Eur J Vasc Endovasc Surg **30**, 307–310 (2005)
doi:10.1016/j.ejvs.2005.04.043, available online at http://www.sciencedirect.com on SCIENCE DIRECT®

SHORT REPORT

Endovascular Management of Isolated Infrarenal Aortic Occlusive Disease is Safe and Effective in Selected Patients

S.R. Vallabhaneni,* K. Björses, M. Malina, N.V. Dias, B. Sonesson and K. Ivancev

Endovascular Centre, Malmö University Hospital, 205 02 Malmö, Sweden

Objective. *To examine the safety and efficacy of endovascular management of isolated infrarenal aortic occlusive disease within our centre.*
Design and methods. *Retrospective analysis of all patients who underwent endovascular treatment of occlusive disease that is confined to the infrarenal aorta between September 1993 and November 2004.*
Results. *Primary aortic stenting was carried out in 16 women and five men using self-expanding (12 patients) and balloon expanding stents to treat both occlusions (six) and stenoses (15). Indications included intermittent claudication (13), critical limb ischaemia (six), and distal embolisation (three). Significant postoperative complications within 30 days were noted in three, including one death. Fifteen patients completed 1-year follow-up with primary patency in 14 and secondary patency in the remaining patient. Clinical improvement was documented in all patients.*
Conclusion. *Primary stenting for occlusive disease isolated in the infrarenal aorta is relatively safe in selected patients with encouraging early follow-up results.*

Keywords: Angioplasty; Stent; Stent-graft; Aorta; Endovascular management; Complications; Occlusive disease; Atherosclerosis.

Introduction

Endovascular techniques are not widely used to treat occlusive disease of the infrarenal aorta despite their popularity in other arterial segments. This is because occlusive disease isolated in the aorta is not as common and also due to a perception that endoluminal manipulation of a severely diseased aorta could be hazardous. Conventional surgical solutions are durable but associated with significant perioperative mortality and morbidity.[1,2] The aim of this study was to examine the safety and efficacy of endovascular management of isolated infrarenal aortic occlusive disease.

Materials and Methods

All patients who underwent endovascular treatment of occlusive disease confined to the infrarenal aorta within one centre between September 1993 and November 2004 were identified from a prospectively completed electronic database and their case notes were analysed retrospectively. Patients who underwent simultaneous endovascular treatment of the infrarenal aorta and iliac segments were not included in this analysis. It has been our usual practice not to attempt endovascular treatment when the aortic occlusion extended to within 1 cm of the origin of the lower main renal artery (juxtarenal occlusions).

Technique of intervention

Bilateral common femoral access was established followed by the administration of heparin. The lesion is then crossed using hydrophilic guidewires, which are then exchanged for stiffer wires. Appropriately

*Corresponding author. S.R. Vallabhaneni, MD, FRCS, EBSQ-Vasc, Endovascular Centre, Entrance 44, Malmö University Hospital, 205 02 Malmö, Sweden.
E-mail address: fempop@liv.ac.uk

1078–5884/000307 + 04 $35.00/0

sized sheaths are then advanced across the lesion over the stiff guidewires. Self-expanding stents of up to 14 mm diameter can be delivered through 6 F sheaths (e.g. Luminexx stent, Bard Peripheral Vascular Inc., Tempe, AZ, USA) and premounted balloon expandable stents of up to 9 mm can be delivered through 7 F sheaths (e.g. Advanta stent-graft, Atrium Medical Corp., Hudson, NH, USA). The stent or stents are then positioned, sheaths are withdrawn and the stents are deployed. It is standard practice to use the 'kissing balloons' technique and recreate the aortic bifurcation when dealing with the distal aortic segment. Occasionally, additional trans-brachial access is used for accurate reference imaging and to pass the initial guidewires in the antegrade direction. The later lowers the risk of creating a cephalad-extending dissection of the aorta. The procedure is usually undertaken under local anaesthesia with cardio-respiratory monitoring throughout. Attention is paid to antiplatelet therapy and the identification and modification of risk factors (Fig. 1).

Results

Patient details

Seventeen elective and four emergency procedures were undertaken under local anaesthesia. The 16 (75%) female patients were significantly younger (mean age 58 years, range 32–89) than the men (mean 70, range 61–86). (Fisher's exact, doublesided $p = 0.04$). American Society of Anaesthesiologists (ASA) risk grading was grade 1 in six patients, grade 2 in eight, grade 3 in five and was not documented in two patients. Five patients, all females, were documented to have activated protein C (APC) resistance.

Indications for treatment were disabling claudication in 13 (62%), critical limb ischaemia in four, critical ischaemia with distal embolisation in two and distal embolisation alone in one patient. Another patient had an acute occlusion of an aortobifemoral bypass graft cleared by thrombolysis, thereby revealing a severe stenosis at the aortic anastomosis. All lesions were atherosclerotic in aetiology. The aorta was occluded in six patients, nearly occluded in one and stenosed in the remaining 14. Infrainguinal arteries were free from significant occlusive disease in 13 patients. Occlusion of the femoropopliteal segment was noted on both sides in one patient and on one side only in six.

Procedural success and safety

Stents were inserted primarily in all patients. Both self-expanding (12 patients) and balloon expandable stents of different makes including Memotherm (Angiomed, Karlsruhe, Germany), Palmaz (Johnson&Johnson, Warren, NJ, USA), Wallstent (Schneider, Bulach, Switzerland) and Jostent (Jomed International, Helsingborg, Sweden) were used according to the preference of the physician performing the procedure. It has been our usual practice to prefer self-expanding stents in non-calcified lesions and balloon-expandable stents in heavily calcified or tight lesions. Nominal diameters of the stents used ranged from 12 to 16 mm (median 12) and these were dilated using balloons of nominal diameters ranging from 9 to 16 mm (median 10).

Postoperative complications were noted in three patients. One developed a groin haematoma (conservatively treated) and another developed a pseudoaneurysm (requiring surgical repair). There was one death within 30 days. This was of a patient with a life-threatening acute aortic occlusion and deep venous thrombosis in the presence of untreated and disseminated pulmonary malignancy. An attempt to treat this condition was considered justified by the clinical team. Intra-arterial thrombolysis, aortic recanalisation and stenting were performed with apparent success initially. However, the stent occluded within a week followed by unsuccessful surgical thrombectomy and death.

Follow-up

Standard follow-up was clinical examination and duplex sonography at 1 month and at 1 year. Additional follow-up was provided when there were ongoing problems.

One month

At 1 month, duplex sonography confirmed stent patency in all the 20 patients. All patients reported improvement in walking distance except one, who reported little change. This was an 89-year-old in whom a pressure gradient of 25 mmHg across the aortic stenosis was abolished by the procedure, with healing of her foot ulcer occurring. Resting ankle-brachial pressure index (ABPI) before and after the procedure was recorded in 16 patients. The median value of ABPI before treatment was 0.5 (range 0–0.8), which increased to 0.9 (0.5–1.1) after treatment.