The management of abdominal aortic aneurysms (AAA) has been changed significantly by the advent of endoluminal repair. This involves the transmural placement of a graft within the aneurysm so that the sac is excluded from the general circulation, preventing expansion and rupture. The graft is held in place by self-expanding stents that are deployed against relatively narrow areas and above the aneurysm. This technique avoids laparotomy and cross clamping the aorta, reducing morbidity and mortality as it constitutes a much smaller physiological insult to the patient. The means that repair can often be offered to patients who would be unsuitable for open repair due to comorbidities.

**DETECTION OF AAA**

Many patients now present with an aneurysm that has been found during imaging of an unrelated problem. The widespread and cross-sectional imaging of the abdomen has meant that many AAA that previously would only have been diagnosed when they ruptured are now diagnosed when they are asymptomatic, and there is evidence that this early diagnosis has meant a decrease in the number of ruptures. Screening also reduces the number of patients presenting with ruptured aneurysm due to early diagnosis and confers a survival benefit, and should be offered to patients with a smoking history or family history of AAA.

Patients are offered repair once their AAA reaches 5.5 cm, as at the risk of which rupture begins to rapidly increase. The only exceptions to this are aneurysms that are symptomatic, vascular (as the risk of rupture is more difficult to predict) or infected. Patients with aneurysm smaller than this can usually be followed with regular duplex ultrasound as this sequence exposes to imaging radiation and cost. Even patients with small AAA should be referred to a vascular surgeon for assessment.

**ENDOLUMINAL VS OPEN REPAIR**

Once the aneurysm reaches 5.5 cm, the patient will be offered repair. More precise imaging with a dedicated aortic CT being done first as this enables delineation of the anatomy, determining whether endoluminal repair is feasible, as some anatomical factors will contraindicate an endoluminal approach. If the AAA is suitable for endoluminal repair, this would usually be offered as the first option. Occasionally there will be patient factors that need to be taken into account when deciding which type of operation is offered. If the patient is young, they may be offered open repair as a first option as the durability of endoluminal repair is still being determined. If the patient is unable or unwilling to attend for regular follow up they should be offered open repair. If the patient is to have an open aneurysm repair they will usually be referred for a cardiac assessment, while if they are suitable for endoluminal repair this is usually not required unless they have a relevant history. Depending on patient factors and technical aspects of the operation, some patients may patients may be discharged the day following surgery.

Patients leaving endoluminal repair usually do so without pain. The graft may migrate, and up to 20% of patients may develop what is known as an endoleak, which is leakage within the confines of the aneurysm sac but external to the graft. The major types of endoleaks are type 1, where the leak is via the sealing zone of the aneurysm, or type 2 where the sac fills via a branch vessel. Type 1 endoleaks are usually managed by open repair or stenting, whereas type 2 usually have a more benign course and can be watched.

In conclusion, in appropriate patients endoluminal repair represents a safe and effective option that returns the patient to the community and their regular lifestyle much faster than open repair.

**CLAUDICATION**

by Dr Nigel Ackroyd

The word claudication is thought to be derived from Claudius I who likely had a disability of cerebral palsy that caused him to limp.

**SIMPLE THINGS FIRST:**

Take a history and establish the presence of the exercise-pain-referral sequence. Vascular claudication produces pain and numbness or heaviness. If the latter symptoms are present consider a nerve cause. In an era of sophisticated ultrasound, CT and MRA, remember we are still allowed to cause lower limb circulation by feeling the pulses. If there are no pulses present then consider other diagnoses. The absence of claudication makes it unlikely points to the likely site of arterial obstruction. The ankle to brachial pressure index still is a very effective way of assessing PAD. It is often combined with a treadmill exercise study and a normal exercise study effectively excludes PAD.

**THE YOUNGER PATIENT:**

The diagnosis of Popliteal Entrapment, Cystic Adenomatoid Disease and Post Exercise Compartment Syndrome in young patients is difficult. It often requires the use of CT Angiography, Magnetic Resonance Angiography as well as Duplex Ultrasound with extreme foot posturing. Also aggressive arteridithers may occur in patients with type 2 angioplasty and stenting. Perhaps the most common pattern of disease in simple claudication is of a stenosis or occlusion in the region of the adductor hiatus. Here the superficial femoral artery passes under a fibrous arch in the adductor magnus muscle and is subject to repeated trauma with walking and with the postural pulsations. These lesions are readily treated by angioplasty and stenting. As a local oncoendocardial procedure done as a day patient. It should be remembered that there is often a diffuse and generalized arteriosclerosis with proximal and distal thrombosis. A typical result as is seen in Fig 1 using in this case, a balloon expandable covered stent as illustrated in Fig 2.

A subintimal sublumbar plane may be entered for these longer blocks. While there is active debate as to the use of stents in these long reconstructions one would generally start the area that was felt to be the worst in terms of underlying stenosis.

**STENTS:**

It is of some interest that the word “sten” relates to Charles Stent a 19th century English dentist. Stents that are balloon expandable are usually made from 316L stainless steel. Self expanding stents are made from Nitinol which is a Nickel Titanium alloy with remarkable physical properties. As well as its remarkable memory Nitinol is also superelastic; it can be greatly deformed (estimates of up to 10%) and it will spring back to its predetermined shape. Locally drug eluting stents coated with sirolimus have been used in the visceral arteries building in their coronary circulation. Finally dissolving stents made of magnesium have been added to the many technical innovations that have characterised the progression of endovascular surgery over the last three decades.

**TIABAL ANGIOPLASTY:**

The iliac vessels are receiving much more attention of late. The patients are mainly diabetics and there is often a foot ulcer. The intention here is to open the iliac vessels to the ankle or beyond to allow the ulceration to heal. Once the ulcer has healed the foot or a whole requires relatively less blood compared to the non healed state. To accomplish this, small diameter (2mm to 3mm) balloon angioplasty catheters with long balloon lengths (10cm to 15cm) have been developed which allow the whole length of the iliac artery to be dilated.

**SAFARI:**

It is sometimes the case that a vessel cannot be recanalised from the antegrade direction but a retrograde approach may succeed. The SAFARI technique (Subintimal Arterial Flushing Aneurysm Retrograde Intervention) pass an angiographic wire introduced into the distal aneurysm in the foot to retrograde recanalise a vessel and for the wire to be captured into an aneurysm sheath. Subsequent interventions are then conducted antegrade. This is a new technique that is achieving some success with diabetic feet and those with critical ischaemia due to iliac vessel disease.

**SURGERY IS STILL OK:**

Because endovascular techniques are so seductively easy for the surgeon and patient there may be a tendency to oversize these techniques. A case in point is the popliteal aneurysm. A satisfactory appearance can be achieved using a covered stent (see Fig 3 & Fig 4) but regrettably these stents work inadequately in the long term. Possibly because of the flexion and distortion stress on the graft as they cross the knee joint. Far better is a short vein bypass and ligation of the aneurysm. Another area where endovascular techniques have been troublesome are in the carotid circulation but that is another discussion altogether.

**References:**

Available on Request
The management of abdominal aortic aneurysms (AAA) has been changed significantly by the advent of endoluminal repair. This involves the transluminal placement of a graft within the aneurysm so that the sac is excluded from the general circulation, preventing expansion and rupture. The graft is held in place by self-expanding stents that seal against relatively normal arteries above and below the aneurysm. This technique avoids laparotomy and cross clamping the aorta, reducing morbidity and mortality as it constitutes a much smaller physiological insult to the patient. This means that repair can often be offered to patients who would be unacceptable for open repair due to co-morbidities.

**DETECTION OF AAA**

Many patients now present with an aneurysm that has been found during imaging of an unrelated problem. The widespread availability of cross-sectional imaging of the abdomen has meant that many AAA that previously would only have been diagnosed when they rupture are now diagnosed when they are asymptomatic, and there is evidence that this early diagnosis has meant a decrease in the number of ruptures. Screening also reduces the number of patients presenting with ruptured aneurysm due to early diagnosis and confers a survival benefit, and should be offered to patients with a smoking history or family history of AAA.

Patients are offered repair once their AAA reaches 5.5 cm, at the size at which the risk of rupture begins to rapidly increase. The only exception to this are aneurysms that are symptomatic, vascular (as the risk of rupture is more difficult to predict) or infected. Patients with aneurysms smaller than this can usually be followed with regular duplex ultrasound as this minimizes exposure to ionising radiation and contrast. Even patients with small AAA should be referred to a vascular surgeon for assessment.

**ENDOLUMINAL VS OPEN REPAIR**

Once the aneurysm reaches 5.5 cm, the patient will be offered repair. More precise imaging with a dedicated aortic CT scan done first as the sac is excluded from the general circulation, determining whether endoluminal repair is feasible, as some anatomical factors will contraindicate an endoluminal approach. If the AAA is suitable for endoluminal repair, this would usually be offered as the first option. Occasionally there will be patient factors that need to be taken into account when deciding which type of operation is offered. If the patient is young, they may be offered open repair as a first option as the durability of endoluminal repair is still being determined. If the patient is unable or unwilling to attend for regular follow up they should be offered open repair. If the patient is to have an open aneurysm repair they will usually be referred for a cardiac assessment, while if they are suitable for endoluminal repair this is usually not required. If they have a relevant history. Depending on patient factors and technical aspects of the operation, some patients may require a staged approach. This means that the patient has a history of aneurysm surgery and is under consideration for a second operation to offer. If the patient is unable or unwilling to attend for regular follow up they should be offered open repair. If the patient is to have an open aneurysm repair they will usually be referred for a cardiac assessment, while if they are suitable for endoluminal repair this is usually not required.

**Angioplasty and Stenting**

Perhaps the most common pattern of disease is simple claudication. This is a stenosis or occlusion in the region of the adductor hiatus. Here the superficial femoral artery passes under a fibrous arch in the adductor magnus muscle. It is subject to repeated trauma with walking and with the arterial pulsations. These lesions are readily treated by angioplasty and stenting. Such an area is a local arterial procedure done as a day patient. It should be remembered that there is often a delay of several weeks with proximal and distal thrombi. A typical result is as seen in Fig 1 using in this case, a balloon expandable covered stent as illustrated in Fig 2.

A sublobar approach may then be employed for these longer blocks. While there is active debate as to the use of stents in these long reconstructions one would generally start the area that was felt to be the worst in terms of underlying stenosis.

**The word claudication is thought**

To be derived from Claudius I who likely had a disabling form of cerebral palsy that caused him to limp.

**SIMPLE THINGS FIRST:**

Take a history and establish the presence of the exercise-pain-rest-swell sequence. Vascular claudication produces pain and not swelling. Rutherford 4, which is the only foot ulcer, and 5, which is the only foot ulceration to heal. Once the ulcer has healed the foot ulcer or ulceration to heal. Once the ulcer has healed the foot ulcer or ulceration to heal. Once the ulcer has healed the foot ulcer or ulceration to heal.

**THE YOUNGER PATIENT:**

The diagnosis of Popliteal Entrapment, Cystic Adenomatous Disease and Post Exercise Compartment Syndrome in young patients is difficult. It often requires the use of CT Angiography, Magnetic Resonance Angiography as well as Duplex Ultrasound with extreme foot posturing. Also aggressive arteriosclerosis may occur in patients treated with endovascular surgery.

**TIBIAL ANGIOPLASTY:**

The tibial vessels are receiving much more attention of late. The patients are mainly diabetics and there is often foot ulceration. The intention here is to open the tibial vessels to the ankle or beyond to allow the ulceration to heal. Once the ulcer has healed the foot ulcer is a relative to the healed ulcer.

**SAFARI:**

It is sometimes the case that a vessel cannot be recanalised from the antegrade direction but a retrograde approach may succeed. The SAFARI technique (Subintimal Arterial Flushing Aneurysm Retrograde Intervention) pass an angiographic wire introduced into the dorsalis pedis artery in the foot to retro-gradally recanalise a vessel and for the artery to be captured into an aneurysm sheath. Subsequent interventions are then conducted antegrade. This is a new technique that is achieving some success with diabetic foot and those with critical ischaemia due to tibial vessel disease.

**SURGERY IS STILL OK:**

Because endovascular techniques are so seductively easy for the surgeon and patient there may be a tendency to overuse these techniques. A case in point is the popliteal aneurysm. A satisfactory appearance can be achieved using a covered stent (see

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**CLAUDICATION**

by Dr Nigel Ackroyd

The editors and Sydney Adventist Hospital do not accept responsibility for any errors or omissions in any article in this publication.
WHAT’S NEW IN VASCULAR SURGERY?

by Dr Walid Mohabbat

AORTIC SURGERY & AAA SCREENING

Most aortic aneurysms and abcessions have an underlying genetic basis that leads to a breakdown in the proteins that provide structural strength to the wall of the aorta. Smoking and positive family history of aneurysms or death at a young age are the greatest risk factors. However, the majority of aortic aneurysms are never detected and >80% of patients are asymptomatic at the time of initial diagnosis. The natural history of aortic aneurysms is continued expansion until rupture occurs and aortic diseases remain a leading cause of death in individuals over the age of 60 in the Western world. The only way to lower this detection rate is to increase our detection rate in asymptomatic individuals before rupture occurs.

MESSAGE 1: WHO TO REFER FOR AAA SCREENING?

• Men aged >50 who have smoked at least 100 cigarettes during their life
• Men and women aged >60 with a family history of aneurysm
• Men and women aged >60 with a history of TIA or stroke
• Meet and women aged >60 with a history of coronary artery bypass grafting (CABG)

Large randomized trials have shown that endovascular techniques using stentgrafts have reduced the mortality rate of elective repair from ~5% with open surgery to <1%. Most AAAAs can be repaired completely percutaneously without the need for any incisions. However, when the aortic repair involves the renal or visceral segment of the aorta, operative mortality for open repair is 10-30% in the literature. It is this group of patients with suprarenal, thoracic and thoracoabdominal aneurysms that will derive the greatest benefit from minimally invasive techniques.

MESSAGE 2: TREATMENT OF AORTIC DISEASES

• Today the aorta is within the domain of the endovascular surgeon and patients with complex aortas may now gain the most to gain from endovascular solutions. Surgeons who desire to implement these new techniques will need to demonstrate or develop subspecialty training in this field prior to embarking on complex aortic procedures.

CAROTID ARTERY DISEASE

• Carotid stenosis is responsible for up to 1/3 of all strokes. Carotid Duplex ultrasound performed in an experienced vascular laboratory remains the best method to detect a significant carotid stenosis prior to a disabling stroke. At present both carotid endarterectomy (CEA) and carotid artery stenting (CAS) are complementary therapies that both have a role to play in the modern management of carotid disease. Several large randomized control trials have been completed including the North American Vascular Open Registry trial to compare these two techniques.

PURE ENDOVASCULAR REPAIR OF A THORACOABDOMINAL ANEURYSM

MESSAGE 3: TREATMENT OF CAROTID ARTERY DISEASE

• CEA and CAS are complementary therapies being studied in randomised control trials.
• Only vascular surgeons proficient in both carotid endarterectomy and carotid artery stenting should be allowed to give an unbiased treatment recommendation to one therapy over another.

PERIPHERAL VASCULAR DISEASE

Peripheral vascular disease (PVD) is a common manifestation of atherosclerosis and is prevalent in >12% of the general population and in up to 20% of those aged over 75. These patients are at increased risk of death and with minimal limb ischaemia (leg pain at rest) ulcers, rest pain or gangrene ~25% are dead by 12 months. Hence it is extremely important to recognize and to vascularize the limb be associated with a low morbidity and mortality. Recent data have shown that traditional lower extremity bypass is associated with a ~3-5% mortality rate and a 23-35% major complication rate in series of excellence. Minimally invasive endovascular techniques can also be used to neurevasculation the limb under local anaesthesia +/- sedation via a femoral artery needle puncture. These techniques are much better accepted by patients who can then rapidly return to normal activities and require <24 hours in hospital.

MESSAGE 4: ENDOVASCULAR TREATMENT FOR PVD

• Endovascular techniques should be used in preference to more invasive open surgery in treating PVD. Open surgery is generally reserved for patients who have repeatedly failed with endovascular therapy.

LASER FOR VARICOSE VEINS

Endovenous laser is an office based procedure performed under local anaesthesia for the treatment of varicose veins originally developed in the USA. Several large randomised control trials have shown that it has the best success rate of any procedure available for the treatment of large varicose veins. It allows treatment of an incompetent great saphenous vein (GSV) or small saphenous vein (SSV) by using a LASER fibre within the vessel.

MESSAGE 5: ENDOVENOUS LASER THROMBOSIS (DVT)

Acute deep vein thrombosis (DVT) involving the femoral veins is associated with significant morbidity in the long term due to the associated post pulmonary embolism. Over 5 years post DVT treated with standard anticoagulation along with aspirin, major disabling muscle dysfunction is present in 50%, ambulatory venous hypertension in 95%, venous insufficiency in 95%, venous ulceration in 15% and venous stenosis in 15%. Several authors have shown that a strategy of thrombus removal reduces the risk of developing post thrombotic syndrome and significantly improves patient outcomes. The least invasive and most effective means of thrombus removal is with pharmacological or pharmaco-mechanical thrombolysis. Studies have shown that endovenous directed lytics effectively remove the thrombus burden, preserve endothelial function and preserve venous competence in the long term.

MESSAGE 6: CATHETER DIRECTED THROMBOLYSIS FOR DVT

• All patients with femoral DVT who are physically active should be considered for a strategy that avoids patient mobilization. Without this post thrombotic morbidity after femoral DVT is a significant concern. Anticoagulation alone with concomitant heparin infusions is generally recommended only for patients who are extremely active or who have bleeds of <2y.

www.sah.org.au

UPCOMING GP CONFERENCES

8th September Gastroenterology GP Conference

Cytology/GP Conference

Registration and free buffet dinner from 6.15 pm with conference from 7 – 9pm. The program is approved by the RACGP QAI & CPO Program. RACGP Code: 947821 1K to register.
WHAT’S NEW IN VASCULAR SURGERY?

MESSAGE 1: WHO TO REFER FOR AAA SCREENING?

• Men aged >50 who have smoked at least 100 cigarettes during their life
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Large randomized trials have shown that endovascular techniques using stentsgrafts have reduced the mortality rate of elective repair from ~5% with open surgery to ~1%. Most AAAAs can be repaired completely percutaneously without the need for any incisions. However, when the aortic repair involves the renal or visceral segment of the aorta, operative mortality for open repair is 10-30% in the literature. It is this group of patients with suprarenal, thoracic and thoracoabdominal aneurysms that will derive the greatest benefit from minimally invasive techniques.

MESSAGE 2: TREATMENT OF AORTIC DISEASES

• Today the entire aorta is within the domain of the endovascular surgeon and patients with complex aortic disease are treated in the majority of centres. This has led to a significant improvement in survival for both acute and chronic aortic disease. The most common indications for endovascular surgery are rupture or dissection, and the need for hospital admission, general anaesthesia, incisions or wounds. Compared to standard surgical repair there is a significant reduction in post-operative morbidity and mortality. The greatest benefit is derived from minimally invasive techniques for patients who have rapidly returned to normal activities and require <24 hours in hospital.

MESSAGE 3: TREATMENT OF CAROTID ARTERY DISEASE

• Endovascular treatment is responsible for up to 1/3 of all strokes. Carotid Duplex ultrasound performed in an endovascular laboratory remains the best method to detect a significant carotid stenosis prior to a disabling stroke.
• Antiplatelet dual antiplatelet therapy (ASA and clopidogrel) are complementary therapies that both have a role to play in the management of carotid disease. Several large randomised control trails have shown that in the treatment of large varicose veins. It allows treatment of an incompetent great saphenous vein (GSV) or small saphenous vein (SSV) by using a LASER fibre within the vessel wall.

MESSAGE 4: ENDOVASCULAR TREATMENT FOR PAVIC

• Endovascular techniques should be used in preference to more invasive open surgery in treating PAVIC. Open surgery is generally reserved for patients who have repeatedly failed with endovascular therapy.

LASER FOR VARICOSE VEINS

Endovascular laser is an office based procedure performed under local anaesthesia for the treatment of varicose veins originally developed in the USA. Several large randomised control trails have shown that it has the best success rate of any procedure available for the treatment of large varicose veins. It allows treatment of an incompetent great saphenous vein in minimally active or who have larger limb veins.

PERIPHERAL VASCULAR DISEASE

Peripheral vascular disease (PVD) is a common manifestation of arterial disease and is present in >12% of the general population and in up to 20% of those aged over 75. These patients are at increased risk of death from cardiovascular and cerebrovascular disease. The risk is highest for patients with normal renal function. If patients with normal renal function have a ~3% mortality rate and a 23.3% major complication rate in centres of excellence. Minimally invasive endovascular techniques can be used to neurevascure the limb under local anaesthesia +/- sedation via a femoral artery needle puncture. These techniques are much better accepted by patients who can rapidly return to normal activities and require <24 hours in hospital.

News from the San

Sydney Adventist Hospital’s ‘Run for Life’ Fun Run is on Sunday 25th October this year. Open to all able and active runners it is 5 km run, 5km walk and 10km run through the beautiful streets of Wahroonga makes for a great family event. A highlight is the battle between the local schools competing for the School Championship Cup. Live music, a free barbecue and great individual events and lucky number prizes make this a fun and healthy way to spend a Spring Sunday morning. Registrations at www.sah.org.au or email runforlife@sah.org.au.

UPCOMING GP CONFERENCES

8th September Gastroenterology GP Conference – San Day Surgery Hornsby (SDSH) received commendations during its recent annual standards assessment. Certified and approved for General Practice and Endorsed by COPD@OH (Endorsed by COPD@OH)

Sydney Adventist Hospital is home to the Avondale College Faculty of Nursing and Health from which more than 60 nurses graduate each year. Avondale College has been offering Excellence in Christian Tertiary Education since 1897. Avondale College courses include Nursing, Education, Arts, Science & Business, Theology and the Certificate II in Diploma in Outdoor Recreation. Phone 1800 991 292 or email: enquiries@avondale.edu.au or www.avondale.edu.au

The San welcomes newly SAF-accredited orthopaedic surgeon Dr Brian Hui (Spinal Sub-Specialty).

A San Pathology Collection Centre is now open at 1 / 2 Millenium Road Penrith Hills. Queries 9980 6834 or 9487 9500.

DENTAL SURGERY. In a recent patient survey SDSH achieved almost 99% satisfaction rate! Please contact Manager Bev Lun on 9476 5048 25 http://www.sah.org.au SEPTEMBER 2009

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