EJVES Extra (2009) **18**, 26–28

SHORT REPORT

Emergency Visceral Hybrid Procedure for Ruptured Thoraco-Abdominal Aortic Aneurysms: A Case Report

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Submitted 9 March 2009; accepted 10 March 2009

KEYWORDS
Thoraco-abdominal aortic aneurysm;
Ruptured aneurysm;
Endovascular;
Hybrid procedure

Abstract Rupture of a thoraco-abdominal aortic aneurysm (TAAA) is usually lethal. Patients with contained ruptures, who reach the hospital, have traditionally been subjected to open reconstructive surgery. However, especially in older patients, open surgery has a high mortality and morbidity rate. We describe a case of an 82-year-old man with a contained rupture of a Crawford type IV TAAA, whom we successfully treated with endovascular exclusion after visceral and renal re-vascularisation (a visceral hybrid procedure (VHP)).

Case Report

An 82-year-old male patient with a contained rupture of a Crawford type IV thoraco-abdominal aortic aneurysm (TAAA) (Fig. 1) was referred to our tertiary referral centre by a neighbouring hospital. His medical history revealed elective open repair of an infrarenal abdominal aortic aneurysm and a right-sided inguinal hernia repair. The patient did not use any medication apart from platelet inhibitors (carbasalate calcium). The patient presented with severe back pain, was still conscious and was adequately and haemodynamically stable with an intravenously administered beta-blocker for controlled hypotension, with a blood pressure of 110/70 mmHg and heart rate of 60 beats per minute. We repeated the blood tests (haemoglobin, 7.5 mmol l^{-1} ($N = 8$–10 mmol l^{-1}); creatinine, 72 μmol l^{-1} ($N = 75$–110 μmol l^{-1})), cross typing and computed tomography angiography (CTA) with contrast to evaluate possible endovascular treatment (Fig. 2). Open reconstruction of his TAAA was not considered an option. Spinal protection was optimised by preoperative placement of a spinal-fluid drain level L3–L4. Emergency open bypass surgery was performed. A standard bifurcated prosthesis was provided with extra branches on each limb, creating a single inflow, quadruple outflow prosthesis. After

DOI of original article: 10.1016/j.ejvs.2009.03.006.
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1533-3167
doi:10.1016/j.ejvsextra.2009.03.004

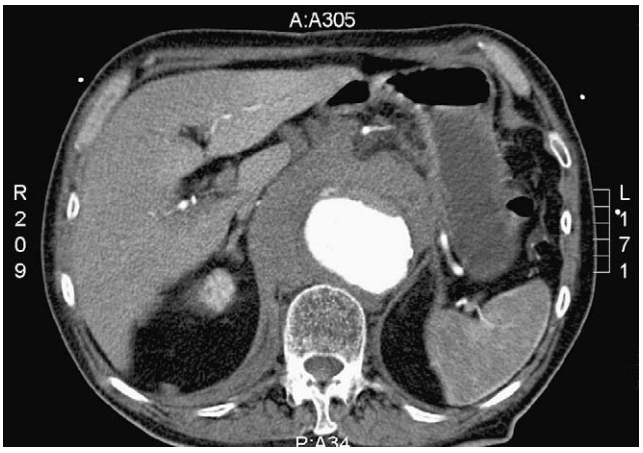

Figure 1 Ruptured type IV thoraco-abdominal aneurysm with haematoma surrounding the aneurysm and leakage at the anterior side of the aneurysm.

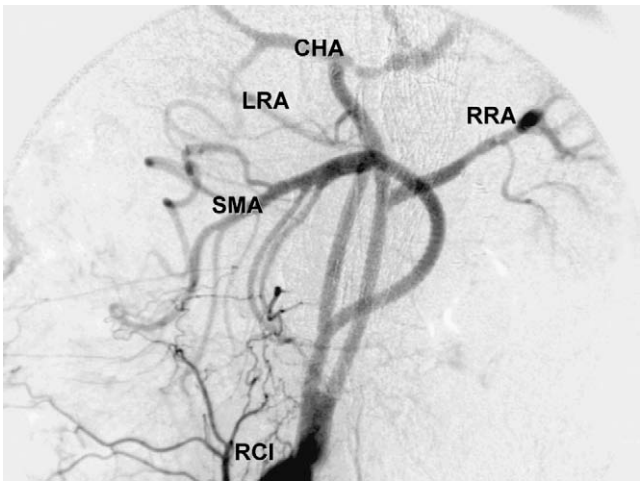

Figure 3 Completion angiography of the visceral and renal bypasses. Bypasses originate from the right common iliac artery (RCI), separate branches to the common hepatic artery (CHA), right renal artery (RRA), left renal artery (LRA) and superior mesenteric artery (SMA). (The bypass to the SMA crosses anterior to the anastomosis of the bypass to the RRA.)

administering 70 IE kg^{-1} heparin, the inflow side of the prosthesis was anastomosed side to end with the right common iliac artery and re-vascularisation of the dominant cranial right renal artery, the left renal artery, the common hepatic artery and the proximal superior mesenteric artery was performed. The lesser caudal right renal artery was not re-vascularised. The origins of the renal arteries, the coeliac trunk and the superior mesenteric artery were ligated. During this stage of the operation, the bypass to the right renal artery was occluded by a thrombus for a couple of minutes, for which thrombectomy was performed and extra heparin (40 IE kg^{-1}) injected. Persisting haemorrhage from the small capsular lesions in the spleen, despite conservative measures, made a splenectomy necessary. After closing the abdomen, two endografts were introduced through the right femoral artery, excluding the aneurysm and the origins of the bypassed visceral arteries. One 20-cm long, 34 mm in diameter and another 20-cm long, 37 mm in diameter endografts (Gore TAG; WL Gore and Associates Inc., Flagstaff, AZ, USA) were used with

Figure 2 (a) Coronal reconstruction showing the aneurysm with the surrounding haematoma and the left renal (LR) and right renal (RR) artery. (b) Saggital reconstruction showing the haematoma (H) and the coeliac trunk (CT) and superior mesenteric artery (SMA).

approximately 10-cm overlap. Perioperative blood loss was 10.5 l, one-third of it was re-administered to the patient using a cell-salvage machine. Intra-operative angiography showed patent bypasses (Fig. 3) and there were no signs of endoleak.

The patient recovered 6 days on the Intensive Care Unit (ICU). During ICU admission, the patient required 5 days on ventilation and he suffered from transient renal impairment, with a maximum creatinine level of 223 μmol l^{-1}. No dialysis was needed. Doppler ultrasound showed normal blood flow to the left kidney and the upper part of the right kidney. The spinal drain could be removed after 3 days since no neurological impairment had occurred. Hypertension was treated with oral beta-blockers and platelet inhibitor treatment was reinstated. CTA, on postoperative day 10, showed patent bypasses and no signs of endoleak. Colonic diverticular bleeding due to deranged anticoagulative treatment combined with respiratory insufficiency caused the patient to be re-admitted to the ICU from postoperative day 11 until 13. No mechanical ventilation or endoscopic treatment was needed. The patient could be discharged home after 27 days. A CTA at 5 months follow-up showed patent bypasses and shrinking of the TAAA; the patient was doing well without complaints.