Endovascular Approach to Subclavian Artery Aneurysm

In the December issue of *Vascular Disease Management*, Mengal et al present a case report in which they utilized Wallgraft stents to treat a symptomatic arterial aneurysm involving the distal portion of the left subclavian artery in a 25-year-old female. The patient evaluation at 6 months post procedure showed the patient to be asymptomatic. The patient experienced no immediate or late-term complications. Arterial duplex performed at the 6-month follow-up visit demonstrated a widely patent subclavian artery with exclusion of the aneurysm. The etiologies of subclavian arterial aneurysms are discussed in detail in this case report.

Interventional treatments of a wide variety of subclavian artery pathologies have the potential to offer significant advantages over traditional surgical approach. Traditional surgical approach to subclavian artery pathology typically requires open thoracotomy. It is associated with significant morbidity, mortality, and risk of neurologic injury. Interventional therapy has the potential to shorten hospital stays, diminish costs, and decrease morbidity.

Proximal obstructive subclavian arterial disease is being treated commonly by percutaneous intervention. Indications for treatment include arm claudication, subclavian steal, myocardial ischemia (where there has been prior or contemplated distal internal mammary artery bypass), and preservation of vascular access to the central arterial system in patients with diffuse obstructive atherosclerosis and no other remaining access sites. Atherosclerotic obstruction can be approached via femoral, brachial, or radial access. Most cases of atherosclerotic disease are treated with bare-metal stents (typically balloon expandable at the origins of the vessels and self-expanding beyond the origin); however, short covered balloon expandable stents have been utilized (off label) in cases where there have been repeated episodes of in-stent restenosis involving the origin of the left subclavian artery.

Aneurysmal disease, blunt or sharp traumatic injury and inadvertent placement of large-bore catheters into the subclavian artery, are also being treated more commonly via interventional techniques. Most of these treatments have historically been performed via femoral approach utilizing either polytetrafluoroethylene...
(PTFE)- or Dacron-covered stents to seal the area of injury, perforation, dissection, or aneurysm. It should be noted that Dacron is porous, therefore initially there may be oozing through Dacron-covered grafts until the graft ultimately is rendered impermeable when exposed to blood. This is particularly important when intervention is being utilized to seal perforations. When woven stent-grafts are utilized, the length of the graft foreshortens longitudinally as it expands axially. Care must be taken to ensure that if there is axial stent growth that the stent graft will not ultimately foreshorten, resulting in untreated areas at the ends of the intended treatment zone. Polytetrafluoroethylene is nonporous and is typically utilized in conjunction with nitinol self-expanding stents that are not woven or with balloon-expandable stents that have minimal foreshortening with axial expansion. These stent grafts do not foreshorten after deployment. All stent-grafts must be placed carefully to avoid obstructing important arteries arising off of the subclavian artery. As with any stent graft utilized interventionally, it is important to properly size the graft to ensure a proper seal but to also avoid excessive chronic outward force, which may increase the likelihood of restenosis. Stent grafts should be dilated after delivery to “iron out” material in-folding with careful attention to avoid balloon injury at the stent edges. Post stent-graft placement antiplatelet therapy and regular duplex surveillance are mandatory to ensure long-term patency. Repeat intervention should be considered even in asymptomatic individuals if there is evidence of high-grade edge stenosis.

Subclavian interventions represent a much less invasive approach to the treatment of subclavian artery pathology. It is particularly appealing in patients who are at high risk with open surgical technique. As with any intervention, careful pre-assessment, planning, consultation, proper equipment, technique, and postprocedural follow-up are crucial.