

DR. CAINE AND PARTNERS

VASCULAR UPDATE

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Vascular problems IN SPORTSMEDICINE

Several well described vascular syndromes are characteristically associated with sporting activities.

Perhaps the most common is **effort induced thrombosis of the axillary/subclavian vein** which is particularly seen in baseball pitchers, cricket players, fly fisherman, gymnasts and other sportsmen. In these cases compression of the vein at the thoracic outlet leads to acute thrombosis with considerable swelling of the arm or recurrent episodes of swelling and discolouration. The subclavian vein tends to be compressed between the clavicle and the first rib, often influenced by a hypertrophied subclavius muscle. Repeated muscular activity in the dominant arm causes repeated trauma as the vein is scissored between these two structures. A fibrous stricture develops in the vein which is then at risk of sudden thrombosis. Treatment is urgent and consists of catheter directed thrombolysis of the clot followed by surgical excision of the first rib with or without balloon angioplasty of the venous stenosis.

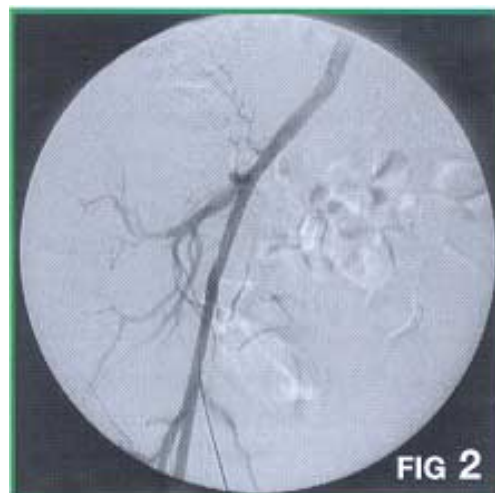
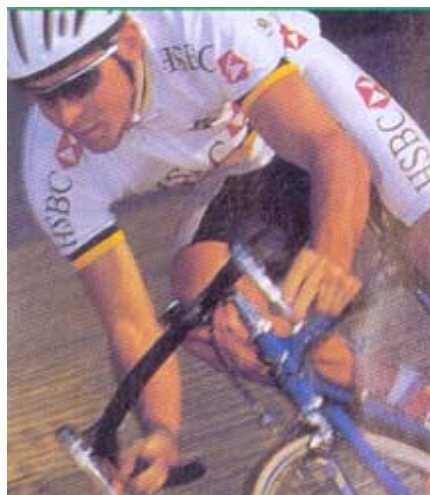
Competitive cyclists are prone to develop a long fibrous stricture of the external iliac artery related to repetitive hip flexion and extension over a long period of time. This lesion produces claudication symptoms after cycling long distances. The diagnosis is made using colour-flow duplex before and after exercise. These stenoses respond well to simple balloon dilatation under local anaesthetic.

Compartment syndromes are frequently seen in sportsmen and tend to cause confusion with intrinsic arterial pathology resulting in claudication. Evaluation requires careful assessment in a vascular laboratory with or without intra-compartmental pressure measurements.

Raynaud's phenomenon and other vasospastic problems are frequently associated with high frequency vibrations as experienced by motor bike riders, racing car drivers and occasionally cyclists.

The **popliteal artery entrapment syndrome** refers to a condition in which the popliteal artery is compressed by abnormal muscular or ligamentous structures in the popliteal fossa usually associated with an aberrant insertion of the medial head of gastrocnemius. This usually produces claudication symptoms in young adults but may result in thrombosis of the artery with limb-threatening ischaemia. Sportsmen with exercise induced pain frequently have to be evaluated in the vascular lab to exclude this diagnosis. Some forms of the syndrome may be more frequent in athletes due to muscular hypertrophy.

Atherosclerotic disease in its early stages may produce symptoms of claudication only after running or cycling for considerable distances. Claudication symptoms even in apparently healthy sportsmen may require careful evaluation in the vascular laboratory.



ANGIOGRAMS OF AN EXTERNAL ILIAC STENOSIS IN A COMPETITIVE CYCLIST BEFORE (FIG.1) AND AFTER (FIG.2) BALLOON ANGIOPLASTY

The UK Small Aneurysm Trial

One of the most exciting recent developments in the management of MA was the publication in the Lancet in November 1998 of the results of the UK small aneurysm trial. This was a prospective, randomised study comparing ultrasonic surveillance of small infrarenal aneurysms with early surgery. 1090 patients aged 60-76 with asymptomatic aneurysms measuring 4.0-5.5cm in diameter were randomised to undergo early elective open repair (563) or ultrasonic surveillance (527). Patients were followed for a mean of 4.6 years and if in this time the diameter exceeded 5.5 or the patient developed symptoms, surgical repair was recommended. Mortality was analysed on an intention to treat basis.

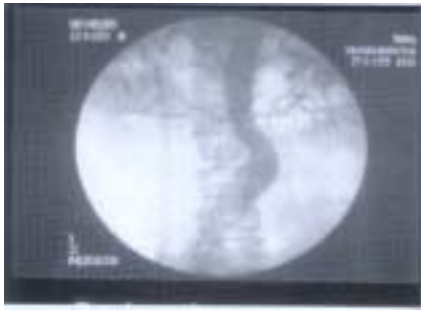
Results suggested that for patients with small aneurysms, ultrasonic surveillance is safe and early surgery is not associated with any long-term survival advantage. The risk of rupture of small aneurysms was 1% per year. The 30 day mortality from early surgery was 5.8%. Aneurysm rupture occurred in 17 of the 527 patients randomised to surveillance (3%); two thirds had warning signs or symptoms. The median annual growth rate of small aneurysms was 0.33cm.

The study has replaced many previously held assumptions with facts and is likely to significantly influence clinical practice. Most small aneurysms can be safely watched. However, in centers with low operative mortality rates for elective aneurysm surgery, elective repair of some smaller aneurysms may be appropriate.

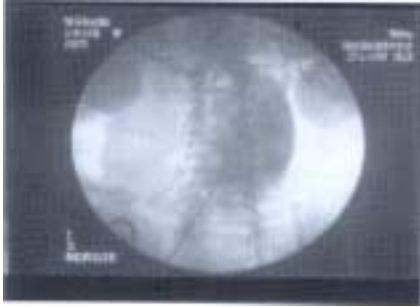
Aneurysm Repair at Kingsbury Hospital

Minimally Invasive Abdominal Aortic Abdominal aortic aneurysm repair using primary procedure. Our early results a stent-graft introduced through the with this new technique are consistent groins has become an established with world-wide experience. procedure. Six to twelve month post-operative evaluations of the first 16 patients who underwent aortic endografting at Kingsbury in 1999 have now been completed. All the stent grafts were successfully deployed with no major complications. Minor complications were one small groin haematoma and two lymph leaks. No patient required an open repair and there were no returns to the operating theatre. Thirteen out of sixteen were discharged home within 48 hours of the procedure. Only one endoleak (persisting perfusion of the aneurysm sac around the stent graft) was demonstrated on follow-up: in this patient the endoleak was sealed by introducing a further covered stent through the groin 5 months after the

The feasibility and safety of endovascular aortic aneurysm repair is no longer in doubt. What remains unanswered is how these stent grafts will perform in the longer term. For this reason we continue to apply very strict anatomical exclusion criteria, accepting only those patients who are ideal candidates for the procedure. High quality spiral CT scanning is required to make this assessment. Currently approximately 50% of the aneurysms we assess are suitable for a stent graft. Every patient with an abdominal aortic aneurysm that is large enough to require treatment deserves consideration for possible repair using this minimally invasive technique.



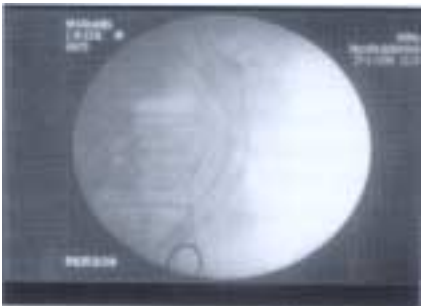
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ANEURYSM STENT GRAFT DEPLOYED



LATERAL VIEW OF STENT GRAFT

CHRONIC CRITICAL LIMB ISCHAEMIA: A COMPLEX AND COSTLY PROBLEM

Critical limb ischaemia, defined as rest pain for more than two weeks or the presence of ischaemic ulceration or gangrene, is . enormously demanding -both on the abilities of the vascular surgeon and the resources of the hospital or health care system. In a prospective audit of 228 patients with 275 severely ischaemic limbs only 64% could be managed in a single hospital admission. A total of 361 separate reconstructive procedures were required as well as 70 amputations. Limb salvage rates of 94% at 30 days and 65% at 4 years were achieved but the 30 day mortality approached 10%. The average hospital stay per admission was 16 days. Patients with early occlusion of bypass grafts had a particularly bad prognosis. The overall patient survival rate was only 40% at 4 years, Critical limb ischaemia is almost invariably associated with major co- morbidities and therefore a multi- disciplinary team approach is likely to achieve the best results. The management of critical limb ischaemi will continue to be one of the most demanding challenges a vascular unit has 1 deal with.

RECREATIONAL DRUGS

and Vascular Disease

The risk factors for development of atherosclerosis are well described. The role that tobacco plays is beyond dispute but there is now evidence that cannabis use may also be implicated.

A report from London describes the case of a young man who had smoked only cannabis for seven years. Before that he had smoked cannabis mixed with tobacco. He presented with rest pain and gangrene in his toes, with absent foot pulses. His angiogram demonstrated typical features of Buerger's disease. He underwent lumbar sympathectomy and toe amputation, was commenced on aspirin, and improved dramatically.

The association of Cannabis use and obliterative vascular disease was first described in 1960. Other agents used concomitantly have also been described as causing vascular problems. LSD, amphetamines and Cocaine have all been positively linked to peripheral vascular problems, even when not taken intravenously.

Inadvertent intra-arterial injection is well known as a cause of arterial problems, but the association between smoked or inhaled recreational drugs is less obvious.

Recreational drug use is an increasing problem. There may be a need to identify this as a possible contributing factor in the pathogenesis of vascular disease, especially in younger patients.

Schneider HJ et al. Eur J Vasc Endovasc Surg 18:366-367

How to Distinguish Spondylogenic from Vasculogenic Leg Pain

One of the most frequent clinical problems faced by general practitioners, orthopaedic surgeons, rheumatologists and vascular specialists is determining whether leg pain is due to a spinal or a vascular cause. To make things more difficult the two conditions frequently co-exist.

Sciatica is usually easily distinguished because of the distribution of the pain, the sudden onset often associated with posture change, a positive straight leg raise test and associated neurological signs. Far more difficult to sort out is the problem of spinal stenosis. This frequently produces claudication symptoms that may be difficult to distinguish from true vascular claudication. The characteristics of spinal claudication are that symptoms are aggravated by extension of the spine (as in walking downstairs) and relieved by flexion (as in walking upstairs). Symptoms are often produced by standing rather than walking and may be relieved by squatting or bending forward. Unlike vascular claudication the symptoms are variable from day to day with an inconsistent claudication distance. Although rest relieves the symptoms it may take several minutes to do so, unlike the immediate relief experienced by the vascular claudicant.

Careful clinical examination is essential. However non-invasive assessment in the vascular laboratory will often be required. The mainstay of diagnosis is Doppler measurement of the ankle to brachial systolic pressure index (ABI) before and after exercise. If exercise produces the patient's symptoms in the absence of any fall in the ABI, a vascular cause can usually be excluded.

Venous pain is worse on standing. often relieved by walking and tends to get worse as the day progresses. There may be symptoms at night. Pain is usually associated with swelling and on clinical examination there are usually varicose veins or skin changes of chronic venous insufficiency. Venous Doppler studies will determine whether there is any evidence of venous incompetence or obstruction.

Cervical Ribs

These are congenital anomalies resulting from incomplete fusion of the costal element of the seventh cervical vertebral body. The defect may be bilateral and is relatively common. The true incidence is unknown, as the majority are asymptomatic. Cervical ribs are "complete" if they extend from the seventh vertebra to the first rib. If they are incomplete, they are usually associated with a fibrous band, which connects the tip of the cervical rib to the scalene promontory of the first rib. This band may cause the same problems as the bony rib itself.

Cervical ribs may present as a classical thoracic outlet problem. Most (80%) of these are neurological, with the remainder being vascular. (18% arterial, 2% venous). The neurological presentation is usually with paraesthesia in the Ulnar nerve dermatome. Less commonly, there may be pain in the shoulder girdle region, or muscle wasting in the hand or forearm.

Arterial problems present as claudication in the forearm on exertion, or with digital gangrene caused by distal embolisation. The clot is formed within a post-stenotic dilatation of the subclavian artery distal to the narrowing formed where the artery is tented over the cervical rib (or band).

The rib may be found clinically by palpation of a bony prominence in the supraclavicular fossa, or on X-ray. There may be an audible bruit. Pulses are usually present. The neurological deficit is usually easily demonstrated when present.

Treatment of symptomatic cervical ribs involves excision, with division of the scalenus anterior muscle. Asymptomatic ribs require no treatment. Complications of untreated symptomatic cervical ribs include permanent neurological deficit, or ischaemia of the arm.



THE THORACIC OUTLET WITH A LONG CERVICAL RIB CONSTRICTING THE SUBCLAVIAN ARTERY AND PRODUCING A POST-STENOTIC ANEURYSM

Spontaneous Internal Carotid

Artery Dissection

This is a rare, but important clinical entity. It is an important cause of Ischaemic strokes, especially in the younger age groups.

Of extreme importance is the fact that there are clear warning symptoms prior to the onset of the stroke, thus allowing possible stroke prevention if the diagnosis is made.

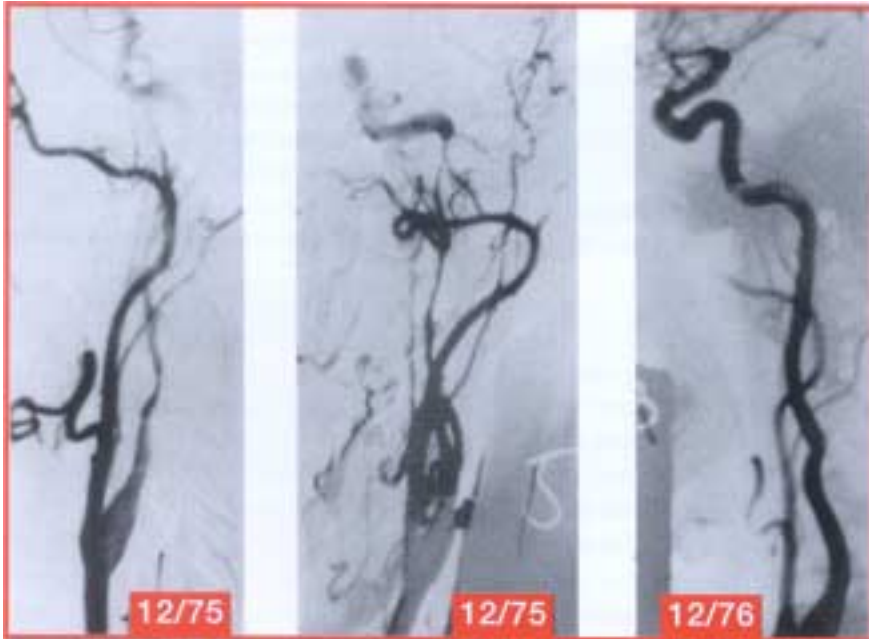
The first report of this condition was in 1954, and over 300 cases have subsequently been reported in the literature. While the true incidence is unknown, it is estimated that 10 - 20% of strokes in the young may be caused by the condition. Arteriopathies such as Cystic Medial necrosis, Marfan's Syndrome, Ehlers-Danlos Syndrome, Fibromuscular dysplasia and trauma (direct blow, or a hyperextension injury) may be implicated but most cases are idiopathic.

The majority of patients present with neck pain, and invariably have a tender carotid artery on palpation. 20% of patients present with established or evolving neurological signs. Stroke is embolic, and rarely caused by hypo perfusion. The dissection starts in the carotid bulb, and involves the extracranial internal carotid artery only. Common carotid involvement is very uncommon, as is intracranial extension. The diagnosis is easily made with Duplex scanning, thus allowing early treatment.

Treatment consists of Warfarin or aspirin. Many vascular surgeons use subcutaneous fractionated heparin with aspirin, at the commencement of Warfarin therapy. The choice of anticoagulant is individualized to the patient.

Most occlusions recanalise within 1 month if aggressively anticoagulated. The risk of contralateral dissection is around 12%, which is enough to justify contralateral follow-up scans. 10 year survival rates are 90%.

Dissection of the Internal Carotid Artery followed by Stroke is always preceded by prodromal symptoms. Duplex Doppler is the best method of diagnosis, and allows for early treatment.



SEVERE NARROWING OF THE INTERNAL CAROTID ARTERY DUE TO SPONTANEOUS DISSECTION (12/75) WITH SPONTANEOUS RE-EXPANSION RESULTING IN A NORMAL LOOKING CAROTID THREE MONTHS LATER (12/76)

Pregnancy and Varicose veins

A recent study from the UK has confirmed the widely held belief that pregnancy has a significant effect on venous dilatation. However, the study also demonstrated that if veins were normal prior to pregnancy, then they returned to normal after pregnancy, indicating that pregnancy itself does not cause varicose veins.

16 pregnant women were assessed. 13 had a family history of varicose veins. All women were noted to have increasing venous dilatation of their lower leg veins with advancing pregnancy. Duplex assessment allowed measurement of actual vein diameter, as well as the degree of reflux within the veins.

The maximal diameter increase was in the left long saphenous vein, followed by the right. These changes were statistically significant compared with non-pregnant controls. The changes were also greater in previously diseased veins. After delivery, the changes reverted to pre-pregnant sizes unless there was pre-existing disease.

Sparer C et al Eur J Vasc Endovasc Surg 18, 294-299

Carotid Endarterectomy after Recent Stroke

Traditionally vascular surgeons have observed a six week waiting period before undertaking carotid endarterectomy in patient who have already suffered an established stroke. This is based on the high morbidity and mortality rates of several early series. More recently several studies have suggested that this rule may no longer be applicable. The largest of these was recently reported from Durban in the European Journal of Vascular and Endovascular Surgery. In a retrospective review of 86 patients who underwent early surgery versus 121 patients whose surgery was delayed beyond six weeks there was no difference in morbidity and mortality between the two groups. Certain categories of patient are probably unsuitable for early surgery. These include patients with profound deficits and reduced level of consciousness and patients with cerebral swelling

resulting in a midline shift. Good risk patients with recent cerebral infarction should be studied using colour-flow duplex and carotid endarterectomy offered to those who have critical carotid stenoses.

Hoffman M, Robbs J (Europ J Vasc Endovasc Surg 1999; 18.6-1 0