

Comparison of Midterm Outcomes between Surgical Treatment and Endovascular Reconstruction for Chronic Infrarenal Aortoiliac Occlusion

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ABSTRACT

Purpose: To compare the midterm results of aortoiliac stent (AIS) placement with those of surgical treatment in patients with chronic infrarenal aortoiliac occlusion.

Materials and Methods: Midterm outcomes in patients treated at a single center from 2005 to 2010 were retrospectively reviewed. Correlations between baseline clinical factors and midterm outcomes were assessed.

Results: The technical success rate was significantly lower in the AIS group than in the surgery group (83.3% vs 100%; $P = .016$). Of 68 technically successfully treated patients, 33 underwent surgical revascularization and 35 received AIS placement. There were no significant differences in patient demographics, Rutherford classification, cardiovascular risk factors, and 30-day mortality rates. Surgically treated patients had a longer average postoperative hospital stay ($P = .001$) and higher rates of postoperative complications, including respiratory failure ($P = .010$), transient renal dysfunction ($P = .002$), and multiple organ dysfunction ($P = .023$). Mean ankle-brachial index increased significantly in both groups ($P < .001$), but to the same extent. The primary 1-, 3-, and 5-year patency rates were 93.6%, 90.2%, and 90.2%, respectively, in the surgery group, and 91.4%, 81.8%, and 64.2%, respectively, in the AIS group ($P = .054$). No differences were observed in survival rate ($P = .945$), limb salvage ($P = .860$), or secondary patency ($P = .916$).

Conclusions: AIS for chronic infrarenal aortoiliac occlusion is associated with a shorter hospital stay and lower postoperative morbidity rates. Although midterm primary patency rate was lower than for traditional open surgery, AIS appears to be a safe, minimally invasive, and reliable procedure for patients with chronic infrarenal aortoiliac occlusion.

ABBREVIATIONS

AIOD = aortoiliac occlusive disease, AIS = aortoiliac stent, TASC II = Trans-Atlantic Inter-Society Consensus for the Management of Peripheral Arterial Disease

Chronic infrarenal aortoiliac occlusion, defined as occlusion of the distal abdominal aorta and bilateral iliac arteries, has been categorized by the Trans-Atlantic Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II) as a variant of a type D lesion. TASC II guidelines advocate surgical therapy for type D lesions (1). Aortobifemoral bypass is regarded as

the gold standard of treatment for severe aortoiliac occlusive disease (AIOD), with 5- and 10-year patency rates of approximately 90% and 75%, respectively (2–4). However, the relatively higher perioperative mortality and morbidity of surgery limit its use in some high-risk cases. During the past two decades, endovascular treatment has become the choice of management for localized AIOD, primarily because of the advent of balloon angioplasty and stent technology. Endovascular interventionalists have achieved technical success in the treatment of complex aortoiliac lesions, but it remains unclear whether the patency of endovascular reconstruction for type C and D lesions is comparable to that of traditional surgical revascularization. Recent reports on the endovascular treatment of more severe cases of AIOD have yielded results approximating those of open surgery (5–8). Unfortunately, these series assessed

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patients with type B or C lesions or did not include surgical treatment as a control group (5–8). The present study was therefore designed to compare the midterm outcomes of surgical treatment and aortoiliac stent (AIS) placement in patients with type D chronic infrarenal aortoiliac occlusion.

MATERIALS AND METHODS

Indications

The institutional review board of our center approved the study protocol. Patients treated at a single center for chronic infrarenal aortoiliac occlusion from January 2005 to December 2010 were retrospectively reviewed (Table 1). All patients were symptomatic, with chronic limb ischemia of predominantly Rutherford category 3/4 (severe claudication or ischemic rest pain) (9). Diagnosis was confirmed by reviewing preoperative imaging demonstrating chronic infrarenal aortoiliac occlusion involving the abdominal aorta and the bilateral iliac arteries. Patients with good outflow were selected, specifically those with no significant superficial femoral artery–popliteal stenosis or adequate profunda compensation and at least one-vessel runoff to the foot. Patients with aortic occlusion only or with acute limb ischemia with thrombosis in the setting of native chronic aortoiliac occlusion were excluded.

Treatment Options

Patients were recruited from two independent departments in our institution—the departments of vascular surgery and vascular intervention—after they had consulted with a specialist from one of these departments as outpatients. Some patients required consultation with both departments to determine the optimal treatment option, with the decision based primarily on lesion anatomy and the patient's general health. In general, open surgery was recommended for younger patients with complex lesions. Juxtarenal occlusions (defined as a distance ≤ 2 cm between the ostium of the more distal renal artery and the aortic occlusion) with heavily calcified lesions are still challenging for interventional methods, with open surgery recommended for these patients. In contrast, AIS placement was recommended for patients deemed to be at high risk. Choice of method also depended on the balance between preferences for less invasive and less costly treatment, because endovascular repair is more expensive for patients than surgical repair in China. These factors might bias the selection of treatment to some extent.

Surgical Procedures

All surgical cases were performed under general anesthesia, and all surgical procedures were performed by the same surgical team by using a transperitoneal midline incision. All procedures were bilateral and employed a

Table 1. Baseline Patient Characteristics

Variable	Open Surgery (n = 33)	Endovascular (n = 35)	P Value*
Mean age \pm SD, y			
At symptom	54.5 \pm 9.5	57.6 \pm 10.8	.211
At diagnosis	56.8 \pm 9.6	60.8 \pm 10.7	.103
Female sex	6	5	.663
Cardiovascular risk factor			
Smoking	24	23	.532
Hypertension	14	20	.225
Diabetes	10	12	.726
Coronary artery disease	11	12	.934
Hyperlipidemia	17	15	.475
Other complications			
Cerebral infarction	1	5	.199
Arrhythmia	2	2	1.000
Venous thromboembolism	1	1	1.000
Anemia	4	1	.191
Chronic renal insufficiency	1	2	1.000
Symptoms			
Claudication	33	35	
Rest pain	23	25	.876
Tissue loss	6	5	.663
Erectile dysfunction	13	18	.319
Impalpable femoral pulse	31	33	1.000
Impalpable pedal pulses	32	35	.485
Rutherford classification [†]			.887
Moderate claudication	0	1	
Severe claudication	9	8	
Ischemic rest pain	17	20	
Minor tissue loss	6	5	
Major tissue loss	0	0	
Occlusion level			.327
Infrarenal	23	28	
Juxtarenal	10	7	

SD = standard deviation.

*P values are from *t* test for continuous variables and χ^2 test or Fisher exact test for nominal variables. *P* < .05 is considered significant.

[†]According to the revised version of recommended standards for reports dealing with lower-extremity ischemia published in 1997 (9).

bifurcated polytetrafluoroethylene graft (Vascular Graft; W.L. Gore and Associates, Flagstaff, Arizona). End-to-side proximal anastomosis was performed in all but one patient, who had an abdominal aortic dilation. End-to-side proximal anastomosis can protect the collateral pathways but may be problematic during aortic embolectomy in patients with a relatively higher level of aortic occlusion. Therefore, to prevent embolization in

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