SHORT REPORT

Successful Repair of Ruptured Abdominal Aortic Aneurysm in a Renal Transplant Recipient. A Case Report and Review of Literature

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Introduction

Ruptured abdominal aortic aneurysm (AAA) is a rare but well documented co-morbid problem following renal transplantation. The successful repair of a ruptured AAA with salvage of the transplant kidney has been reported with and without aortic cross clamp protection of the kidney.1-4 We report a successful case of repair of ruptured AAA with transplant kidney salvage and review the literature.

Case History

A 74-year-old man who developed chronic renal failure of unknown aetiology in 1986 had a cadaveric renal transplant into the right iliac fossa in 1992. His postoperative creatinine was stable at 160 \( \mu \text{mol/L} \). In January 1999, he was admitted with breathlessness and a productive cough, and a diagnosis of respiratory tract infection was made. Whilst in hospital, he developed sudden onset of severe abdominal pain and became hypotensive with a systolic blood pressure of 70 mmHg. Abdominal examination did not reveal a pulsatile mass as the patient was obese. A diagnosis of ruptured AAA was made clinically and confirmed by rapid ultrasound scan. The patient was resuscitated and simultaneously transferred to the operating theatre within 90 min. He had a midline laparotomy and a diagnosis of ruptured AAA was confirmed. No specific protection was undertaken for the transplant. The ruptured AAA was repaired by the insertion of a straight Dacron graft with an aortic cross clamp time of 35 min. Postoperatively he was transferred to ITU and required inotropic support. He was anuric for 3 days, needing haemofiltration and then polyuric after the fourth postoperative day. He was discharged 24 days after operation. At discharge his creatinine had fallen to the preoperative level. Two years following the rupture, he remains well with a creatinine level of 190 \( \mu \text{mol/L} \).

Literature Review

A medline search of the literature revealed six cases of successful repair of ruptured abdominal aortic aneurysm in the presence of a renal transplant (Table 1). It is possible that unsuccessful repairs have not been reported.

Successful repair of ruptured AAA has been achieved both with, and in a single case, without protection of the transplant kidney during aortic cross clamping. A temporary rise in creatinine after operation has been reported but none of the patients had long term dysfunction of the transplant kidney. Three of the patients were normotensive following rupture,1,3,5 one was hypotensive2 and the preoperative haemodynamic status was not mentioned in two of the patients.4 Schwartz et al.2 performed successful repair in a hypotensive patient in whom the aorta was cross clamped following which an axillofemoral shunt was inserted to protect the kidney and then a tube graft was used to restore aortic continuity. The
cross clamp time was 75 min and the postoperative course was complicated by ischaemic colitis with gangrene of the sigmoid colon.

**Discussion**

In patients without rupture, successful repair has been achieved both with and without cross clamp protection of the kidney.\(^4,6,7\) We report only the second case in the world literature of patient and graft survival following ruptured AAA without using renal protection. Lacombe in his series of five patients undergoing elective repair of AAA did not use any specific protection and did not notice any significant renal dysfunction.\(^6\) He suggests that retrograde perfusion of the transplant kidney during aortic cross clamping is sufficient to protect the kidney. He also demonstrated that the transplant kidney can tolerate up to 60 min of renal artery clamping.\(^8\) Panneton et al. recommend the use of cold perfusion and topical cooling with ice slush.\(^4\) Florack et al. demonstrated experimentally in dogs that the transplant kidney can tolerate up to 30 min of warm ischaemia but after 60 min of warm ischaemia only one out of six kidneys survived.\(^9\) In patients with a rupture it has been suggested that repair of the aneurysm should always be done without interrupting flow to the transplant kidney particularly when there is associated systemic hypotension.\(^3,5\) However, we advocate that in the presence of significant hypotension, the priority should be to save the patient’s life. Cross clamping of the aorta and vascular continuity should be rapidly obtained. Our patient was already hypotensive at the time of diagnosis. He required prompt control of the aorta with the priority of patient survival. He had a period of acute tubular necrosis from which he recovered fully.

Measures to protect the kidney can only prolong the time to aortic cross clamping and jeopardise attempts to save the patient’s life. We conclude that in patients with ruptured abdominal aortic aneurysms, if the patient is hypotensive the priority should be to cross clamp the aorta and restore vascular continuity. We have demonstrated that it is possible to achieve patient and graft survival with rapid aortic control and reperfusion. In haemodynamically stable patients renal protection may be used either in the form of cold perfusion or axillofemoral shunting with topical cooling.

**References**