Remote Superficial Femoral Artery Endarterectomy and Distal aSpire Stenting: Mid-term Results

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David Rosenthal, MD, Atlanta, GA; Frans L. Moll, MD, PhD, Utrecht, the Netherlands; John D. Martin, MD, Annapolis, MD

Purpose

The treatment of long-segment (> 15 cm) superficial femoral artery (SFA) occlusive disease by minimally invasive endovascular procedures such as percutaneous transluminal angioplasty (PTA),[1] laser-assisted balloon angioplasty,[2] and atherectomy[3] have proven disappointing and the use of stents in concert with long-segment angioplasty, has not altered the long-term patency.[4]

Remote SFA endarterectomy is an operation, which can be performed through a single small incision, allows for "debulking" of the arterial plaque and placement of an endovascular stent. The aSpire stent (Vascular Architects, San Jose, CA) is an adjustable expanded polytetrafluoroethylene (ePTFE) covered nitinol stent which is flexible, yet has high radial strength to withstand torsional and compressive stresses at the knee joint. The purpose of this review was to determine if RSFA and distal aSpire stenting is superior to SFA stenting and standard bypasses.

Methods

One hundred seven patients underwent RSFAE and distal aSpire stenting; the indications for operation were claudication in 94 and limb salvage in 13 patients. RSFAE is performed by exposing the SFA through a small groin incision. An arteriogram identifies the point of proximal popliteal artery reconstitution. After systemic heparinization, an arteriotomy is made from the origin of the SFA distally and an endarterectomy is commenced in the standard subadvential cleavage plane. The intimal core is transversely cut at the SFA origin and threaded into the loop of a conventional ring stripper (Vollmar Dissector Aesculap, San Jose, CA) and under fluoroscopic surveillance the ring stripper is advanced distally down the SFA beyond the occluded segment. The ring stripper is exchanged for the MollRing Cutter device (Vascular Architects, San Jose, CA), which transects the distal atheromatous core and the entire column of plaque is removed. Arteriography is performed to confirm a patent femoral popliteal segment. A guidewire is passed across the distal SFA endarterectomy end point and balloon-stent angioplasty with the aSpire stent is performed, "tacking" the distal plaque to prevent further dissection while preserving geniculate collateral vessels. If indicated, the arteriotomy may be extended proximally to perform an open endarterectomy of the common femoral artery or profunda femoris ostia.

Results

One hundred seven patients underwent RSFAE. The mean length of endarterectomized SFAs was 27.4 cm (range 13–41 cm). In eight patients, a common femoral and profunda femoris endarterectomy was also performed also. The primary cumulative patency rate by means of life-table analysis was 68.6% + 13.5% (SE) (mean 16.2 months; range, 1–31 months). Repeat radiologic intervention was necessary in 13 (12%) patients (8 PTA, 5 stent angioplasty), for a primary-assisted patency rate of 87.5% ± 8.5% (mean 18.4 months). There were no deaths, three wound complications occurred, and the mean hospital length of stay was only 1.7 ± 0.5 days.

Discussion

RSFAE and distal aSpire stenting offers the vascular surgeon a minimally invasive endovascular alternative for the treatment of SFA occlusive disease. The aSpire stent has a nitinol framework that provides excellent wall coverage and its PTFE covering eliminates metal to artery contact, one of the possible causes of neointimal hyperplasia. The stent is flexible, yet has high radial strength to withstand torsional stresses proximal to the knee joint and its unique design facilitates laminar flow. By adjusting the position of the stent spiral prior to final deployment, not only is the plaque end-point tacked, but the geniculate collateral vessels at the end-point are preserved as well. The 12- (84%) and 24-month (68%) primary cumulative patency rates are comparable with patency rates expected after above knee femoropopliteal (AKFP) bypass graft at 12 (85%) and 24 months (71%) and superior to comparable SFA (TASC D) lesions treated by stent angioplasty at 12 (63%) and 24 months (41%) follow-up, respectively.[5–8] The incidence of restenosis after RSFAE remains significant in that 12% (13 of 107) of patients required an adjunctive procedure to maintain SFA patency and restenosis due to intimal hyperplasia remains the Achilles heel of RSFAE. Hopefully in the near future the use of improved antiplatelet medications, drug therapy, endothelial cell seeding or brachytherapy will help solve the problem of restenosis.

Long segment occlusive disease of the SFA has not been successfully treated by radiologic minimally invasive procedures because of the SFA's long length, tortuosity, small caliber, and relatively low flow. It is incumbent, therefore, that the vascular surgeon has a minimally invasive, superior alternative. RSFAE with distal aSpire stenting is a safe and moderately durable procedure that allows preservation of SFA collaterals. The mid-term patency rates of RSFAE are similar to those of AKFP bypass and superior to stent angioplasty. RSFAE appears to be a minimally invasive adjunct for the treatment of SFA occlusive disease.

References

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