CASE REPORTS

Treatment of Infra-renal Aorto-iliac Aneurysms by Total Exclusion

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ABSTRACT

A new approach to the treatment of abdominal aortic aneurysms is described. This technique decreases the morbidity of surgery by minimising haemorrhage and reducing fluid and electrolyte loss.

INTRODUCTION

A great milestone in abdominal aortic aneurysm surgery was achieved in 1951 when Dubost and colleagues replaced this lethal lesion with a homograft. Since then, direct graft replacement has remained the treatment of choice for this condition (Szilagyi et al, 1966). Following Dubost's success, the aneurysmal sac was resected during surgery; however, most surgeons subsequently found that this dissection was difficult and often resulted in considerable blood loss. In 1966, Oscar Creech showed that it was safer, easier, and more effective to interpose the aortic graft within the aneurysmal sac rather than excise that wall completely. A further reduction in morbidity was achieved in poor-risk patients by the non-resective treatment of abdominal aortic aneurysms (Karmody et al, 1982). In this technique, acute thrombosis of the aneurysms is induced by ligation of the iliac arteries while blood flow to the limbs is maintained by an axillo-bifemoral graft. Because the aneurysm is not dissected or opened, blood loss from this procedure is minimal. However, as these authors themselves point out, the indirect technique of limb revascularisation (namely, the axillo-femoral graft) is the weak point of this operation. Recently, we employed a new technique described by Karmody et al (1984) in which the whole aneurysm is simply excluded from the circulation and blood flow to the limbs restored by aortic graft replacement through the extraperitoneal space.

Principles and Technique

The aneurysm is excluded from the circulation by ligation of the iliac or femoral arteries and oversewing of the distal stump of the transected aorta near the neck of the aneurysm. The circulation is restored by an aorto-bi-iliac or femoral graft placed extraperitoneally.

The patient lies supine but the upper trunk is rotated so that the left shoulder points to the roof and the left upper limb extends over the right side of the operating table. If the femoral arteries are to be used, the right femoral artery is first exposed via a groin crease incision; this is facilitated by rotating the entire operating table to the left.

An oblique muscle-cutting incision is made in the left flank, through the 11th intercostal space or the bed of the 12th rib. This must extend from the border of the sacrospinalis muscle posteriorly to, and including part of, the rectus muscle sheath anteriorly, about 10 cm below the umbilicus. All dissection is extraperitoneal. The peritoneum and retroperitoneal fat are pushed forward by blunt dissection. The plane is kept as far posteriorly as possible so that the left kidney, renal artery and ureter are mobilised anteriorly.

Dissection medially and posterior to the left renal artery reveals the aorta and the neck of the aneurysm. Inferiorly, in this same plane, the left iliac arteries are easily isolated; from the infero-medial end of the incision, a tunnel is made extraperitoneally, via the retropubic space to the right groin incision.

The aneurysm neck is divided between two clamps and the distal end oversewn with a continuous 3–0 prolene suture. Because this is now a "low pressure" system, there is no risk of bleeding even if the sac is thin-walled. A knitted dacron bifurcation graft is anastomosed to the proximal divided aorta. This graft must be rotated 90° to the position in which it is normally used during the transperitoneal operation. Thus, the right and left limbs lie in an antero-posterior plane. The posterior limb is used for anastomosis to the left common or external iliac artery while the anterior limb passes via the preperitoneal tunnel (anterior to the bladder) to join the right femoral artery. The right external iliac and left iliac arteries are ligated and divided. The distal cut ends are used for anastomosis end-to-end to the limbs of the bifurcation graft. Because the entire aneurysm is excluded, it undergoes spontaneous thrombosis.

CASE REPORT

A 72-year-old negro man was admitted to the Port-of-Spain General Hospital because of lower abdominal pain. He was hypertensive. Significant findings were confined to the abdomen where he had aneurysms of the distal aorta and both common iliac arteries. All distal pulses were normal. Ultrasound confirmed aneurysms of the left common iliac (6 cm), the right common iliac (4 cm) arteries and the aorta at the bifurcation (6 cm). These were repaired by the exclusion operation described above. The right limb of the graft was anastomosed to the right femoral, and the left to the left external iliac artery. During operation, estimated blood loss was about 800 ml; 200 ml was lost during dissection and opening of the vessels while about 600 ml occurred as leakage through the interstices of the knitted Dacron graft; there was no bleeding from the aneurysms themselves as they were not opened. He was transfused with one pint of blood. No naso-gastric suction or gastrostomy was used. He was kept on the general ward (not Intensive Care Unit), passed flatus after 26 hours and tolerated oral fluids after 30 hours. He needed no assisted ventilation or additional oxygen, recovered uneventfully and was discharged after nine days with no symptoms.

DISCUSSION

The transperitoneal approach to the aorta has several disadvantages. It requires bowel exposure and manipulation which result in loss of fluid and electrolytes during surgery, and ileus post-operatively. It may also necessitate extensive dissection through adhesions or could result in adhesion formation later. Exposure of the aneurysm neck from this anterior approach is usually very difficult if the aneurysm is massive. If the renal arteries are involved, control of the supra-renal aorta is much more difficult from an anterior approach. In addition, the long midline incision for the transperitoneal approach can significantly impair respiratory function. Although the first aortic aneurysm repair (Dubost et al, 1951) was done via a thoraco-abdominal approach, most surgeons have now adopted the more familiar anterior transperitoneal route. However, a few surgeons have advocated routine extraperitoneal exposure for aorto-iliac reconstruction (Helsby and Moosa, 1975; Stipa and Shaw, 1968). Rob (1963) documented reduced ileus, hospital stay, and lung and wound complications in his patients who had extraperitoneal aneurysmorrhaphy. The exclusion operation described in this paper has the added advantage of not opening the aneurysm. Since most of the bleeding during aneurysm surgery occurs when the sac is opened, this blood loss is eliminated when the sac is excluded. The absence of an incision into the peritoneum and sac could also conceivably decrease the incidence of aorto-enteric erosions and fistulae. Because the technique combines the extraperitoneal approach with some of the advantages of the non-resective treatment of abdominal aortic aneurysms, it is also much safer for high-risk patients and can be used in cases that may be otherwise inoperable.

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