branches without circulatory arrest using a modified trifurcation graft with a side perfusion port. By treating the whole dissected aorta, the aim is to obliterate the false lumen, ensure single true lumen flow, prevent branch vessel mal-perfusion and reduce the incidence of late aneurysmal formation.

From 2016-2018 ten patients have underwent total aortic repair in our centre. Eight were DeBakey type 1 dissections. Two were symptomatic acute type B dissections with evidence of peri-rupture. 50% of patients were male and the median age was 68. No intra-procedural complications relating to stent deployment, injury to vessels or access complications. No mortality at 0 or 30 days. No strokes, bleeding or paraplegia.

Hybrid total aortic repair can be justified based on literature and our unit experience. Larger numbers and longer follow up are required but early results in this high-risk group are promising.

VA062P
BALLERINA STUDY – A RETROSPECTIVE REVIEW OF CROSSED LIMBED EVARS

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Royal Perth Hospital, Western Australia

Purpose
Difficult anatomical characteristics may limit successful cannulation of the contralateral limb during endovascular repair of abdominal aortic aneurysms (EVAR). Crossing the limbs of the stent has been used to aid cannulation. The aim of this study is to compare graft related outcomes in patients who underwent EVAR with crossed limb compared to conventional deployment.

Methodology
A retrospective review of all patients who underwent EVAR using the Gore Endograft system across 7 hospitals within the Western Australia over a 5-year period (2013-2018). Primary outcome measures included graft limb occlusion (GLO), endoleak and reintervention. Secondary outcome measures included early (30 day) and late (2 years) mortality.

Results
215 cases were analysed (83 crossed vs 132 conventional). Mean age was 70.5 years (SD 25.60), with majority being male (86%). No GLO occurred in the crossed limb group while 1 GLO was noted in the conventional group requiring reintervention (p=0.427). No patients required re-intervention in the crossed limb group. Type I endoleaks occurred in 1 (1%) of the crossed limb group vs 2 (1.5%) of the conventional group (p=0.85). Type II endoleaks occurred in 12 (14%) of crossed limb group vs 8 (6%) in the conventional group (p=0.036). There were no Type III endoleaks in the crossed limb group, but 1 (0.7%) was recorded in the conventional group (p=0.427). 30-day mortality event was not recorded in the crossed limb group vs 1 (0.7%) in the conventional group (p=0.427). 1 (1%) late non-aneurysm related mortality event was recorded in the crossed limb group, in comparison to 4 (3%) in the conventional group (p=0.387).

Conclusion
No increased incidence in limb occlusions or mortality was noted between the crossed limb and uncrossed groups. Further larger sample size studies are required in view to determine the long-term outcome of crossed limbs after EVAR.

VA063P
DO PD-1 CHECKPOINT INHIBITORS INCREASE THE RISK OF ARTERIAL THROMBOEMBOLISM?

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The use of immunotherapy in cancer treatment has expanded the treatment options available for patients with advanced cancer. Interestingly, while cancer itself can be prothrombotic, some immunotherapies have been implicated in increased rates of arterial thromboembolism.

Programmed death-1 (PD-1) immune check point inhibitors are human monoclonal antibodies against the cell surface receptor PD-1. PD-1 is mainly expressed on T cells. PD-1 is involved in downregulating immune signalling and thus helping to maintain peripheral tolerance and prevent autoimmune responses. A number of cancers highly express PD-1 ligand which interacts with PD-1, allowing the cancer cells to evade elimination by the immune system.
PD-1 checkpoint inhibitors are licenced for use in treatment of a number of cancers where PD-1 ligand is highly expressed. These drugs are known to produce immune related adverse events (irAEs) in most organ systems. Patients with a history of autoimmune conditions are thought to be at higher risk.

There are a number of reports of arterial thromboembolism as irAEs in the literature. There is a small volume of available literature suggesting that inhibition of the programmed cell death-1 pathway accelerates inflammation and atherosclerosis leading to increased rates of arterial thrombosis.

We discuss the literature regarding the purported mechanisms by which PD-1 checkpoint inhibitors accelerate atherosclerosis as well as the increasing role of the vascular surgeon in the treatment of this group of patients.

VA064P
DUPLEX DERIVED FLOW MEASUREMENTS OF FEMORAL AND POPLITEAL ARTERIES

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Purpose
Measuring volume flows in vessels has been available on commercial ultrasound (US) machines for many years, however, the clinical role of volume flow measurements has lacked applicability. We demonstrate a novel method of estimating a flow in the femoral and popliteal arteries. A “flow ratio” can be derived from forward “systolic flow” (Qs) component of the Doppler waveform; divided by the “total flow” (Qt) throughout the entire cardiac cycle. This ratio (R=Qs/Qt) is analogous to the pulsatility and also the predominance of forward flow in the vessel. Importantly, this ratio also removes potential errors with luminal diameter estimation and wall-motion artefact.

Methods
We examined 55 patients (90 limbs) in patients (average age 63.9years) without peripheral arterial disease. Patients were rested for 20mins and examined recumbently at 20degrees. US measurements were performed per protocol by a single operator and samples were measured from the mid segment of the SFA and the popliteal artery. The US machine’s algorithm is used to derive the time-averaged mean trace from Doppler waveforms.

Results
Resting Flow measurements (Qt) in the SFA averaged 103 (+/-48) mls/min (average diameter 5.4mm) with systolic component (Qs) estimated at 406(+/-104). By contrast, the popliteal Qt averaged 41 (+/-21) mls/min (average diameter 4.6mm) with Qs estimated at 195(+/-91). The ratio (R) in the SFA was 4.5(+/-2.2) and 5.7 (+/-3.4) in the popliteal.

Conclusions
The volume of flow (estimated by US) in the SFA is double that of the popliteal artery (despite minimal diameter differential). The flow in popliteal artery was more pulsatile than the SFA (according to the Ratio Qs/Qt). These in-vivo findings might provide explanation for the variance in predilection to denovo atherosclerotic plaque deposition and the clinical outcome of interventions (particularly with stents) in these two regions. This technique is readily applicable and has many potential clinical implications.

VA065P
ENDOVASCULAR ANEURYSM REPAIR IN OCTOGENARIANS IS SAFE AND EFFECTIVE: PROPENSITY MATCHED ANALYSIS OF MID-TERM OUTCOMES FROM THE ENGAGE REGISTRY

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Objectives
To assess periprocedural results and secondary endovascular procedure outcomes through 5 years in octogenarians and older compared with patients < 80 years of age.
Methods
Data from the ENGAGE were used for the analyses. Patients were characterized into two groups according to age: ≥ 80 years of age (octogenarians and older) and < 80 years of age (controls). A total of 290 octogenarians were compared with 973 controls.

Results
There was no significant difference in the 30-day mortality rate (1.4% [4/290] vs. 1.2% [12/973], P = .85) or major adverse events (5.2% [15/290] vs. 3.6% [35/973], P = .23) in patients ≥ 80 years vs. controls. Propensity matching between the two groups showed a significant difference in overall survival between the octogenarians and controls at 5 years (52.5% vs. 71.8%, P < .0001), but no difference in the freedom from aneurysm-related mortality through 5 years (97.8% vs. 96.6%, P = .51). Multivariate analysis confirmed age ≥ 80 years, pulmonary disease, large baseline AAA diameter and renal insufficiency as factors significantly associated with all-cause mortality, while diameter was the single parameter associated with increased aneurysm-related mortality. Freedom from secondary endovascular procedures through to 5 years did not reach statistical significance; 88.5% in octogenarians and 83.2% in controls (P = .07).

Conclusions
Endovascular aneurysm repair (EVAR) can be performed in individuals ≥ 80 years with no statistically significant difference in aneurysm-related deaths compared with younger patients in the midterm. In the context of advanced age in this cohort, EVAR can be performed with acceptable morbidity rates and is therefore a safe treatment in octogenarians with abdominal aortic aneurysms.

VA066P
ENDOVASCULAR MANAGEMENT OF ACUTE SADDLE PULMONARY EMBOLISM FOLLOWING LUMBAR LAMINECTOMY

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Management of saddle pulmonary embolism poses a significant challenge post neurosurgical intervention with competing interests in treatment of thrombosis with the fear of haematoma formation. We present the case of an 88-year-old female who developed acute saddle pulmonary embolism day 3 post lumbar laminectomy for treatment of symptomatic spinal canal stenosis. She was referred to the surgical service with CT Pulmonary Angiogram showing saddle pulmonary embolism, relative hypotension (>40mmHg below baseline), and right heart strain on bedside echocardiogram. A decision was made to undergo catheter directed thrombolysis to manage her pulmonary embolism while minimising systemic exposure to lytic agents.

She underwent catheter directed thrombolysis of her bilateral pulmonary emboli with immediate on-table resolution of her relative hypotension and resolution of her tachypnea and oxygen requirement post operatively. She was placed on a low dose heparin infusion post-operatively and developed haematoma formation of her lumbar laminectomy site with no neurological compromise necessitating brief cessation of anticoagulation. She was discharged to rehabilitation 2 weeks post-procedure. This case underlines the difficulties surgeons face in the acute post-surgical patient who have life-threatening pulmonary embolism. Catheter directed lysis offers an alternative in patients who would otherwise be deemed too high risk for standard systemic lysis.

VA067P
ESTIMATING THE NATURAL GROWTH OF POPLITEAL ARTERY ANEURYSMS

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Purpose
Popliteal artery aneurysms (PAAs) account for >85% of all peripheral aneurysms. A conservative estimate of occurrence is that they are present in 1% of older males, but they are mostly asymptomatic so this is probably an underestimation. Larger PAAs are clinically significant due to their propensity to thrombose and cause critical limb ischemia. Little is known about the annual growth rate of asymptomatic PAAs.

The aim of this study was to document the natural history of popliteal aneurysm growth and determine the influence of
commonly associated patient factors on PAA growth rates.

Methodology
This retrospective cohort study included patients referred for ultrasound surveillance of popliteal aneurysms at a tertiary hospital between 2008 and 2019. The primary outcome investigated was change in PAA diameter over time. Patient demographic information, associated risk modifiers, and details of any open or endovascular intervention were also recorded. Subgroup analysis was performed to investigate the effect of smoking status, concurrent abdominal aortic aneurysm (AAA), and patient age on PAA growth rate.

Results:
Eighty-eight patients with PAAs were identified, encompassing a total 140 PAAs. The median age at inclusion was 71 (range 29–94) and only one patient was female. There were 58% of patients who had a concurrent AAA, with a similar proportion (59.1%) found to have bilateral PAAs. 51% of aneurysms were repaired; the ratio of open to endovascular repair was ~2:1. The annual growth rate of popliteal aneurysms in the studied cohort was 1.3mm/year.

Conclusion:
In this longitudinal study, PAA grew slowly over time and half of the patients on surveillance had their aneurysm repaired. Subset analysis did not find any correlation between aneurysm growth rate and smoking, the presence of an abdominal aortic aneurysm, or age.

VA068P
FRAILTY IN PATIENTS WITH CRITICAL LIMB ISCHAEMIA CORRELATES TO FUNCTIONAL IMPAIRMENT, DEPENDENCY AND REDUCED QUALITY OF LIFE

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Background
Frailty is recognised as an important prognostic factor for adverse surgical outcomes. Patients with critical limb ischaemia (CLI) report significant functional impairment, however it is unknown how closely frailty correlates to function. In this prospective cohort study of patients having surgery for CLI, we used various methods to classify patients as frail and compared these to domains of functional impairment.

Methods
Participants were consecutively recruited in the preadmission clinic. In a blinded assessment of frailty, a clinician made a clinical assessment of patient frailty. A modified Elders Risk Assessment Index Score (ERAIS) gave an objective measure of frailty. Functional impairment was identified from patient surveys measuring activities of daily living (Katz ADLs and Lawton IADLs) and quality of life (SF-12). Concordance between frailty assessment methods and functional impairment was assessed using SAS 9.4.

Results
Of the 34 patients recruited, 75% were identified as frail on at least one method of assessment. Clinical assessment identified more patients as frail compared to the ERAIS (68% vs. 44%). Frail patients had higher rates of heart disease (56% vs 33%), COPD (22% vs 0%) and cancer (22% vs 0%) than non-frail. Frail patients also had more geriatric related sensory and mobility impairments (56% vs 33%). Of the patients identified as frail, 83% had at least one self-reported feature of functional dependency. Patients with reduced functional domains in the SF-12 were more likely to be classed as frail by clinical assessment than ERAIS.

Conclusion
Our findings show clinical assessment of frailty strongly emphasise functional aspects of frailty in addition to multimorbidity. A dose-dependent relationship between frailty and functional impairment was found. Patients having surgery for CLI have significant functional impairment and reduced quality of life. Interventions to address frailty need to be incorporated into standard CLI care.
VA069P
FULLY ROBOTIC RETROPERITONEAL LYMPH NODE DISSECTION- A FUSION OF TECHNOLOGIES

JASAMINE COLES-BLACK, ATANDRILA DAS, TOAN PHAM, NATHAN LAWRENTSCHUK, DAMIEN BOLTON, SANDY HERIOT, SATISH WARRIAR AND JASON CHUEN

Austin Health, Victoria

Purpose
Retroperitoneal lymph node dissection (RPLND) is technically challenging, often requiring Vascular Surgical involvement. With a morbidity of 17–33%, conversion of laparoscopic approach to open is common. Robotic surgery lends itself to RPLND due to superior visualisation, greater degrees of motion, and precise movements however visualising complex relationships of tumour to aorta remains challenging. Our group has pioneered the fusion of robotic surgery and intraoperative 3D modelling to aid precision dissection in the world’s first application of this technology aiding fully robotic malignant RPLND.

Methodology
Using 3D Slicer (version 4.10; Harvard, US, 2019), standard patient CT imaging was 3D reconstructed. The target node and aortoiliac segment were further highlighted and superimposed on the 3D reconstruction. Using the Da Vinci Xi Surgical Robot, the TileProTM input port was accessed via HDMI output to DVI input cable.

Results
Informed consent was obtained and the patient positioned in modified lithotomy with ureteric stents placed. Four robotic ports and one assistant port were inserted with the robot was docked to the patient’s left. Following adhesiolysis, the right retroperitoneum was entered and aortoiliac segment dissected out with ureteric preservation. True to the 3D reconstruction, this revealed the malignant node at the bifurcation which was sharply dissected, aided by live intraoperative referencing to the 3D reconstruction through the Surgeon Console. This was particularly useful in establishing a plane between the node and anterior aortic wall where dense fibrosis was encountered. The specimen was removed in an endocatch. Operative time was 150 min and blood loss <50ml.

Conclusion
This innovative case highlights cutting-edge 3D modelling as an invaluable preoperative planning tool and intraoperative reference in technically challenging robotic RPLND.

VA070P
GETTING A GRIP – PRODUCING AN ENDOTHELium-LINED 3D-PRINTED AAA PHANTOM

JASAMINE COLES-BLACK, JASON CHUEN, ALEXANDER DUPUY, REBECCA METZGER AND BLAKE COCHRAN

Austin Health, Victoria

Purpose
3D-printed patient-specific aortic phantoms are becoming increasingly feasible for EVAR planning, aiding device selection and intraoperative performance. However, given the nascent of this technology, the ideal AAA phantom with optimal haptic fidelity has yet to be established. This ideal phantom would be flexible with comparable compliance to biological aorta, in order to accurately simulate graft behaviour and aortic deformation. Desired features of these idealised phantoms include similar surface properties to aortic intima, in order to simulate stent graft sealing and adherence.

Methodology
Using our previously described workflow, CT aortograms were converted to representative patient-specific 3D models and negative casts 3D printed in PLA. Models were cast in PDMS (Sylgard 184) and demoulded using 1,4-dioxane. To allow for engraftment of cells, PDMS was coated with bovine fibronectin at 25 μg/mL for 2 hours at room temperature, then air dried for 1 hour. Primary human coronary artery endothelial cells (HCAEC) or HMEC-1 cells were added, the vessel sealed with breathable sealing tape and cultured at 37°C until confluent. Cell viability was determined by live/dead staining.

Results
Both HCAEC and HMEC-1 cells readily colonised the fibronectin coated vessel, forming confluent monolayers after 1-
2 days in culture. Cell viability was > 95%. After incubation and live/dead staining, it was found that the cells were viable at the completion of the workflow, with subjectively similar tactile properties to aortic intima. A Medtronic Endurant II stent graft system was deployed by a consultant Vascular Surgeon, and the haptic properties were comparable to live endovascular surgery.

Conclusion
The described technique for lining a flexible, clear PDMS aortic phantom with a live endothelial layer is a feasible option for simulation of the aortic endoluminal surface for stent-graft deployment.

VA071P
GETTING A GRIP- STEPS TO PRODUCE AN ENDOTHELIUM-LINED 3D-PRINTED AAA PHANTOM

JASAMINE COLES-BLACK, JASON CHUEN, ALEXANDER DUPUY, REBECCA METZGER AND BLAKE COCHRAN

Austin Health, Victoria

Purpose
For the presurgical planning of complex EVAR, 3D printed patient-specific aortic phantoms are becoming increasingly feasible, aiding device selection and intraoperative performance. However, given the nascent state of this technology, the ideal AAA phantom with optimal haptic fidelity has yet to be established. This ideal phantom would be flexible with comparable compliance to diseased aorta, in order to accurately simulate graft behaviour and aortic deformation. A feature of these idealised phantoms would include similar surface properties to aortic intima, in order to predict the likelihood of endoleak and graft migration.

Methodology
Using our previously described workflow, CT aortograms were converted to representative patient-specific 3D models and negative casts 3D printed in PLA. Models were cast in PDMS (Sylgard 184) and demoulded using 1,4-dioxane. To allow for engraftment of cells, PDMS was coated with bovine fibronectin at 25 μg/mL for 2 hours at room temperature, then air dried for 1 hour. Primary human coronary artery endothelial cells (HCAEC) or HMEC-1 cells were added, the vessel sealed with breathable sealing tape and cultured at 37°C until confluent. Cell viability was determined by live/dead staining.

Results
Both HCAEC and HMEC-1 cells readily colonised the fibronectin coated vessel, forming confluent monolayers after 1-2 days in culture. Cell viability was > 95%. After incubation and live/dead staining, it was found that the cells were viable at the completion of the workflow, with subjectively similar tactile properties to aortic intima. A Medtronic Endurant II stent graft system was deployed by a consultant Vascular Surgeon, and the haptic properties were felt to be comparable to live endovascular surgery.

Conclusion
We have developed a technique for lining a flexible, clear PDMS aortic phantom with a live endothelial layer for optimal simulation of the aortic endoluminal surface for stent deployment.

VA072P
INCIDENCE AND OUTCOMES OF THORACIC AORTIC TRAUMA: EXPERIENCE IN A NEW ZEALAND LEVEL 1 TRAUMA CENTRE

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Purpose
Blunt thoracic aortic injury (BAI) is rare yet remains a leading cause of death following blunt trauma. There are few international reports on population-based incidence of BAI and none from Australasia. A recent publication from Maryland, USA described an incidence of 0.47/100,000/year for those >18yo surviving to hospital admission. BAI is the cause of death in up to 15% of road traffic crashes; New Zealand road crash statistics are better than in Maryland. We hypothesised the incidence of BAI in our population is lower than that in Maryland.
Methodology
A retrospective study of BAI in the Northern health region of NZ 1995-2018, using the Auckland City Hospital Trauma Registry (all patients >15yo admitted after trauma). Treatment of BAI in this health region is only available at Auckland City Hospital. Presence of BAI and intervention type identified using AIS codes and text fields. Outcomes were intervention type, and all-cause and aortic mortality. Incidence was denominated by average population in Northern region of NZ over the 23-year period.

Results
Of a population of 1.8 million in the Northern health region, 110 (0.27/100,000/year) sustained a BAI. These patients were young (average 37y), and more often male (74%). Mechanism of injury included road traffic crashes in 71 (65%), and motorcycle crashes in 21 (19%) patients. The majority underwent endoluminal repair (50%), followed by open repair (18%). All presenting after 2005 underwent endoluminal repair. Overall mortality was 30 (27%), of which BAI was the cause in 17 (56%).

Conclusion
The incidence of blunt thoracic aortic injury in the Northern region of NZ is lower than in Maryland. This may be related to better road traffic statistics or other aspects of injury mechanism demography. Knowledge of BAI incidence allows appropriate planning of vascular surgical capability, and further work will identify areas where injury prevention could be effective.

VA073P
INCRRAFT GRAFT; EARLY EXPERIENCE OF A PERSONAL SERIES.

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Objective
To present the experience, lessons learnt and outcomes of a personal series of a low profile endoluminal graft.

Methods
All Cases of Incraft grafts inserted since Feb 2018 included in report. The initial experience and immediate outcome and early follow-up of this patient cohort with the focus on technical and clinical success, vessel patency, reinterventions, and survival.

Results
Eight patients were included in this study. Male to Female ratio 7:1. With mean age of 78 yr. Mean procedure time was 69min and mean screening time 22.6m and mean contrast of 15 and carbon dioxide 517mls and radiation of 26790 ugycm2 with Median preoperative aneurysm diameter was 53 mm. The mean clinical follow-up was 8months. Only one proglide used for each groin. One procedural complications with fem fem crossover and amplatz occlude due to single gate cannulation of both iliac limbs. Overall survival was 100%

Conclusions
Effective low-profile graft with acceptable procedural outcomes and early outcomes. Potential increase in use of these grafts in EVAR with small iliac vessels.

VA074P
INTERIM RE-ANALYSIS OF THE KATSANOS ET AL PACLITAXEL VS. POBA ALL-CAUSE MORTALITY META-ANALYSIS

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Purpose
The recently published meta-analysis “Risk of Death Following Application of Paclitaxel-Coated Balloons and Stents in the Femoropopliteal Artery of the Leg: A Systematic Review and Meta-Analysis of Randomized Controlled Trials” suggested a statistically significant increase in all-cause mortality in patients receiving paclitaxel coated stents or balloons. This has raised considerable interest and concern for both vascular surgeons and regulatory authorities. This study aims to re-analyse these results to confirm significance.
Methodology
The statistical analysis tools implemented by the meta-analysis was investigated with respect to outcome measure and assumptions made.

Results
The data set examined by the meta-analysis compared the crude mortality of paclitaxel and control groups calculated as the combined simple proportions of deaths in the total number of patients entering each arm of each study. This assumes that patients withdrawn or withdrawing, lost to follow-up or otherwise censored had zero mortality. In the only 2 studies that contained 5-year mortality, the proportions of censored patients were similar in both treatment categories. Both studies gave interim results at 1 and 2 years, but no interim analyses were done at 3 and 4 years. Crude Kaplan-Meier curves can be calculated from these papers as individual patient data noting exact times of death and censoring were not available. Losses to follow-up were more conservatively assumed to have occurred before deaths. Little or no difference in mortality between the two arms remains nor is it statistically significant (p=0.28). Similar results are found if more studies are included using this approach noting that more than two-thirds of all patients in the meta-analysis were only followed for 12 months.

Conclusion
This review suggests that the apparent increase in mortality in patients receiving paclitaxel is only statistically significant because of the assumptions made and the form of analysis used.

VA075P
INTERRUPTED DEPLOYMENT OF GORE EXCLUDER EVAR MAIN BODY DUE TO BROKEN DEPLOYMENT STRINGS – 2 CASES REQUIRING EXPLANTATION AFTER FAILED ENDOVASCULAR SALVAGE.

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Royal North Shore Hospital, NSW

We report 2 cases of interrupted deployment of the Gore Excluder main body due to broken deployment strings requiring early explantation and open repair. We present and review the variety of bailout options to use in this scenario prior to considering explantation.

The cases involve a 70-year-old male and an 80 year old female, with >5.5 infra-renal AAAs. The EVARs were performed under general anaesthesia, with bilateral retrograde CFA punctures.

In both cases, the midsection of the main body failed to deploy due to a broken deployment string. Various endovascular techniques, involving multiple wires, catheters and balloons, were attempted in order to fully deploy the main body, however these were unsuccessful in both cases.

In one case, the constrained midsection was able to be partially opened, allowing blood flow to the ipsilateral limb. A femoro-femoral crossover was then performed, until a staged explantation and open aorto-bi-iliac repair could be performed the following day. In case 2, none of the endovascular bailout options were successful, therefore an immediate conversion to open repair was required.

This rare, but important complication has persisted despite changes in technology and components over the 7 years between the reported cases. Whilst there are potential bailout options, there is no clear method of endovascular retrieval known.

VA076P
IVC TUMOURS MASQUERADING AS THROMBUS

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Primary IVC tumours are a very rare event and research of the underlying aetiology and incidence are not well described. They are often associated with known primary malignancies such as renal cell carcinomas (RCC) or other genitourinary tract malignancy and in the presence of significant risk factors for deep vein thrombosis (DVT). We present 2 cases of IVC tumours, treated initially as thromboses. The management of IVC tumours involves high risk
surgery. We evaluated the pre-operative work up, diagnosis, treatment and surgical management of the following cases.

Case 1 - Leiomyosarcoma
A 62-year-old female with a three-week history of bilateral leg pain was treated with rivaroxaban for a ten-month period as an IVC Thrombus. Due to increasing caval mass and IVC distension, an endo-venous biopsy was performed demonstrating a leiomyoma. The final histopathology of the excised tumour was that of a leiomyosarcoma.

Case 2 - Adenocarcinoma
A 57-year-old male presented with three months of bilateral lower limb pain and swelling. Investigations demonstrated bi-iliac and IVC thrombus that was subsequently treated with thrombolysis, IVC filter placement, thrombectomy and stenting. On subsequent follow up there was extrinsic compression of the cava and stent, and further imaging was suggestive of an extrinsic mass. CT guided needle aspiration demonstrated adenocarcinoma and the patient underwent successful wide excision and caval reconstruction.

IVC tumours can masquerade as a thrombus. In retrospect, the “red flags” were; isolated caval thrombosis, hemi circumferential wall adherence, local progression over time (without associated progression of thrombus), extrinsic compression on the cava and persistent extrinsic compression of the IVC stent.

A high index of suspicion must be maintained even though tumours of the IVC are exceedingly rare. Our small case series demonstrates successful surgical resection with an MDT approach.

VA077P
KIDNEY TRANSPLANTATION USING DONORS WITH SINGLE AND MULTIPLE RENAL ARTERIES - IS THERE A DIFFERENCE?

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Aims
Donor kidneys with multiple renal arteries (MRA) have previously been reported to be associated with increased complications and poorer outcomes in recipients. The objective of this study was to investigate the incidence of complications and the impact on the functionality of the transplanted kidney.

Methods
From 2017 to 2019, a total of 100 consecutive kidney transplantations that occurred at Royal North Shore Hospital, Sydney were retrospectively analysed. Patients were assigned to two groups: donors with single renal artery (SRA) and donors with multiple renal arteries (MRA, 26% of cohort). The impact of anatomical abnormalities on short-term outcomes of the transplantation were analysed with respect to warm ischaemic time, biochemical markers, resistive index, and complications requiring return to theatres.

Results
Mean warm ischemia time (in minutes) were similar with 54.2±25.3 vs 46.6±11.5 for transplants using MRA and SRA kidneys respectively. Change in urea at post-operative day 1 was -5.1±39.6% vs -9.6±55.9% and day 7 14.6±97.2% vs 18.7±110.4%. Change in estimated glomerular filtration rate (eGFR) at post-operative day 1 was 71.6±95.0% vs 95.7±130.2% and day 7 456.0±550.6% ± 386.9±443.7%. Change in creatinine clearance at post-operative day 1 was 25.6±28.3% vs 27.7±32.6% and 7 57.0±31.3% vs 49.4±41.1%. On table resistive index were 0.609±0.063 vs 0.607±0.074. Operative complications requiring take back to theatre showed 15.3% vs 9.5%.

Conclusion
Although kidney grafts with MRA have been considered a relative contraindication, this study suggests that kidney transplants using allografts with multiple versus single arteries have similar early outcomes.

VA078P
LOW MORBIDITY ANATOMICAL REVASCULARISATION FOR INFECTED AORTO-BIFEMORAL GRAFT USING A STAGED HYBRID PROCEDURE.

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Background
Prosthetic graft infection following aorto-bifemoral reconstruction is one of the most feared complications in vascular surgery. (1) Extra-anatomic bypass with excision of infected material although morbid, has traditionally been the gold standard approach. (2) We present a previously undescribed technique utilizing a hybrid approach to provide low morbidity revascularisation and excision of infected grafts.

Case report
A 66-year-old woman presented following aortobifemoral bypass with a suppurative right femoral false aneurysm and features on CT angiogram suspicious for complete graft infection. A two-stage procedure was performed: the first hybrid stage involved excision of the infected femoral components only and preservation of an aortic graft stump. The aortic anastomosis was covered with a covered stent to prevent “blowout” at a later stage. Both external and common iliac arteries were then revascularized endovascularly. The second stage was performed 6 weeks later and involved removal of the final aortic piece via midline laparotomy with an aortic bovine pericardium patch (XenoSure Biologic, Lematre Vascular). The entire process was supported with empirical intravenous antibiotic therapy. Follow-up imaging at three months demonstrated no residual infection and the patient remains without complication.

Conclusion
The staged hybrid technique presented in this case report presents a less morbid alternative in managing aortofemoral graft infections.


VA079P
MANAGEMENT OF TYPE 1B ENDOLEAK DUE TO MIGRATION OF EVAR LIMB INTO ANEURYSM SAC, WHILE ENSURING PRESERVATION OF THE INTERNAL ILIAC ARTERY

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In contemporary Australian vascular practice, endovascular techniques are the preferred method of aortic aneurysm repair (EVAR). Despite lower immediate morbidity and mortality of EVAR compared to open surgery, following EVAR patients may require immediate or delayed re-intervention to manage evolving aortic pathology. We present the management of a Type 1B endoleak due to migration of an EVAR limb into the aneurysm sac 4 years after the initial repair, complicated by the need for internal iliac artery preservation due to preexisting buttock claudication.

A 77-year-old male underwent an uncomplicated emergency EVAR in 2015 for a symptomatic 4.8cm infrarenal AAA. The procedure was performed using a standard Cook Zenith Alpha graft and the completion angiogram showed acceptable placement of the graft. In 2016 the patient underwent an angiogram to investigate progressive right buttock claudication which found a narrowed calcified internal iliac artery. This was managed medically without intervention.

In March of 2019 a routine yearly surveillance ultrasound which showed a new T1B endoleak from the right limb. Subsequent CT angiogram revealed migration of the right limb of the graft into the aneurysm sac due to aneurysmal change in the common iliac artery. There was growth of the aortic aneurysm from 3.3cm to 4.8cm. Due to the clinical need to preserve the internal iliac artery the patient was treated with a Cook Branched Iliac Device (IBD) introduced via the contralateral limb. Approaching via the arm was not preferred because of the angulation of the aortic arch. The IBD was successfully delivered via an 8 French sheath over an 0.018 wire to allow for tracking over the steep angle of the EVAR bifurcation.

In conclusion, IBDs can be deployed via the contralateral limb of an EVAR to successfully treat T1B endoleaks and preserving the internal iliac artery.
VA080P
MEDICAL MANAGEMENT OF BLOOD PRESSURE AND HEART RATE IN ACUTE TYPE B AORTIC DISSECTIONS – A SINGLE QUATERNARY CENTRE PERSPECTIVE

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Purpose
Analgesic and antihypertensive choice in acute type B aortic dissection is still based mainly on personal experience and expert opinion. -blockers are widely accepted as the antihypertensive agent of choice, unless contraindicated. Furthermore, vasodilator therapy without prior -blockade has been shown to cause adverse physiological changes in this cohort. This study examines the choice of analgesia and antihypertensive agents made within an Australian quaternary referral hospital.

Method
Between May 2012 and February 2019, 43 patients with acute Type B aortic dissections managed through the Emergency Department at Royal North Shore Hospital, Sydney were retrospectively analysed. Choice of analgesia and antihypertensive agent prescribed were obtained from patient records as well as patient characteristics, vital signs on presentation and if surgical intervention was required.

Results
For the 43 patients that presented with acute Type B aortic dissection, 93% had an admission systolic blood pressure over 120mmHg (mean 160mmHg) and 93% had a heart rate over 60 bpm (mean 76bpm). 7 different types of analgesia were prescribed with Morphine being the most common (50%). 13 different types of antihypertensive agents were prescribed on admission to the ED of which Metoprolol was most frequently used (36%), followed by Hydralazine (11%) and Prazosin (11%). 46% of patients were prescribed 2 antihypertensive agents and 32% with 3 or more. 77% of these patients were transferred to a ICU for ongoing monitoring and management. Within the ICU, 12 different antihypertensive agents were used where the agent of choice was Metoprolol (21%) followed by GTN infusion (18%) and Sodium Nitroprusside infusion (18%).

Conclusion
A more standardised approach to the treatment of heart rate and blood pressure in acute Type B aortic dissection is imperative in ensuring optimal medical management. This is currently being further analysed though a registry at Royal North Shore Hospital.

VA081P
MORTALITY OF PACLITAXEL PATIENTS IN AN AUSTRALIAN VASCULAR SURGICAL CENTRE

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A recent meta-analysis has suggested a significant dose-related increase in mortality following the use of paclitaxel-coated balloons in infra-inguinal endovascular procedures.

Aim
To retrospectively review mortality outcomes of paclitaxel-naïve (PN) and paclitaxel-treated (PT) infra-inguinal peripheral arterial disease (PAD) patients treated by a single Australian vascular surgical unit.

Methods
Patient, procedure and mortality data was sourced and verified from AVA, as well as medical records from local public and private hospitals and clinics. Mortality data was cross-referenced with the Ryerson Index. Patients were only included if they underwent infra-inguinal PAD treatment. Renal failure patients were excluded, as their paclitaxel exposure could not be confirmed.

Results
1060 patients were treated between March 2012 and December 2018. 269 patients received paclitaxel over 512 procedures. 791 patients remained paclitaxel-naïve over 1161 procedures. There was no significant difference in age, sex or co-morbidities between groups. There were more claudicants in the PT group (64.0% vs 54.7%, P=0.008). Over 70% of PT patients occurred during the last 3 years, resulting in significantly shorter median follow-up (14.2 months vs
22.9 months, P<0.01). There was a significant difference in mortality at 12 months favouring the PT group (5.1% vs. 9.5%, P=0.026). This trend continued at 24 (15.3% vs 17.9%, P=0.16) and 36 months (19.2% vs 25.2%, P=0.096) but did not reach significance. At 5 years, mortality was slightly higher in the PT group (40.4% vs 38.2%, P=0.31).

Conclusion
Patients in our experience are older and have poorer survival compared to those in the Katsanos meta-analysis. Unfortunately, our study is limited by the temporal distribution of paclitaxel cases, reducing the possible follow-up period. Despite this, there is no significant difference in medium-to-long term survival between patients receiving paclitaxel and those remaining paclitaxel naïve.

**VA082P**
MYCOTIC AORTIC ANEURYSMS AND INFECTED VASCULAR GRAFTS: THE NORTHERN REGIONAL EXPERIENCE

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**Purpose**
Mycotic aortic aneurysms (MAA) and vascular graft infections (VGI) are uncommon but carry high morbidity and mortality. This study aims to describe the clinical features of MAA and VGI and assess the safety of operative and endovascular management of aortic infections by measuring complication rates and mortality.

**Methodology**
All patients admitted with MAA or aortic VGI at Auckland City Hospital between January 2010 and April 2018 were identified from the Auckland Regional Vascular Service registry and the Australasian Vascular Audit. Data on baseline characteristics, clinical features, management and outcomes were collected from the electronic health record and analysed. All patients had at least one year follow up. Vascular graft infection was defined using the MAGIC criteria.

**Results**
We identified 21 patients with MAA and 23 patients with aortic VGI. Both groups were predominantly male, and mean age was younger in MAA (65.8 years) than VGI (72.8 years). Causative organisms were identified in 61.3% (27/44) of cases, with 95.5% (42/44) of patients receiving intravenous antibiotic therapy. Median duration of antibiotics was 42 days (IQR 7-126) in MAA and 44 days (IQR 30-513) in VGI. The overall 30 day and one-year mortality was 14.3% and 19% in with MAA and 17.3% and 30.4% in VGI, respectively. Rate of complications including death, re-infection and re-intervention was 33% (7/21) in MAA and 56.5% (13/23) in VGI. By intervention type, rate of complications was 0% (0/2) for endovascular bridging followed by repair, 38.5% (10/26) for open repair, and 60% (4/10) for endovascular stenting alone.

**Conclusion**
Overall, patients with VGI were older, required a longer duration of antibiotics and had higher morbidity and mortality than patients with MAA. Endovascular therapy may be a useful bridging therapy before definitive operative management.

**VA083P**
OPEN VS EVAR REPAIR - THE WELLINGTON EXPERIENCE

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**Introduction**
Endovascular aneurysm repair (EVAR) is increasingly becoming common place in the repair of the intact abdominal aortic experience. However long-term outcome data from EVAR-1 shows that there is a survival benefit associated with an open repair at 15 years. Recently, the NICE guidelines have been updated to recommend an open repair over EVAR if the patient is suitable. This has proved to be controversial. This paper outlines the Wellington Experience and outcomes from Open and EVAR aneurysm repairs.
Methods
An audit of practice was taken over a 3-year period from 2015-2017. We included all intact open and EVAR repairs. The primary outcome measured was all cause mortality, while the secondary outcomes were re-intervention, 30-day complication and endo leak rates.

Results
170 cases were undertaken in this period, 62% of which were EVAR. Demographically, the EVAR group tended to be older, and less likely to be symptomatic. Those in the open group had higher rates of post-operative complications (re-look laparotomy, ileus and pneumonia), longer ICU and hospital stay and 30-day mortality. Though with a mean follow up time of 29.5 months, the open group had better rates of re-intervention free survival and all-cause mortality.

Conclusion
Our audit suggests findings that are in-line with the long-term survival benefits of an open repair described in the literature. This unit advocates for an individualised approach to the decision for EVAR or open. Younger, fitter patients may be better suited to an open operation. We recommend an MDT approach to complex cases, the judicious use of cardiopulmonary testing and regular audit of practice.

VA084P
PRESERVING THE AORTIC BIFURCATION AFTER EVAR

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Purpose
The majority of endograft systems available for endovascular aortic-aneurysm repair (EVAR) utilise the infrarenal neck as the primary region of anatomical fixation. In patients with narrow distal aortic anatomy however, standard bifurcated grafts pose the risks of intra-procedural gate cannulation, limb competition, and precludes future up-and-over interventions (of note given many AAA patients have co-existing peripheral vascular disease). Similarly, the solution with an aorto-uni-iliac (AUI) system has its own issues, with femorofemoral bypass requirement, added morbidity, and graft surveillance. The aim of this study is to assess the effectiveness of EVAR fixation at the aortic bifurcation using the Endologix AFX unibody endograft, and its ability in preserving the native aortic bifurcation.

Methodology
A retrospective single-centre analysis was conducted of patients treated electively with the AFX endograft from September 2017 until April 2019 at The Townsville Hospital, with a total of 5 cases identified. Endpoints assessed included technical success, clinical improvement, freedom from re-intervention, endoleak and aneurysm related death.

Results
Technical success was achieved in all 5 cases. One procedure was complicated by closure device malfunction, resulting in arterial insufficiency and subsequent groin cut-down with a primary common femoral artery repair. There were no AFX device complications. All achieved clinical improvement and are currently free from re-intervention. No type 1, 3 or 4 endoleaks have been detected using 6-12 week post-operative CT-Angiogram or aortoiliac ultrasound. There have been no aneurysm related deaths.

Conclusion
Preservation of the aortic bifurcation is proving to be an important addition to EVAR treatment options. Preliminary results in preserving the aortic bifurcation using the Endologix AFX unibody endograft, and its ability in preserving the native aortic bifurcation.

VA085P
PROSTHETIC GRAFT INFECTION AND PRIMARY MYCOTIC ANEURYSMS – COMPARISON OF SURGICAL TECHNIQUES, AN AUSTRALIAN EXPERIENCE

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Purpose
Primary mycotic aneurysms (PMA) and prosthetic graft infections (PGI) are traditionally managed by resection of any infected vascular tissue and revascularisation with an extra-anatomical bypass, which have been reported to have poor
long-term patency and high limb amputation rates. The aim of this study was to compare the outcomes of those patients in our department who had in-situ reconstruction with cryopreserved allograft (group A) with those that had reconstruction with an extra-anatomical bypass with prosthetic graft (group B).

Methodology
The data was retrospectively reviewed and twenty patients were identified; thirteen patients in group A and seven patients in group B. There were six patients with PMA and fourteen with PGI with six of these being complicated by aorto-enteric fistulae (AEF).

Results
There were three peri-operative mortalities in group A (23%) and two in group B (29%). In group A, all three mortalities were related to graft re-infection and post-implantation haemorrhage; two of these from uncontrolled bile leaks related to the original AEF with persistent graft contamination. There was one mortality in group B from graft re-infection and post-implantation haemorrhage while the other was an early mortality from sepsis. The surviving patients were followed up and there was an observed primary graft patency of 89% in group A and 20% in group B from the time of implantation.

Conclusion
In-situ reconstruction with cryopreserved allograft seems best suited for arterial infection uncomplicated by AEF as this was associated with a significant peri-operative mortality. Promisingly, in those patients that survived the peri-operative period, there was superior graft durability. The main barrier to more widespread use in our state remains inadequate supply of banked cryopreserved tissue.

VA086P
PSOAS MUSCLE AREA DOES NOT PREDICT IMMEDIATE POSTOPERATIVE SURVIVAL, COMPLICATIONS, LENGTH OF STAY OR HEALTHCARE COST IN PATIENTS WITH CRITICAL LIMB ISCHAEMIA UNDERGOING VASCULAR INTERVENTIONS

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Purpose
Measurement of low psoas area by cross sectional imaging is a surrogate marker of frailty and an independent predictor of postoperative mortality and complications in a range of surgeries from cancer to abdominal aortic aneurysm. We aim to investigate associations between psoas muscle area and immediate postoperative mortality, complication rates and healthcare cost in patients with critical limb ischaemia (CLI) who has undergone any form of vascular intervention.

Methods
In this retrospective cohort study, 237 patients with CLI underwent vascular interventions between June 2017 and June 2018. 211 of them had perioperative cross-sectional imaging. Total psoas area (TPA) and psoas/vertebral body ratio (PVR) at L4 level to correct for body habitus were measured. Clinical information was collected from patients’ electronic medical record and cost data from hospital audit. Logistics and multiple regressions were used to assess the effect of TPA and PVR on 30-day postoperative mortality, complication rates, length of hospital stay and healthcare cost in patients with CLI who have undergone any form of endovascular or surgical revascularisation.

Results
Data from 211 patients were analysed, 152 (72%) of them underwent primary endovascular interventions and 53 patients (24.6%) had emergency procedures. Neither lowest TPA nor lowest PVR quartile was associated with increased 30-day postoperative mortality rate (for lowest TPA quartile: HR 1.08, CI 0.67-3.44, P=0.031), postoperative complication rate, length of stay or total healthcare cost in patients with CLI in each of the elective or emergency group and as a cohort.

Conclusion
TPA and its derivative PVR failed to be shown as predictors of immediate postoperative mortality or complication rate, need for rehabilitation, length of hospital stay or healthcare cost in patients with CLI undergoing either elective or emergency vascular interventions.
RA087P
RE-INTERVENTION RATES OF ENDOVASCULAR VS. OPEN REPAIR OF RUPTURED ABDOMINAL AORTIC ANEURYSMS – A SINGLE QUATERNARY CENTRE PERSPECTIVE

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Purpose
Ruptured abdominal aortic aneurysm (rAAA) remains one of the most common vascular emergencies. It has been shown that the 30-day mortality from emergency open repair is about 50% compared to emergency endovascular repair of about 30%. However, recent trials have shown that the early survival advantage seen with EVAR fades with time as there are more complications that require secondary interventions in patients who undergo EVAR. This study reviews the re-intervention rate of endovascular and open rAAA’s at a quaternary Australian hospital. We also compared the re-intervention rate between rAAA EVAR and elective EVAR.

Method
A retrospective analysis of endovascular and open repair of rAAAs completed at Royal North Shore Hospital, Sydney between January 2010 and March 2018 was conducted using data from the Australian Vascular Audit. Exclusion criteria included supra-renal, mycotic or isolated iliac rAAAs. Re-intervention is defined as any operation performed after the index procedure and was sourced to 1 year follow up.

Results
52 rAAAs were identified within the period of analysis with 33 patients receiving endovascular repair and 19 receiving open repair. Re-intervention rate at 1 year was 11.11% (4) for those whom received an endovascular repair and 42.86% (6) for patients whom received an open repair, excluding death in the same admission (p<0.05). Re-intervention at 1 year for elective EVAR compared to REVAR was 12.5% and 9.68% respectively. Days from index procedure to re-intervention for elective EVAR compared to REVAR was 134.4 days and 10.33 days.

Conclusion
REVAR remains a safe method of treatment for rAAA with low perioperative re-intervention rates when compared to open repair. Re-intervention for EVAR in the rAAA is also seen to be comparable to an elective AAA. Further investigation is required to assess effect of re-intervention of REVAR on long term morbidity and mortality.

VA088P
REDUCING RADIATION EXPOSURE IN ENDOVASCULAR SURGERY

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Background
With rapid advancement in technology anatomically challenging procedures are becoming increasingly amenable to endovascular treatment. These complex procedures are often associated with longer procedural times, exposing both patients and surgeons to increasing fluoroscopic ionizing radiation associated with the risk of acute toxicity, and a demonstrable risk of long-term malignancy due to DNA damage.

Objective
We sought to evaluate whether carbon dioxide (CO2) angiography in comparison to standard iodinate contrast (C) for the repair of abdominal aortic aneurysm (AAA) was associated with reduced intraoperative radiation exposure.

Methods
This study was performed as a prospective review of patients who underwent elective AAA repair between 2013 – 2018. Procedures were performed across two hospitals by a single surgeon. Primary outcomes included procedure duration, screening time, number of runs, and radiation dose.

Results
A total of 149 AAA repairs were performed. Mean procedure duration was 102.9 mins in CO2 group vs 127.1 mins in C group. Fewer mean number of runs were required in the CO2 group, 13 in comparison to 20 in the C group. Mean screening time was 35.3 mins (SD 26) in the CO2 group vs 41.6 mins (SD 25.2) in the C group. Mean radiation dose was significantly reduced in the CO2 group, 35001uGym2 (SD 31617) in comparison to 112632uGym2 (SD 166250.5)
Conclusion
CO2 angiography was associated with reduced intraoperative radiation exposure in comparison to standard contrast for AAA repair. Future randomised controlled trials evaluating the utility of CO2 in reducing radiation exposure are warranted.

VA089P
SUPERHERO®, AN APPROACH TO RENAL ACCESS IN END STAGE RENAL FAILURE – THE AUSTRALASIAN EXPERIENCE.

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Introduction
The HaEmodialysis Reliable Outflow Device (HeRO), and its advanced variant known as “Super-HeRO” graft are recognised options for renal access in patients who have exhausted all conventional access options.

We present a case series of 9 patients (5 HeRO, and 4 Super HeRO patients), and provide an outline of the Waikato experience associated with this cohort.

Case Series
9 patients (6 Male, 3 female) underwent tunnelled subcutaneous dialysis access in the form either HeRO or SuperHeRO graft at Waikato Public Hospital, New Zealand, between the years of 2015 and 2019. Indications for this procedure included patients with end stage renal failure on Haemodialysis, via tunnelled lines or dysfunctional and non-salvageable arterio-venous fistulae or grafts. All cases were performed in the operating theatre under general anaesthetic with industry representative support.

HeRO grafts are defined as entirely subcutaneously tunnelled prosthetic devices, designed to overcome issues of central venous or outflow stenosis. This device is inserted using only manufacturer provided components. The SuperHeRO device allows the use of alternative graft material as preferred by the interventionalist, which can be attached to the HeRO system by an adaptor. The Waikato approach utilises Flixene graft to allow immediate use and rapid access.

Primary patency ranges from 0 to 358 days, with a mean patency of 61.5 days.
Complications within our experience include: 1 upper limb deep vein thrombosis, 1 steal syndrome, 2 graft occlusions, 1 delayed infection, 1 perforation of central vein, and 1 death on table

Conclusion
We present our local centre’s experience with the HeRO graft, as well as data for the Australasian use of the SuperHeRO device. Despite peri-procedural challenges we have faced we still currently advocate the use of the SuperHeRO as a valid solution for dialysis access for cohorts of patients where all other options have been exhausted.

VA090P
SYSTEMATIC REVIEW AND META-ANALYSIS OF THE ASSOCIATION BETWEEN INTRA-LUMINAL THROMBUS VOLUME AND ABDOMINAL AORTIC ANEURYSM RUPTURE.

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Purpose
Intra-luminal thrombus (ILT) is present in most abdominal aortic aneurysms (AAA). Previous studies have suggested that ILT may promote AAA growth and rupture possibly due to high concentrations of pro-inflammatory cytokines and matrix-degrading enzymes. Assessment of ILT could therefore potentially assist in identifying AAAs that are at higher risk of rupture. The aim of this meta-analysis was to investigate the association between ILT volume and AAA rupture.

Methodology
A literature search was performed to identify studies that investigated the association between ILT volume and AAA
rupture. A meta-analysis was conducted using an inverse variance-weighted random-effects model to compare the ILT volume in ruptured and asymptomatic intact AAAs. Leave-one-out sensitivity analyses were conducted to assess the robustness of the findings. A sub-analysis was performed including studies where patients with asymptomatic intact and ruptured AAAs were matched for aortic diameter. Inter-study heterogeneity was assessed using the I² statistic.

Results
Eight studies involving 672 patients were included in this systematic review. Meta-analysis of all studies found a greater ILT volume in patients with ruptured than asymptomatic intact AAAs (standardized mean difference [SMD] 0.56, 95% confidence interval (CI) 0.17-0.96, p=0.005, I²=79.8%). Sensitivity analyses suggested that the findings were robust however aortic diameter was significantly larger in ruptured than asymptomatic intact AAAs (mean ± standard deviation, 78 ± 18 and 64 ± 15 mm respectively, p<0.001). In the sub-analysis of studies that matched for diameter, no significant difference in ILT volume between both groups was found (SMD 0.03, 95% CI -0.27-0.33, p=0.824, I²=0%).

Conclusions
This meta-analysis suggests that ILT volume is greater in patients with ruptured than asymptomatic intact AAAs, although this is most likely due to the larger diameter of ruptured AAAs.

**VA091P**
**THE ENDOVASCULAR REPAIR OF NON-IATROGENIC PENETRATING PERIPHERAL ARTERIAL TRAUMA: A LITERATURE REVIEW**

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Purpose
As an adjunct to open vascular surgical management, endovascular intervention (EVI) for penetrating peripheral arterial trauma (PAT) can be effective in definitive repair, damage and haemorrhage control for vascular injuries involving the neck, subclavian and lower extremity regions. Here we have conducted a literature review on the durability of endovascular stent grafts for non-iatrogenic penetrating peripheral arterial trauma.

Methodology
A systematic literature search of MEDLINE, EMBASE, Google Scholar and Cochrane Databases for studies documenting the use of EVI for the treatment of penetrating PAT was conducted. Case reports, case series or cohort studies of less than ten patients treated with EVI, iatrogenic injuries and paediatric patients were excluded.

Results
Two prospective cohort studies with 76 patients in total; 57 subclavian artery and 19 carotid artery injuries. 72 gunshot and 4 stab wounds accounted for 68% (52/76) false aneurysms, 28% (21/76) arteriovenous fistulas and 3.9% (3/76) arterial occlusions. 100% technical success was obtained with no conversion to open repair. Grafts included Hemobahn, Wallgraft, Fluency, Jostent and a modified Palmaz prosthesis. Pooled analysis was not conducted given data heterogeneity. In total, 46% (35/76) patients were lost to follow up. 14% (2/14) and 32% (8/25) had significant stenosis or occlusion for carotid and subclavian intervention respectively. 7% (1/14) in the carotid group had a stroke, of which one had the occlusion. No stent graft related mortality, graft sepsis or other stent-graft complications were observed.

Conclusion
The use of EVI for non-iatrogenic penetrating PAT can be utilised successfully with a high rate of technical success. However, our literature review has demonstrated a paucity of studies reporting post-operative outcomes. Whilst no specific treatment algorithm for the use of EVI in PAT exists, current practice is individualised to anatomical and patient related factors.

**VA092P**
**THE MEASUREMENT OF RANGE OF ANKLE MOVEMENTS AND FOOT ARCH IN PATIENTS WITH CHRONIC VENOUS DISEASE (ROAM CVI STUDY).**

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Purpose
Chronic venous disease affects the superficial and deep veins of legs due to valvular insufficiency leading to venous
hypertension and ulceration. This can be due to calf pump dysfunction or obstruction of the vessel. There appears to be a relationship between the range of ankle movements, varied foot arches and clinical severity of the disease.

Methods
This study is a descriptive observational study of case-control type. Patients with unilateral chronic venous disease presenting to vascular surgery are included. A sample size of 41 is calculated with an odd’s ratio of 3. The range of ankle movements like plantar flexion, dorsiflexion, inversion, eversion will be measured using goniometer and the foot arch will be measured by calculating the navicular height (NH), normalized navicular height (NNH) and truncated normalized navicular height (NNHT). The results will be compared with the unaffected limb.

Results
We found patients with advanced CVI had significantly reduced ankle range of motion compared with the control group. Patients with severe CVI had reduced plantar flexion-dorsiflexion ROAM compared with patients with mild CVI and reduced inversion-eversion ROAM (P < .001). Plantar flexion, dorsiflexion, inversion and eversion at ankle were 51.7 degrees, 16.1 degrees, 20 degrees and 8.47 degrees in normal leg while they were 40.5 degrees, 10.53 degrees, 12.16 degrees and 6.45 degrees respectively on the affected leg.

Conclusion
The limbs with venous hypertension have a reduced range of ankle movements according to the severity of disease. Reduction in foot arches is also seen in patients with chronic venous disease. With the increasing severity of disease, a decrease in the arch can occur which further affects the calf pump and thereby contributing to ulcer formation and mobility restriction.

VA093P
THE RELATIONSHIP BETWEEN PROCEDURAL VOLUME AND PERIOPERATIVE OUTCOME AFTER CAROTID REvascularisation IN AUSTRALIA AND NEW ZEALAND

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Purpose
Carotid revascularisation procedures such as carotid endarterectomy (CEA) and stenting (CAS) prevent stroke in selected patients but also carry a known risk of perioperative stroke and/or death (S/D). The aim of this study is to determine the relationship between surgeon- and hospital-volume, with perioperative risk of S/D in patients undergoing CEA or CAS in Australia and New Zealand.

Methodology
Data was extracted from the Australasian Vascular Audit (2010-2017) and annual volume was categorically divided into 5 quintiles (Q) for multivariate regression analysis.

Results
We evaluated 16,765 CEA cases and 1,350 CAS cases. For CEA, the S/D rate was higher for lower-volume (2.21%; Q1-Q3:1-17 annual cases) compared to higher-volume surgeons (1.76%; Q4-Q5: 18-61 annual cases), with an odds ratio of 1.28 (95% CI 1.001-1.64, p=0.049). For CAS, the S/D rate was also higher for lower volume surgeons (2.63%; Q1-3:1-11 cases annually) compared to higher-volume surgeons (0.37%; Q4-5: 12-31 cases annually), with an odds ratio of 6.11 (95% CI 1.27-29.33, p=0.024). No significant hospital volume-outcome effect was observed for either procedure.

Conclusion
A significant relationship exists between surgeon volume and perioperative S/D rates following CEA and CAS, which is more pronounced for the latter. Carotid revascularisation should be performed by high-volume surgeons in Australia and New Zealand with consideration given to minimal surgeon thresholds and networked referral pathways.
VA094P
THE ROLE OF OPEN AAA REPAIR IN MODERN SURGERY: AN AUDIT OF THE LAST 100 ELECTIVE OPEN AAA REPAIRS AT A REGIONAL TERTIARY AUSTRALIAN HOSPITAL.

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Since the first Endovascular aneurysm repair (EVAR) in 1991 the technology has dramatically. In the current state of the art some practitioners have stated that open aneurysmorraphy (OR) is no longer a requisite skill for vascular surgeons. However, find the long term follow up burdensome and risks attached to secondary are not insignificant. Fenestrated endovascular repairs do not enjoy equivalence in EVAR.

Methods
We audited our OR practice, to create a contemporary sample the last 100 cases of repairs were selected, ruptures and acute repairs were excluded. The hospital record and the Australasian Vascular audit were trawled. The unit policy has been to all suitable patients with a higher threshold for suitability is applied to younger so in older patients.

Results
The first repair in the sample was undertaken in February 2012 and the last in May were 82 males and the average age was 74. Of the 100, 79 had an ASA of 3 recorded. Length of stay was 9.1 days, and 88 patients were admitted on the day on surgery. In the reason for OR was anatomical unsuitability for EVAR, although a small group were no deaths. A suprarenal clamp was required in 17 cases. A complication was in 55 cases but only 20 of these had a LOS greater than 10 days. In the same period undertaken (mortality 3) 46 OR for rupture (mortality 15) and 13 OR for Acute AAA (Mortality 1)

Conclusion
This contemporary series demonstrates that OR can still be performed safely where vascular team committed to providing this care. In our practice, this forms the increasing use of FEVAR for hostile neck anatomy.

VA095P
THE USE OF VASCULAR CLOSURE DEVICES FOR THE MANAGEMENT OF THE ARTERIALLY PLACED CENTRAL LINE – A SINGLE CENTRE EXPERIENCE

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Introduction
Central venous lines (CVLs) are placed commonly, but arterial injury can occur with potentially catastrophic consequences. The use of vascular closure devices (VCDs) to remove misplaced CVLs remains off label, but there is growing evidence to suggest safe removal. This may prove useful in situations where manual compression is not safe, or surgical repair would involve drastic exposure. This four case series documents, with the use of radiological imaging, one tertiary vascular centre’s experience with the use of VCDs to remove arterial CVLs over a 12-month period.

Examples of cases
A 39-year-old female had a CVL placed into the right subclavian artery during a resuscitation, with subsequent imaging showing thrombus adherent to the line within the brachiocephalic artery. She underwent thrombolysis therapy through the CVL. Serial imaging demonstrated clearance and the CVL was removed with an angioseal without complication.

A 65-year-old female underwent a portacath insertion prior to commencing chemotherapy. On post-op imaging the tip was noted to be in the arterial tree and on CTA this was confirmed to enter the anterior wall of the proximal right subclavian artery. Under a GA, the portacath was removed using an 8fr angioseal deployed. There was a small pseudoaneurysm (4mm) on completion CTA, but this resolved on serial imaging.

Conclusion
Although the case numbers from our single centre are small, in the case of the erroneously placed central line, our experience aligns with the growing literature, in that VCDs appear to be safe and effective. Patient selection based on
individual and anatomical factors is crucial and vascular surgeons and interventional radiologists should work closely to decide on the optimal management of these patients on a case-by-case basis. There are no clear guidelines for follow up imaging following intervention.

VA096P
TIMING IS EVERYTHING: TIME FROM SYMPTOMS TO CAROTID SURGERY IN NEW ZEALAND AND AUSTRALIA

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Purpose
The objective of this audit study was to determine the time from symptom to carotid endarterectomy (CEA) and the proportion of CEAs performed in each time category in New Zealand and Australian hospitals from 2014-2019.

Methodology
The Australasian Vascular Audit database was examined for the period from 2014-2019. Time to CEA was compared between hospitals. Time to surgery was coded into three categories: < 2 weeks, 2-4 weeks, and >4 weeks. Multinomial logistic regression was used to determine the association between time to surgery, hospital, hospital size, comorbidities, complications, and degree of stenosis. Significance was set at <0.05.

Results
The proportion of patients in each category was the same in New Zealand and Australia. 61% of surgeries were performed <2 weeks from symptom to surgery, 20% 2-4 weeks, and 19% >4 weeks. There were no significant differences in the number of complications in different periods (stroke 1.8%, all complications 5.7%). There was significant variation in the proportion of patients in each category between different hospitals, ranging from 24%-88% for <2 weeks, 5%-45% for 2-4 weeks, and 3%-54% for >4 weeks. The size of the hospital and comorbidities did not impact the timing of surgery.

Conclusion
The current international guidelines for treating carotid endarterectomies (CAE) are to treat within 2 weeks of symptoms. The results of this audit suggest that New Zealand and Australian Hospitals may benefit from an examination of current practices in order to meet the international guidelines, especially in hospitals that have significant delays to surgery.

Acknowledgement
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VA097P
TWENTY YEARS OF VASCULAR SURGERY RESEARCH IN AUSTRALASIA- DEFINING FUTURE DIRECTIONS

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Purpose
Vascular surgery as a specialty has seen significant growth in recent decades however to date, no quantitative assessment has been published regarding the research productivity of Australasian Vascular Surgeons. This bibliometric study aims to provide an objective representation of the research output of this cohort over the past two decades.

Methodology
A retrospective search of Scopus was conducted by two independent reviewers to collate, assess and define all publications by identifiable Australasian Vascular Surgeons from 1/1/98 to 31/7/18. Letters, replies and abstract-only entries were excluded. Data was collected on the gender and location of each surgeon, their total publication count, citation count and H-index. Each entry was assessed for NHMRC Levels of Evidence. Year of publication, primary topic and surgical technique used for each article was collected.
Results
Over twenty years, 188 Australasian Vascular Surgeons contributed to 2120 publications with a total citation count of 48,650. Level IV evidence accounted for 57% of publications, with level I-II evidence reflecting 8% of total publications, consisting of 39 systematic reviews, 33 meta-analyses and 97 randomised control trials. The top 5% of authors account for 41% of the total publications and are responsible for significantly more high-level evidence studies. The most published topic was thoracoabdominal aortic pathologies (24%), and the most published technique was endovascular surgery (24%), followed closely by open surgery (21%). The academic productivity of Australasian Vascular Surgeons has doubled over the past twenty years, from 74 publications per year in 1998 to 148 in 2017.

Conclusion
Australasian Vascular Surgeons have made a significant contribution to research, though output is concentrated in a smaller group of individuals. More work can be done to encourage greater participation in surgical research.

VA098P
UTILISATION OF TEVAR IN THE TREATMENT OF AORTIC DISSECTION; AN AUSTRALIAN AND NEW ZEALAND EXPERIENCE.

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Purpose
Type B aortic dissection is generally managed medically initially with surgical intervention reserved for those who develop complications related to said dissection. However, there is a trend towards intervention in uncomplicated cases. We aimed to assess the utilisation of thoracic aortic stenting (TEVAR) in type B aortic dissection across both Australia and New Zealand.

Methodology
Retrospective data was obtained from the Australian Vascular Audit (AVA) online database. All patients who underwent surgical intervention for type B aortic dissection between 01/01/2010 and 31/12/2017 were included. Demographics, surgical intervention, need to return to theatre, and complications were recorded. Endpoints were; In-hospital mortality and length of stay.

Results: 1460-940
In total, 521 patients underwent surgical intervention (TEVAR +/- combined procedure) for type b aortic dissection; 468 TEVAR and 53 hybrid. Those undergoing a hybrid procedure were slightly older; 62.8years (SD 13.3) compared to 62years (SD 14.2). Unplanned return to theatre occurred in 17 patients (3.26%); 13 of TEVAR-alone (2.78%) requiring further intervention. Overall in-hospital mortality was 5.95% with unplanned return to theatre being associated with a significant risk (P=0.0383). Total acute length of hospital stay was 7555 days with a mean of 14.46 days (12.8 SD). Interestingly, over this time period the number of TEVAR procedures performed per year increased from 47 cases (2010) to 95 cases (2017).

Conclusion:
The utilisation of TEVAR in type b aortic dissection is undoubtedly on the rise across both Australia and New Zealand with a relatively low in-hospital mortality risk associated with same. Further investigation is required as regards to long term outcomes.

VA099P
VASCULAR SURGEONS AND SOCIAL MEDIA: THE FUTURE OF COLLABORATION, EDUCATION AND AWARENESS.

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Purpose
Social media uptake and usage is rapidly growing throughout the globe. Its purpose has extended far beyond social interaction and now encompasses education, academic networking and advertising. Therefore, to continue to engage and interact with the public it is important for healthcare professionals to be active within multiple social media platforms. We aim to assess the use of websites and uptake of social media by vascular surgeons in Australia and New Zealand.
Methodology
Vascular surgeons were identified via the RACS website. Comprehensive searches of websites and social media platforms (Facebook, Twitter, LinkedIn, YouTube and ResearchGate) were undertaken to record the presence of websites or social media accounts. Factors examined included sex, years in practice and geographical location of the surgeon.

Results
204 vascular surgeons were identified. Only 50.5% of vascular surgeons had websites, the use of which correlated with greater social media engagement. Surgeons had a mean of 1.37 social media accounts, with the most popular being LinkedIn (54.4%), followed by Facebook (38.7%), ResearchGate (23%), Twitter (16.2%) and YouTube (4.4%). Social media engagement was more prevalent in Australian surgeons and those who were practicing for fewer years.

Conclusion
Surgeons with fewer years in practice, which could be correlated with age, have higher uptake of social media usage. LinkedIn is the most utilised platform, followed by Facebook. Given the rapidly expanding uptake of social media for social, educational and commercial use it is important that we as medical professionals continue to stay up to date with this ever-evolving technology.

VA100P
WOUND COMPLICATIONS IN AMPUTATION SURGERY

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Purpose
Infection is a feared complication in patients following vascular surgery. In those undergoing major amputation, the impact of wound dehiscence on outcomes is not known. We aimed to assess the impact of need to return to theatre in patients undergoing lower limb amputation on mortality and hospital stay.

Methodology
Retrospective data of all patients undergoing BKA & AKA at Fiona Stanley Hospital between the 1/10/15 and the 30/9/18 was assessed. Demographics, need to return to theatre, revision amputation (BKA to AKA), length of hospital stay and time in rehabilitation and discharge destination were recorded. Endpoints compared were; 30day & 12month mortality, and total admission length (hospital + rehabilitation).

Results
In total, 140 patients underwent major amputations; 44 AKA & 96 BKA. Those undergoing AKA were older; 71.3 years (S.D 14) compared to 62.9 years (S.D. 13.3) (p=0.008). Return to theatre occurred in 26 patients (19%); 5 AKA with 6 theatre visits, 19 BKA with 26 theatre visits of whom 13 converted to AKA. Overall mortality was 8.6% at 30 days and 29% at one year. Need for conversion from BKA to AKA increased mortality at one year (N = 7, p=0.01).

Total acute length of hospital stay was 2901 days, with an additional 3843 days in rehabilitation. Any return to theatre was associated with greater total stay; AKA median 29days (8-234), BKA median 40days (10-183), return to theatre median 55 days (7-132) p=0.0343. Despite this most patients went home

Conclusion
Wound dehiscence following major amputation was common, need to return to theatre significantly increased patient stay and revision amputation increased mortality. Strategies are needed to address wound healing in amputees.

VA101P
WOUND COMPLICATIONS POST VASCULAR GROIN EXPOSURE SURGERY

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Purpose
Groin wound dehiscence is a well-recognised complication following femoral artery exposure in vascular surgery. In those undergoing such surgery, it can have a detrimental effect in regards to both morbidity and mortality. We aimed to assess our rate of occurrence and the impact of re-admission and further surgical intervention on this cohort of patients.
Methodology
Retrospective data of all patients who underwent femoral artery exposure procedures at Fiona Stanley Hospital between the 1/1/18 and the 31/12/18 was assessed. Demographics, length of procedure, re-admission, length of re-admission stay and requirement for surgical intervention were recorded. Endpoint compared was; total admission length (initial +/- re-admission).

Results
In total, 65 patients underwent femoral artery exposure necessitating groin incision. Overall, 12 patients required re-admission secondary to wound dehiscence or surgical site infection with 2 more patients having prolonged initial admissions secondary to same (21.5%). This group was significantly older than those in whom re-admission did not occur; 74.7 years (SD 10.6) compared to 64.4 years (SD 11.9) (P = 0.0045). Procedure length was not statistically significant between them; 257mins (SD 50.3) VS 252mins (SD 68.4).

Total length of hospital stay following re-admission was 232 days, with a median of 16.57days (SD 13) while total admission length was significantly longer in those requiring re-admission (P=0.0156). Return to theatre occurred in 58% of those who required re-admission and was associated with greater total stay; medical management median 6.2days compared to surgical intervention median 22.33days (p=0.0188).

Conclusion
Wound dehiscence following femoral exposure was common, with re-admission resulting in significant hospital stay. We have subsequently implemented a new protocol for all lower limb open incisions with utilisation of NPWT in high risk patients.