Iliac Surgical Options

When is surgery still the best option for aortoiliac occlusive disease?

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There is little doubt that percutaneous endovascular therapy has supplanted the bulk of open surgical repair for aortoiliac occlusive disease (AIOD). A brief survey of the senior author's practice indicates that during the interval 2003 to the present, 46 percutaneous endovascular procedures were performed in patients with AIOD, whereas 27 formal surgical revascularizations were performed. In addition, so-called hybrid procedures (ie, an open femoral artery approach) were utilized 30 times. Treatment options for AIOD are many and have been reviewed elsewhere.[1] Despite the migration to endovascular therapies, a surgical perspective is bolstered by the substantiation of the gold standard aortobifemoral bypass graft as an extremely effective and durable treatment for AIOD.[1] But, these are interesting times and the risk/benefit ratio of any intervention can no longer be considered in the myopic context of operative mortality and long-term durability.

Surgeons (hopefully) long ago appreciated the futility of banging the long-term durability drum. Our patients and their referring physicians desire minimally invasive therapies with their attendant low risk and rapid return to functional status. Such a paradigm is particularly important when intervention is carried out to relieve claudication—true for the majority of patients treated for AIOD. In this context, we review the variety and specific application of surgical reconstructions for AIOD. Such reconstructions (Table 1)

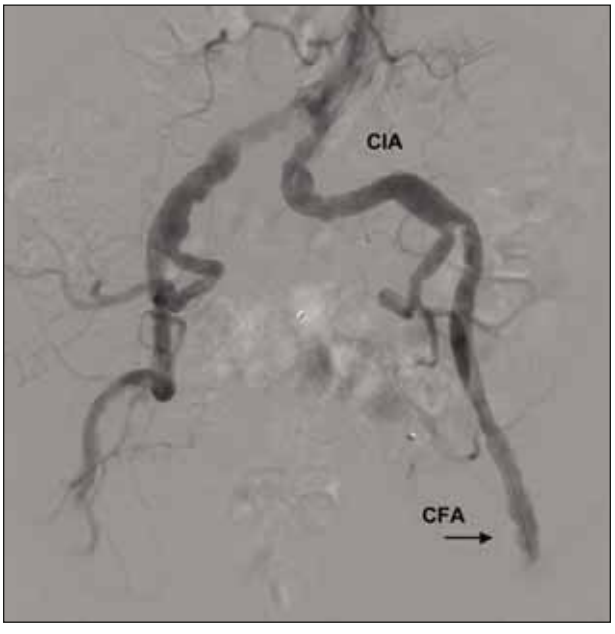

Figure 1. An angiogram depicting extensive common femoral artery occlusive disease (arrow). Such plaque distribution is well suited for a hybrid surgical approach via an open groin, which permits concomitant proximal endovascular intervention and/or distal infrainguinal therapy. CIA = common iliac artery; CFA = common femoral artery.

TABLE 1. ANATOMY DICTATING SURGICAL TREATMENT

Absolute	Relative	Hybrid Therapy
• Infrarenal aortic occlusion	• Hypoplastic AIOD syndrome	• Extensive CFA disease
• Associated AAA requiring treatment	• Multiple failed endovascular treatments	• EIA long-segment occlusion
	• Long-segment EIA disease	• Delivery of stent graft

EIA = external iliac artery; CFA = common femoral artery.

are selectively applied as a function of anatomic patterns of disease, associated conditions and/or comorbidities, and previous interventions.

SURGICAL OPTIONS

Aortobifemoral Grafting

Aortobifemoral grafting is the standard and the benchmark against which all therapies for bilateral AIOD should be considered. In properly selected and evaluated patients, operative mortality rates of 1%, with attendant patency rates of 85% to 95% at 5 years and 75% to 80% at 10 years, can be achieved.[1] The procedure is also well suited for treating complex patterns of occlusive disease, including multisegment disease and long-segment occlusions. Furthermore, aortobifemoral grafting has been documented to achieve excellent functional outcomes, although assessing the contribution of the frequently associated infrainguinal disease is a constant of surgical judgment.

Important technical components of the procedure include selecting the appropriate method of proximal anastomosis (end-to-end preferred in most), careful graft limb tunneling to avoid ureteral complications, avoidance of sexual dysfunction in sexually active male patients, and, most importantly, verification and/or reconstruction of profunda femoris outflow. End-to-side proximal reconstruction is useful in treating specific patterns of occlusive disease. Specifically, this configuration permits the preservation of aberrant arterial anatomy, including low renal arteries, a large patent inferior mesenteric artery, or continued prograde pelvic/hypogastric perfusion in the presence of bilateral external iliac occlusion, thereby minimizing the risk of buttock claudication and other complications of pelvic ischemia.[2,3]

Aortoiliac Endarterectomy

The role of aortoiliac endarterectomy for AIOD has been replaced in the more recent surgical era by bypass grafting or, more commonly, endoluminal therapies. Traditionally, the applicability of endarterectomy was limited to the 5% to 10% of patients with focal aortic bifurcation disease. In addition, as newer technologies are available for the treatment of AIOD, fewer surgeons have accrued substantial experience in performing the procedure, further limiting its application. Nevertheless, it remains a therapeutic option in certain patients and can provide good outcomes when performed by experienced surgeons.

Extra-Anatomic Bypass

Extra-anatomic reconstructions are traditionally applied in patients with graft infection, "hostile" abdomens, and prohibitive surgical risk (Table 2).[4-7] Advocates of extra-anatomic reconstruction have favored diminished perioperative morbidity and mortality rates in exchange for inferior durability.[4] Recent reports document nearly equivalent results after axillofemoral bypass compared to traditional aortobifemoral reconstruction.[8] Specifically, 5-year patency was documented to be 74% in the axillobifemoral cohort versus 80% in the aortobifemoral bypass group. Associated mortality rates for the groups were <1% versus 3.4%, respectively.[1,8] Presumably, the higher mortality rate in the extra-anatomic subgroup reflects the pervasive comorbidities among these patients. In addition, the role for iliofemoral bypass with concomitant femoral-femoral bypass is a viable surgical option in patients with unilateral disease and symptoms.[9,10] Despite the expanding role for percutaneous endoluminal therapies in treating AIOD, extra-anatomic bypass remains a pragmatic surgical option in patients with specific comorbidities and occlusive disease patterns. Favorable patency rates can be anticipated in contemporary practice. Table 2 depicts the surgical options in managing AIOD with accompanying mortality and patency rates.

Hybrid Surgery

A hybrid surgical approach (ie, combining open surgical therapy, usually at the common femoral artery, and endovascular intervention) is well suited for patients with occlusive disease of the common femoral artery with associated inflow (AIOD) and/or infrainguinal disease. Because of the American Heart Association advisory committee's 1994 report detailing superior results of bypass procedures versus angioplasty/stenting for aortoiliac disease, debate persists regarding optimal management of complex aortoiliac lesions (Figure 1), particularly in the era of endovascular therapy. Specifically, external iliac arterial disease has been

identified as a predictor of poor endovascular outcome.[11] Endovascular therapy has emerged, however, as the standard treatment modality for patients with focal common iliac arterial disease, with patency rates approaching 70% and clinical success rates reaching 90%.[12]

Because many patients with AIOD have synchronous lesions in the common femoral artery, as well as distal disease, we believe that the combined open femoral and endovascular approach offers a good surgical treatment option in such patients. Nelson et al from Dartmouth documented favorable patency results approaching 80% to 83%, in keeping with similar patency rates reported elsewhere in the surgical literature.[13]

Combined modality intervention is well described. Brewster et al reported good long-term results with combined iliac angioplasty and distal arterial reconstruction.[14] Others have described combined iliofemoral stent grafting in conjunction with distal reconstruction.[12,15] In our experience, the combined hybrid intervention provides a good option for optimal management of patients with complex patterns of aortoiliac disease, in particular, patients with common femoral (Figure 1) and extensive (or small caliber) external iliac artery disease. In the latter circumstance, the hybrid procedures allow for stent grafting of such small-caliber vessels. Furthermore, the hybrid approach facilitates concomitant treatment of infrainguinal disease, making it a useful treatment paradigm for such patients.

SUMMARY

Although the explosion of endovascular technology has transformed management strategies in the treatment of peripheral vascular occlusive disease, the role for surgery persists in the successful management of AIOD. A surgical

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TABLE 2. SURGICAL OPTIONS FOR MANAGING AIOD

Procedure	Anatomic Limitations	Mortality (%)	5-Year Patency	Comment
Aortoiliac Endarterectomy[1]	Focal aortic bifurcation disease	1-7	72-95	Focal disease amenable to this procedure usually treated with stenting
Aortobifemoral Bypass Graft[2, 3]	Multiple redo aortic surgery	1	85	The gold standard; major operation with potential sexual dysfunction in males
Iliofemoral Bypass Graft[16]	Requires suitable ipsilateral common iliac artery for inflow	5	83	Intermediate procedure extent; suitable for long external iliac artery occlusions
Axillofemoral Bypass Graft[6, 7]	Requires suitable donor axillary artery; bifemoral graft usually preferred	3-13	79	Long bypass graft requires GA; inferior patency especially with superficial femoral artery occlusive disease
Femorofemoral Bypass Graft[4]	Requires donor iliofemoral artery free of stenoses	1.3-15	60-92	Groin incisions only; amenable to simultaneous PTA/stenting of donor iliac or superficial femoral artery
Obturator Foramen Bypass Graft[17]	Requires donor iliac artery	14*	60	Generally used to circumvent sepsis in groin
Thoracic Aortobifemoral Bypass Graft[18]	Requires thoracotomy	4	79	Generally used in context of multiple abdominal redo or sepsis
Hybrid Open Groin Approach[12]	Preferred treatment for extensive CFA disease	0	80	Minimally invasive; allows for CFA endarterectomy; permits iliac artery stent grafting; upstream or downstream endovascular interventions

GA = general anesthesia; CFA = common femoral artery.
**Mortality for obturator bypass reflects its rare application for routine occlusive disease and likely depicts its use for hostile situations including infection, crush injury, and bypassing malignancy.*