ENDOVASCULAR AND SURGICAL TECHNIQUES

A Minimally Invasive Technique Allowing Ligation of the Internal Iliac Artery During Endovascular Repair of Aortic Aneurysms with an Aorto-uni-iliac Device

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Introduction

Although the length of the infrarenal neck is the major determinant of the feasibility endovascular stent grafting for abdominal aortic aneurysm (AAA), the proportion of aneurysms managed in this way can be increased by using an aorto-uni-iliac device. In particular, deployment of the distal graft in the external iliac artery (EIA) may be useful in patients with dilatation of one or both common iliac arteries (CIA). However, when the distal limb of the stent graft is positioned beyond a patent internal iliac artery (IIA) its occlusion, to prevent back-bleeding into the aneurysm sac, is required. This report describes a new technique for ligating the IIA which allows the entire procedure to be performed via the groin incisions used for stent graft insertion.

Technique

Following exposure of the common femoral arteries (CFA), the inguinal ligament ipsilateral to the IIA requiring occlusion is partly divided to allow digital separation of the peritoneum from the EIA. Although mobilisation of the EIA may be facilitated by division of the proximal CFA branches, these are left intact to maximise pelvic blood flow following IIA occlusion. Once maximum digital separation of the peritoneum and EIA has been achieved, the operative field is defined with two narrow bladed retractors, positioned anterior and medial to the EIA. A 10 mm laparoscope housed within a sheath allowing both lens irrigation and intraoperative suction is then positioned medial to the EIA. Further dissection of the EIA, IIA and distal CIA is achieved using laparoscopic cholecystectomy forceps and diathermy scissors (Ethicon Ltd, U.K.). Care is taken to avoid ureteric injury during the proximal dissection. Following identification of the IIA it is occluded with either metal clips (arteries <1 cm) or a one linen ligature passed around the vessel close to its origin (Fig. 1). Positioning of the ligature is accomplished with curved laparoscopic cholecystectomy forceps and ligation facilitated by long Lahey forceps. Although Fig. 1 demonstrates the use of metal clips for IIA occlusion, four out of five arteries in the present series were too large for this technique and thus the artery was ligated.

Following deployment of the aorto-uni-iliac stent graft the inguinal ligament is repaired with non-absorbable sutures and a femorofemoral crossover graft fashioned to revascularise the contralateral limb.

Results

This technique has been successfully employed on five occasions with satisfactory exclusion of the IIA. The
has both logistical and cost implications. These include early or separate admission, co-ordination with the angiography unit and additional radiology (staff and facilities) time. Furthermore, it may be unsuccessful if the IIA is aneurysmal. In three patients included in this series the IIA was dilated beyond its origin although relative narrowing at the iliac bifurcation allowed successful ligation. Whilst the largest IIA measured 3.0 cm diameter, the possibility of technical failure in the very small proportion of patients with much larger IIA aneurysms cannot be excluded. However, such patients are more likely to be considered unsuitable for endovascular exclusion of their AAA.

Intraoperative embolisation prior to stent-graft deployment may also be contemplated, although failure to occlude the artery, particularly if aneurysmal, may require conversion to open ligation. Furthermore, when performed in an operating theatre the quality of fluoroscopic imaging may be inferior to that of the angiography suite, making selective embolisation more difficult. Finally, intraoperative embolisation will require an additional contrast load which may increase the risk of nephrotoxicity.

Although one patient developed complications following IIA ligation, these would presumably have occurred regardless of the method used for IIA occlusion. Furthermore, the IIA was aneurysmal and would have been ligated during conventional AAA repair.

The combination of minimally invasive surgical techniques and endovascular aneurysm repair described in this report will allow successful AAA exclusion with minimum surgical exposure in a greater proportion of patients than has been possible thus far. Furthermore, operative time was not judged to be increased over that required for open ligation and will undoubtedly diminish with further experience and the development of specifically designed instruments.

**References**


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