Iliofemoral endarterectomy associated with systematic iliac stent grafting for the treatment of severe iliofemoral occlusive disease

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ABSTRACT

Objective: Iliofemoral endarterectomy with external iliac artery (EIA) stent grafting can be an alternative to traditional open surgery in patients with severe iliac occlusive disease extending to the common femoral artery. We report the midterm outcomes of this approach.

Methods: Between 2009 and 2015, 108 patients (76% male; median age, 63 years) underwent a total of 127 iliofemoral endarterectomies combined with EIA stent grafting. Indications were claudication in 60%, rest pain in 20%, ulceration in 15%, and acute ischemia in 5%. Lesions exclusively involved only the EIA segment in 40% of cases, with occlusion in 28%. Lesions involved both the EIA and common iliac artery segments in 49% of cases, with 19% of common iliac artery occlusions and 24% of EIA occlusions. Iliac lesions extended into the aortic segment in 11% of cases. Iliofemoral endarterectomy was performed by eversion whenever possible. Deployment of the EIA stent graft systematically incorporated the EIA segment and the proximal end of the endarterectomy. Self-expanding covered stents were calibrated to the diameter of the endarterectomized EIA.

Results: The procedure was technically successful in 100% of patients. Median diameter of covered stents was 8 mm (range, 6-10 mm). No intraoperative arterial rupture or dissection was observed. Early reoperations (3%) were performed for bleeding, infection, or thrombosis. Median length of stay was 5 days. No 30-day mortality was observed. Median follow-up was 30 months (range, 0-6 years), and overall mortality was 13% (due to cancer in half of the cases). Repeated angioplasty was performed in three (2%) cases, and a subsequent open procedure on the iliofemoral segment was performed in seven (5%) cases. At 2 years, primary patency rate of the treated segment was 91%. The 2-year primary assisted patency and secondary patency rates were 94% and 98%, respectively. Five-year primary, primary assisted, and secondary patency rates were 87%, 92%, and 98%, respectively.

Conclusions: Combined iliofemoral endarterectomy and covered stenting of the EIA for treatment of severe occlusive lesions provided acceptable midterm results, probably because of the gain of diameter provided by covered stents. This technique avoids complications due to an aortic or iliac surgical approach and clamping as well as complications related to the presence of a prosthetic implant in an intra-abdominal position. (J Vasc Surg 2016;■:1-8.)

Although endovascular repair of the common femoral artery (CFA) has been described,[1] open repair of the CFA remains the treatment classically used in patients with isolated occlusive disease.[2,3] Surgical repair of the CFA avoids the risk of stent fracture and does not compromise future surgical or endovascular options. Treatment is not consensual for lesions extending proximally into the external iliac arteries (EIAs).[4] Guidelines from the TransAtlantic Inter-Society Consensus II (TASC II) recommend open surgical bypass for TASC C and D lesions (Table I), with consideration of endovascular options for only TASC C lesions in good-risk patients.[5] Surgical options, including iliofemoral endarterectomy and aortofemoral bypass, have been reported to be durable but may be associated with higher perioperative morbidity and mortality and late complication rates according to the literature.[6,7] Axillofemoral bypass and interfemoral bypass, less invasive but also less durable, are generally reserved for frail and high-risk patients.[8] Chang et al reported their results of combined CFA endarterectomy and iliac stenting, with acceptable long-term patency and higher primary patency rates in the subgroup with covered stents.[9] It would be interesting to focus on the specific results of combined CFA endarterectomy and systematic EIA stent grafting in good-risk patients.

The aim of this study was to report long-term outcomes of a hybrid approach combining iliofemoral endarterectomy and systematic EIA stent grafting for the treatment of severe iliofemoral occlusive disease.

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Table I. TransAtlantic Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II) aortoiliac lesion classification

Lesion type	Description
Type A	Unilateral or bilateral stenosis of CIA Unilateral or bilateral single short (≤3 cm) stenosis of EIA
Type B	Short (≤3 cm) stenosis of infrarenal aorta Unilateral CIA occlusion Single or multiple stenosis totaling 3-10 cm involving the EIA not extending into the CFA Unilateral EIA occlusion not involving the origins of internal iliac or CFA
Type C	Bilateral CIA occlusions Bilateral EIA stenoses 3-10 cm long not extending into the CFA Unilateral EIA stenosis extending into the CFA Unilateral EIA occlusion that involves the origins of internal iliac and/or CFA Heavily calcified unilateral EIA occlusion, with or without involvement of origins of internal iliac and/or CFA
Type D	Infrarenal aortoiliac occlusion Diffuse disease involving the aorta and both iliac arteries requiring treatment Diffuse multiple stenosis involving the unilateral CIA, EIA, and CFA Unilateral occlusions of both CIA and EIA Bilateral occlusions of EIA Iliac stenosis in patients with AAA requiring treatment and not amenable to endograft placement or other lesions requiring open aortic or iliac surgery

AAA, Abdominal aortic aneurysm; *CFA*, common femoral artery; *CIA*, common iliac artery; *EIA*, external iliac artery.

METHODS

The study was approved by the Institutional Review Board and was conducted in accordance with the Declaration of Helsinki. Informed consent requirements were waived for this retrospective study.

Inclusion and follow-up. Between January 2009 and December 2015, all patients treated at Amiens University Hospital by CFA endarterectomy and EIA stent grafting for repair of severe iliofemoral occlusive disease were consecutively included. Data were collected retrospectively.

All patients underwent preoperative physical examination and were evaluated by duplex ultrasound (DUS) and contrast-enhanced computed tomography (CT). These two examinations provided both hemodynamic and morphologic analysis of the vessel and guided the operative strategy. Patients with significant EIA occlusive disease (thrombosis or severe extensive stenosis) extending into the CFA were considered for hybrid treatment. Patients with extensive occlusive disease involving the common iliac artery (CIA) or aorta were also included. Patients were regularly reviewed with 1-month, 6-month, and annual clinical and DUS follow-up. A localized peak systolic velocity increase of >2.5 times was considered evidence for recurrent stenosis. Repeated surgery was performed after CT angiography or digital subtraction angiography according to the surgeon's usual practice. CT angiography or digital subtraction angiography showing luminal narrowing >50% was considered evidence of restenosis.

Operative technique. Femoral artery exposure was obtained by a curved groin incision under general anesthesia. In patients with extensive EIA stenosis, CFA or superficial femoral artery (SFA) puncture was first performed to provide guidewire access across the iliac lesion into the abdominal aorta under fluoroscopic guidance. If guidewire access could not be obtained initially, it was then attempted after endarterectomy. In the case of EIA thrombosis, recanalization was first attempted with antegrade wire access by crossing the aortic bifurcation through contralateral CFA puncture. Rarely, axillary or carotid artery access was used for patients with bilateral iliac occlusion.

CFA endarterectomy was then performed with the guidewire in place. When the femoral artery lesion did not extend far into the SFA and profunda femoris artery (PFA), endarterectomy was performed by eversion. After ligation of the superficial circumflex iliac artery and epigastric superficial artery and dissection of the EIA sparing the inguinal ligament as far as possible, oblique transection of the CFA was performed just above the femoral bifurcation. The eversion CFA endarterectomy was extended proximally as far as the EIA. The femoral bifurcation was then endarterectomized, ensuring preservation or restoration of adequate PFA and SFA outflows (Fig 1). Direct suture was then performed using a 5-0 or 6-0 polypropylene suture. The posterior wall was reconstructed using the anchor or parachute anastomosis technique. Eversion endarterectomy could be correctly performed only when occlusive disease did not extend too far into the SFA or PFA. When eversion was not technically feasible, standard endarterectomy with direct suture or patch angioplasty was performed. When the arterial wall was too thin or torn, prosthetic femorofemoral bypass was performed.

After restoration of flow, a 9F short sheath was placed over the wire. The EIA was then predilated using a 6- or 7-mm-diameter angioplasty balloon according to the "paving and cracking" technique. The diameter of the