Upper Extremity Arterial Disease

The pathology of upper extremity arterial disease and the clinical presentation are a result of a variety of conditions much different than those associated with lower extremity ischemia. The greatest percent of lower extremity events are due to atherosclerosis. This is not so for the upper extremity. This difference can make diagnosis and treatment more challenging and leads to potentially poorer prognosis, however, major limb loss is rare.

Arterial problems of the upper extremity can be divided into categories based on the size of the vessel affected, such as larger arteries and smaller digital vessels. The major cause of events are thromboembolic obstruction or vasospastic.

**THROMBOEMBOLIC**

Physical findings secondary to thromboembolism present with classic acute ischemia including loss of pulse, pain, paresthesias, pallor and coldness. The origin of the clot can be the heart, the aortic arch or a peripheral artery aneurysm. The most common of these being in the subclavian artery or as a complication of thoracic outlet syndrome. Less common causes include hypercoagulable states secondary to malignancy or protein coagulation disorders.

**LARGE ARTERY OBSTRUCTION**

Atherosclerosis typical of that in the lower extremities affects the origins of the subclavian artery resulting in an upper extremity pulse gradient, possible steal syndrome, but generally little to no symptoms because of the rich collateral circulation in this area. Treatment would be offered for symptomatic arm claudication.

**THORACIC OUTLET SYNDROME (TOS)**

This anatomic condition can obstruct the subclavian artery causing a variety of symptoms or embolic events as already noted. In this condition, the anatomic abnormality is corrected by removing the first rib or a cervical rib along with the first rib, thereby, decompressing the thoracic outlet.

**GIANT CELL ARTERITIS (TAKAYASU’S)**

Giant cell arteritis (Takayusu’s and fibro-muscular dysplasia) involve upper extremity large
arteries. Both conditions are poorly understood but are to be considered in the differential diagnosis.

**SMALL ARTERIES**

These vessels are not affected by atherosclerosis but rather a variety of connective tissue disorders including rheumatoid arthritis, scleroderma, lupus erythematosis and Buerger’s disease. These conditions lead to vasospasm and are profoundly affected by smoking or repeated trauma. Raynaud’s syndrome – episodic digital ischemia secondary to cold stimuli is also limited to small arteries.

**Diagnosis of Upper Extremity Arterial Disease**

Beyond the history and physical, the use of the vascular laboratory and CTA (computed angiography), are the most useful diagnosis tools. In certain cases, a full hematologic evaluation is indicated.

**Treatment**

Therapy for this variety of conditions can include modalities of open surgery, endovascular procedures and pharmacologic management. Such procedures would be:

1. Embolectomy
2. Carotid subclavian bypass
3. Subclavian artery stenting
4. First rib resection
5. Clot lysis
6. Calcium channel blockers
7. Partial digital amputation for painful necrotic finger lesions

In summary, upper extremity arterial disease evaluation, diagnosis and treatment can be difficult and represent a much different spectrum than those of the lower extremities. Using an approach of separating large and small vessels and origin of event (embolic, obstructive, vasospastic) and the diagnostic tools available, the correct diagnosis and therapy can be achieved.