I have performed more than 270 nonsurgical closures of ASD in children and adults using the Amplatzer septal occluder. The patients range in age from 5 months to 87.5 years and in weight from 5.4 to 120 kg. The immediate complete closure rate is 80 percent, and within 24 hours the complete closure rate is 95 percent. At 6 months following the procedure the success rate is greater than 97 percent. Our complication rate is very low (only 3 patients out of 270 had complications). In 2, the device embolized after release; in both we were able to retrieve the device and successfully place two devices during a separate procedure. The third patient experienced a problem with the electrical system of the heart, which was treated effectively.

We have taught this technique to physicians in the United States and abroad. The device (or a modification thereof) also can be applied in some patients who experienced a stroke due to a passage of clot from the right atrium to the left atrium through a patent foramen ovale.

References
Minimally invasive methods and strategies have been developed and their application and popularity have been increasing. These include aortoiliac, femoropopliteal, renal, and carotid intraluminal stenting and stent-grafting, minimally invasive infrainguinal bypass, laparoscopic venous perforator ligation, photodynamic laser venous ablation, and critical pathways of clinical care. Each of these new services is available within the Section of Vascular Surgery at the University of Chicago. The purpose of this article is to briefly review some of these new initiatives and their clinical results.

**Carotid Endarterectomy Without Angiography or Intensive Care Unit Admission**

Carotid endarterectomy (CEA) is the treatment of choice for patients with symptomatic carotid stenosis and in selected patients with asymptomatic stenosis. Preoperative diagnostic arteriography, once considered prerequisite to CEA, is rapidly being replaced by carotid duplex scanning. The obvious advantages of duplex scanning include noninvasiveness and rapid acquisition. Many medical centers, including ours, now routinely perform CEA based on duplex scanning alone. During recent years, the use of preoperative arteriography at our institution has decreased from 85 percent to 39 percent. This has occurred while preserving the rate of 0.6 percent for stroke death, and the rate of 99.6 percent for 3-year freedom from ipsilateral stroke.

Even more striking than the infrequent need for preoperative arteriography is the rapidity with which patients recover from CEA and are discharged from the hospital. By modifying patient expectations and implementing critical pathways of clinical care, nearly half of all patients who undergo CEA at our institution leave the hospital the following day and nearly 90 percent are discharged by the second day.

Carotid angioplasty and stenting recently has been advocated as an alternative to CEA, and our initial institutional experience has been favorable. However, since most studies have shown increased risks and costs compared with traditional CEA, we continue to recommend angioplasty and stenting on a limited basis only.

**Minimally Invasive Infrainguinal Bypass**

Traditionally, lower-extremity bypass requires an incision over the entire course of the greater saphenous vein on the medial thigh and calf in order to facilitate both valve lysis and tributary ligation. These incisions can be a source of considerable morbidity. To avoid making these incisions would result in a significant advance in both patient comfort and cost savings. Over the past 4 years, the technique of minimally invasive arterial bypass (MIAB) has been developed at The University of Chicago. Now patients who undergo in situ infrainguinal bypass can receive two small incisions instead of a long incision down the entire length of the leg. Preparation of the vein conduit, including valve lysis and tributary occlusion (Figure 2), is performed using a specially designed valvulotome and side-branch occlusion system (Vascular Division, Baxter Healthcare Corporation, Irvine, California) approved by the US Food and Drug Administration.

The initial clinical results using MIAB at this institution and others have been favorable. The outcome and patency rates of MIAB procedures are indistinguishable from operations requiring longer incisions. Patient satisfaction, postoperative length of stay, and total hospital costs are reduced using minimally invasive techniques. A trend toward decreased resource use is evident as well, as the average total cost of MIAB was approximately $10,000 less per case compared with the traditional in situ operation.
Abdominal aortic aneurysm (AAA) appears in 2 percent to 9 percent of the elderly population and AAA rupture is the thirteenth leading cause of death in the Western Hemisphere. Elective surgical repair, first championed in 1952,9 has been a major advance in extending the life of afflicted patients. In the modern era, surgical repair of abdominal and peripheral aneurysms has become remarkably safe, with mortality rates less than 2 percent in large series.1,10 These operations have proven extremely durable, with a complication rate of only about 2 percent over the patient’s entire lifetime.11 However, the surgical morbidity of the open operation remains fairly high; a significant number of patients experience respiratory and cardiac complications as well as an extended period of convalescence.

Recently, the effectiveness and acceptance of endovascular techniques has led to the development of strategies for minimally invasive aortic and peripheral aneurysm repair. First described in 1991,16 at least 10 different models of stent-grafts currently are under active investigation. Their common features include a combination of tubular graft material (e.g., Dacron, polytetrafluoroethylene [PTFE], or polyester) supported by metal alloy struts that are intended to fix the device inside an aneurysm sac (Figure 3). Vascular access usually is obtained via the open transfemoral route, and the stent-graft placed intraluminally through a temporary sheath. When the correct position of the stent-graft is fluoroscopically confirmed (i.e., it bridges the normal arteries surrounding the aneurysmal segment), the device is either balloon-dilated or self-expanded, thus excluding the aneurysm from the arterial circulation (Figure 4).

The Schneider Wallgraft Endoprosthesis (Boston Scientific Corp., Oakland, New Jersey) is under active investigation at the University of Chicago (IRB protocol #9629). It is a covered modification of the popular Wallstent, a self-expanding stent currently approved for intravascular and other uses. Candidates include patients with peripheral aneurysm and/or high-risk occlusive disease. The device is deployed much like a traditional stent, and the early experience has been favorable (Figure 5).

The early results of endovascular aneurysm repair have been favorable. Large series of successful deployments have been reported, although technical failures still occur, and randomized trials have demonstrated reductions in combined morbidity and mortality.17,18 A particularly promising device is the White-Yu Endovascular Graft (figures 3 and 4) (Baxter Healthcare Corporation, Santa Ana, California). A recently published series of 93 patients reported from Sydney, Australia, documented an 86 percent successful deployment rate, overall mortality of 3.1 percent, and late endoleak in only 3 cases.19 These salient results

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have led to the initiation of a Phase II randomized clinical trial using this device, and we are currently enrolling patients at The University of Chicago (IRB protocol #9207).

References

Dental Implant Update

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Dental implantology was introduced in Sweden in the late 1960s and in North America less than a decade later at four medical/dental centers. Recent advancements resulting from research and clinical trials have made dental implants often the treatment of choice to replace missing teeth.

Implants are made from titanium, which is extremely biocompatible and allows for osseointegration into the human body. A dental implant is a titanium root form that is gently placed into bone and acts as a stable support for a prosthetic tooth or denture. It eliminates the mobility, discomfort, and difficulty associated with partial and complete dentures. An implant can eliminate the need to reduce healthy tooth structure when a bridge has to be constructed. They are predictable, safe, and successful. Studies have shown success rates of slightly less than 100 percent, depending on the selected site of placement.¹

According to the American Dental Association, more than 100 million people in the United States are missing from 10 to 15 teeth. Fifty million Americans are missing all of their teeth. The National Health and Nutrition Exam Survey reports that 57 percent of the American population between the ages of 65 and 74 years use dentures (www.demographics.com). These patients often suffer from loss of self-esteem and confidence. They often refrain from smiling, laughing, and eating the foods they enjoy. Patients with dental implants regain their confidence by once again having fixed teeth. These teeth don’t require much more care than natural teeth. Dental implants can provide a long-term, if not permanent, alternative to bridges and dentures. The average bridge lasts from 6.2 to 11.2 years, owing to recurrent decay and mechanical material barriers.² Patients who currently have a single crown may have to make the decision of whether to have a bridge or an implant placed when their crown fails.

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