CLINICAL STUDY

Endovascular Aneurysm Repair Treatment of Aortoiliac Aneurysms: Can Iliac Branched Devices Prevent Gluteal Claudication?

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ABSTRACT

Purpose: To compare the risk of gluteal claudication after endovascular aneurysm repair (EVAR) of aortoiliac aneurysms by interventional exclusion of the internal iliac artery (IIA) with plugs or coils versus a branch iliac device to maintain pelvic blood supply and to identify risk factors for postoperative gluteal claudication.

Materials and Methods: A retrospective analysis of a prospectively collected data set included patients with aortoiliac aneurysms treated with EVAR from January 2007 to December 2013 at a tertiary referral vascular unit. Descriptive and procedural data were obtained from a database of prospectively enrolled patients. Medical records of 112 consecutive patients treated with EVAR were scrutinized for graft-related adverse events and pelvic ischemia. The occurrence of gluteal claudication was determined from medical records.

Results: Iliac occlusion was performed in 115 limbs, and a branch iliac device was placed in 25 limbs. Gluteal claudication developed in 38% of limbs treated with IIA exclusion but in none of the limbs treated with branch iliac devices ($P < .001$). Procedure time, fluoroscopy time, and use of iodine contrast material did not differ between the two groups. The incidence of gluteal claudication was higher when coils rather than plugs were used for embolization of the IIA before EVAR ($P = .002$).

Conclusions: The findings suggest that the use of a branch iliac device significantly reduces the risk of gluteal claudication after EVAR of aortoiliac aneurysm.

ABBREVIATIONS

CIA = common iliac artery, EVAR = endovascular aneurysm repair, IIA = internal iliac artery

In approximately 20% of patients undergoing endovascular aneurysm repair (EVAR), the common iliac artery (CIA) is unsuitable as a safe landing zone for standard stent graft limbs (1). If the iliac artery is moderately enlarged (< 22 mm in diameter), stent graft systems provide bell-bottom limbs to allow sealing in of the CIA (2,3). If the CIA is highly irregular or aneurysmatic (vessel diameter > 22 mm), the stent graft cannot be landed in the CIA. Instead, the graft limb needs to be extended across the iliac bifurcation into the external iliac artery.

There are two main endovascular options for an abdominal aortic aneurysm extending into the iliac arteries: (*i*) exclude blood flow with a limb extension and perform embolization of the internal iliac artery (IIA) (iliac occlusion) and (*ii*) preserve blood flow with a branch iliac device (4–7). An iliac occlusion may result in severe complications, such as erectile dysfunction, ischemia of the pelvic organs, spinal cord ischemia, and gluteal necrosis, and even death (8,9). The most common complication is gluteal claudication, reported in 50% of unilaterally occluded IIAs (8, 10–12). Use of a branch iliac device potentially avoids these severe ischemic complications. The only published study comparing outcomes after iliac occlusion versus a branch iliac device (13) identified a trend for lower risk of gluteal claudication after placement of a branch iliac device. In the present study, the primary aim was to compare the risk of gluteal claudication in patients undergoing EVAR with aortoiliac aneurysms treated with a branch iliac device

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versus iliac occlusion. The secondary aim was to identify risk factors, if any, for gluteal claudication.

MATERIALS AND METHODS

Patients

The regional Ethical Review Board did not require approval for the research performed. The branch iliac device program at the center was initiated in January 2007. During the 7 years from 2007 through 2013, 562 patients with abdominal aortic aneurysms underwent EVAR with a Zenith bifurcated stent graft (Cook, Inc, Bloomington, Indiana). Of these patients, 112 (20%) had aneurysms involving the iliac bifurcation. The iliac aneurysms were unilateral in 84 patients and bilateral in 28 patients. There were 140 limbs treated (Fig 1): 115 with iliac occlusion and 25 with a branch iliac device. Demographic characteristics are listed in Table 1. Data extraction from a consecutively and prospectively collected in-house database was completed by February 2015.

EVAR Planning and Sizing

Before the endovascular procedures, computed tomography (CT) angiography was performed with a biphasic acquisition protocol (unenhanced and contrast-enhanced scanning with a bolus-tracking system). Measurements, sizing, and planning for the procedure were done on a dedicated three-dimensional–computer workstation (Vitrea, version 6.0.1282.6267; Vital Images, Minnetonka, Minnesota), eventually supplemented with two-dimensional diameters estimated with a picture archiving and communication system (Agfa IMPAX 5.2; Agfa-Gevaert NV, Mortsel, Belgium). The presence of a > 75% stenosis of the IIA was determined from the scan data and the intraoperative images.

EVAR Procedure

The endovascular technique used has been described in detail elsewhere (14). Briefly, the patient was placed under general anesthesia, and heparin (50–100 IU/kg) and a single dose of a prophylactic intravenous antibiotic (1.5 g cefuroxime [Zinacef; GlaxoSmithKline, Middlesex, United Kingdom]) were administrated intravenously. Initially, the cutdown technique was used to introduce large-bore devices; at the present time, percutaneous access with fascia suturing is the preferred option (15). In patients with minor aortoiliac aneurysms, the preferred treatment was the bell-bottom technique; however, in patients with a CIA > 22 mm in diameter, the goal was to preserve at least one IIA, as recommended by the Society for Vascular Surgery (16). Unilateral aortoiliac aneurysms were primarily treated by excluding the IIA, and bilateral aortoiliac aneurysms were treated by excluding one IIA and placing a branch iliac device on the opposite side. The dominant cause for treatment beyond the iliac bifurcation was a CIA aneurysm without a distal landing zone, which occurred in 93 limbs treated with iliac occlusion (81%) and 23 limbs treated with a branch iliac device (92%).

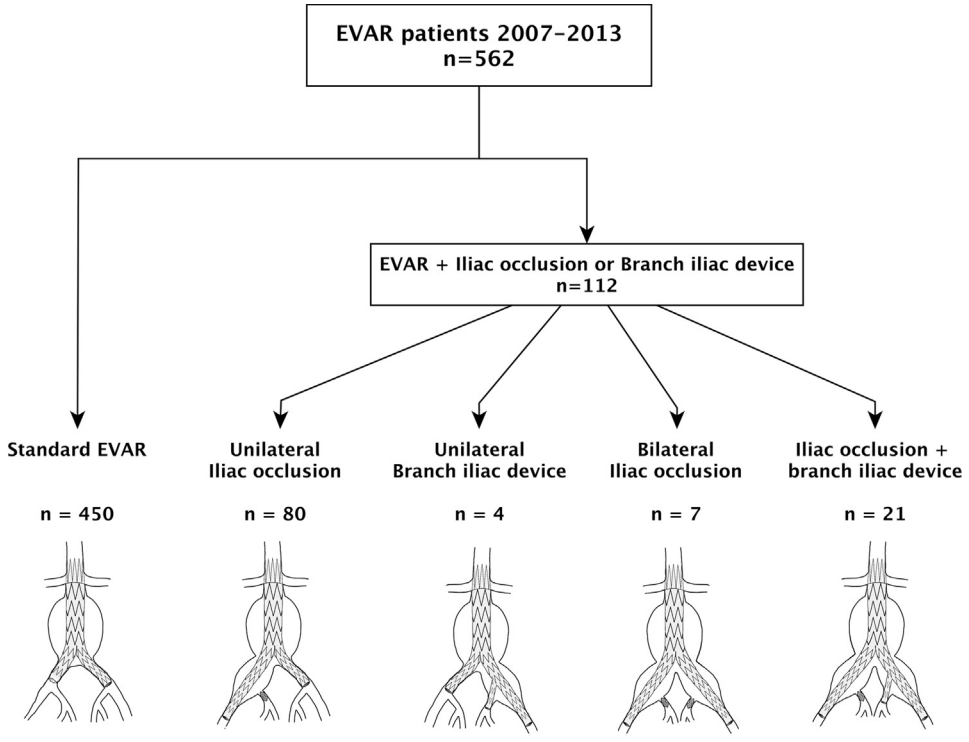

Figure 1. Flow chart showing surgical approach in 562 patients who underwent EVAR during the period 2007–2013. Standard EVAR comprised a bifurcated stent graft with a bilateral landing zone in the common iliac artery.