

Vascular Surgery Making *Minimal* Change

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Advances in Endovascular Surgery – Part I



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Vascular surgery has experienced many changes since its inception. The past decade, in particular, has brought about an abundance of new and exciting changes that have extended the scope of vascular surgery practice beyond the traditional operative interventions for revascularization. Today, vascular “centers of excellence” are being developed around the country in which vascular surgeons treat patients not only with established operative techniques, but also by utilizing minimally invasive angiography based procedures in the treatment of peripheral vascular disease. Procedures that are currently being performed include; abdominal aortic stent graft repair for abdominal aortic aneurysms, and angioplasty and stenting for iliac artery occlusive disease, aortic arch great vessel disease, as well as renal and mesenteric artery occlusive disease. The future also holds advances in stent technology and distal artery protective devices that should make superficial femoral artery and carotid artery angioplasty and stenting both safe and durable procedures.

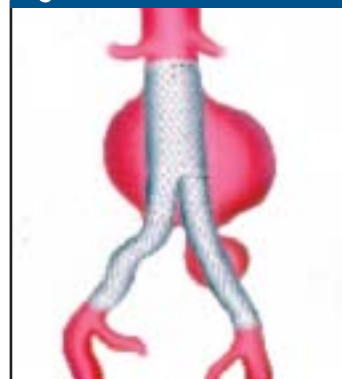
This article, presented in a series over the next three issues, will describe treatment options for common problems seen in the vascular surgery population. New interventional techniques used in the practice of vascular surgery will be discussed and compared with surgical intervention both in terms of initial success and long-term outcomes. Overall, endovascular techniques are now providing treatment options for high-risk patients who, at one time, had little in the way of treatment alternatives. Part I of this article will cover treatment for abdominal aortic aneurysms and aortoiliac occlusive disease.

Abdominal Aortic Aneurysms

The utilization of stent grafts for the treatment of abdominal aortic aneurysms has become more prevalent in the past five years. A recent comparison trial has shown that perioperative mortality is equal when comparing open repair versus endoluminal repair of abdominal aortic aneurysms. This result was obtained despite the fact that 44% of the patients treated endovascularly had been turned down for traditional open aneurysm repair.ⁱ Endovascular repair of abdominal aortic aneurysms offers the benefit of shorter operative time, decreased blood loss, and shorter hospital stay as well as decreased over-all recovery time.ⁱⁱ

Despite the advantages of endoluminal stent grafts, there remains two concerns. First is the known 10% – 20% incidence of endoleak at one-year post stent deployment. Endoleak is a problem unique to endovascular aneurysm repair and its treatment is controversial. Endoleaks are typically observed unless the aneurysm remains pulsatile or if the aneurysm sac continues to enlarge in follow up studies. Treatment of endoleaks includes further endovascular procedures involving extension cuffs or embolization of the area responsible for the leak. Finally, conversion to open repair may be necessary if the leak cannot be controlled. The second concern for endovascular repair of abdominal aortic aneurysms is the unknown long-term outcome. This includes whether an endograft will arrest the natural history of progressive aneurysm degeneration of the aorta. Similarly the durability of the grafts long term is simply unknown. However, a recent study of the AneuRx endoluminal aortic stent graft did demonstrate a 99.5 % rupture prevention rate at three years and an 86% overall survival at three years.ⁱⁱⁱ This data should be assimilated with the knowledge that the average five-year survival after open repair of abdominal aortic

Figure 1



aneurysms 5cm or greater is only 60%.^{iv} Future studies will be required to address the long-term durability of this new intervention, however, the short-term data is very promising in the treatment of aneurysmal disease with this exciting treatment option.

Aortoiliac Occlusive Disease

Infra-renal abdominal aorta and iliac arteries are among the most common sites of chronic obliterative atherosclerosis in patients with symptomatic occlusive disease of the lower extremity.^v Patients with localized aortoiliac occlusive disease typically present with claudication of varying severity. Symptoms may be equal in both legs, though one leg is usually more severely affected than the other. Typically, symptoms affect the proximal muscle groups including the musculature of the buttock, hip, or thigh. Physical exam may show diminished pulses, abdominal bruits over the iliac arteries, and possibly muscle wasting or other constitutional signs of chronic ischemia. Noninvasive vascular exam can help make the diagnosis by showing decreased upper leg pressures and diminished amplitude in femoral artery waveforms. After aortoiliac disease has been worked up and a presumptive diagnosis made, angiography is used to identify the distribution of occlusive disease.

The following example is that of a 54-year-old female with a two pack per day smoking history that presented with right leg ¼ to ½ block claudication. This patient’s physical exam showed non-palpable pulses on the right and 2+ pulses throughout on the left side. Non-invasive testing depicted flat waveforms on the right with an ankle-brachia-index (ABI) of 0.47. The left side showed triphasic waveforms and a 0.97 ABI. Angiography (fig 2) revealed a total occlusion of the right common iliac artery (CIA). After guidewire traversal and thrombolytic therapy the CIA was angioplastied and stented (fig 3) thus restoring flow and eliminating claudication as well as returning ABI to normal limits. Currently the patient is symptom free at 27 months and her ABI is 0.89.

Aortobifemoral grafts continue to be the “gold standard” for the treatment of aortoiliac occlusive disease.^{vi} A consensus of several large series in the recent literature supports this statement indicating that it is reasonable to expect an

85% to 90% graft patency rate at five years and 70% to 75% at ten years. Perioperative mortality rates are also now as low as 3% in many centers though the range is 2.5% to 12% at thirty days.^{vii}

Alternative treatment for aortoiliac occlusive disease utilizes endovascular techniques involving angioplasty and stenting of the iliac arteries, as described in the above example. The patency rates for angioplasty and stenting of iliac arteries is 87% to 95% at 12 months and 72% to 91% at 36 months.^{viii, ix} When utilizing endovascular techniques perioperative mortality is as low as 0 in several centers but ranges as high as 9%.^x Endovascular approaches for aortoiliac occlusive disease is proving to be a very durable procedure with many patient advantages including short, if any, hospital stay and minimal over-all recovery time. Part II of this series will be presented in the next issue of *The Leading Edge*. The next installment will cover minimally invasive treatment of aortic arch great vessel occlusive disease and carotid artery disease. **For more information, please call Heart & Vascular Care, a division of The Iowa Clinic, P.C., at (515) 241-5700** ▼

Figure 2



Figure 3



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