Autotransplantation of a Single Functioning Kidney Following Rupture of Renal Artery Aneurysm

Abstract:
JF Sullivan, JC Forde, P Daly, W Shields, P O’Kelly, DM Quinlan, DP Hickey
Department of Urology and Transplantation, Beaumont Hospital, Dublin 9

Renal artery aneurysms (RAA) are the second most common visceral artery aneurysm. In cases of rupture they pose a significant mortality risk. Extracorporeal arterial reconstruction and autotransplantation is often necessary in certain complex cases that are not amenable to aneurysm repair in vivo. We report a case of a 35 year old female with a RAA in a solitary functioning kidney, requiring ex vivo reconstruction and autotransplantation to the iliac vessels.

Case Report
A 35 year old female with a body mass index (BMI) of 41, presented with sudden onset left flank pain radiating to her back associated with visible haematuria and an episode of transient syncope. She had a background history of a poorly functioning right kidney and hyperthyroidism. On initial examination she was clinically stable with a blood pressure (BP) of 113/70 mmHg and heart rate (HR) of 65 beats per minute (bpm). Routine haematological and biochemical investigations revealed a haemoglobin (Hb) of 13.2g/dl and serum creatinine (sCr) of 152 µmol/l. A non-contrast CT scan was performed. This revealed a large left sided retroperitoneal haematoma with extensive haemorrhage within the para-aortic region. There was no evidence of renal tract calculi. Two hours later, the patient complained of worsening flank pain and became haemodynamically unstable (BP 70/50 mmHg, HR of 129 bpm).

A repeat HB fell to 11.3g/dl, sCr rose to 202µmol/l and she became oliguric. She was resuscitated with intravenous (IV) fluids and once stable underwent a triphasic contrast CT which revealed a large left sided RAA measuring 1.4 x 2.1cm, with extensive active haemorrhage (Figure 1). The aneurysm arose 2.1cm distal to the origin of the left renal artery, with the artery trifurcating immediately distal to the aneurysmal sac. At this point various interventions were considered including endovascular and endo-aneurysmal repair but were not seen as viable due to the patient’s BMI and location and complexity of the aneurysm. The decision was made to proceed with surgery in an attempt to salvage the patient and if possible the solitary functioning left kidney. The patient was placed supine and a chevron incision was made. The ligament of treitz was exposed through the posterior peritoneum and left renal pedicle identified, mobilised and controlled.

The retroperitoneum was opened, the large haematoma evacuated and left renal artery controlled proximally. The left kidney was then mobilised, vessels cross-clamped, ligated and a left nephrectomy completed. The kidney was then perfused with cold saline and the RAA repaired ex vivo with 6/0 prolene sutures (Figure 2). Through a separate iliac fossa incision, the left iliac vessels were exposed (RIF), the kidney was autotransplanted to the iliac vessels (6/0 prolene). The warm ischaemia time was 40 minutes. The patient made an uneventful post operative recovery and was discharged on day 10 with a sCr of 177µmol/l. Follow up renal imaging at 10 months showed the transplanted kidney was uniformly well perfused and sCr had returned to baseline (131µmol/l).

Discussion
Renal artery aneurysms (RAA) may be divided into micro, fusiform, dissecting and saccular forms, as in this case. Most are less than 1 cm and the literature states they should be treated conservatively unless complicated by hypertension or pregnancy. In the remainder of individuals it is suggested that aneurysms greater than 2 cm require intervention. More recently, a greater number of these RAA have been repaired by endovascular stenting and embolisation techniques. However, there is no long term follow up data with regards to these approaches and furthermore they are not considered suitable for more complex aneurysms, especially in or close to distal branch arteries. In this particular case, the distal location of the aneurysm along with the trifurcation of the vessel near the entrance to the renal parenchyma made it unsuitable for stenting or embolisation. Therefore open surgery and extra corporeal reconstruction was chosen. Although not performed emergently, laparoscopic nephrectomy with ex vivo repair is becoming a more accepted alternative in the elective setting. Ex vivo repair has been recently advocated by various authors. English et al reported 72 repairs for RAA in which 50% were performed ex vivo, with low morbidity and mortality, no unplanned nephrectomy, and excellent patency. Minimal invasive options for RAA repair are available and likely to continue to increase in use as technology and experience improve. Currently primary excision and reconstruction remains the mainstay of surgical treatment for complex RAA. Ex vivo repair provides a bloodless surgical field and optimal visualisation. In cases which a solitary functioning kidney is affected by an aneurysm of its main supplying artery we recommend extracorporeal repair as the most suitable approach to attempt to salvage the organ. This case report highlights the importance of early clinical awareness of the possibility of a RAA in patients presenting with spontaneous retroperitoneal haematoma.

Correspondence: JF Sullivan
Department of Urology and Transplantation, Beaumont Hospital, Dublin 9
Email: johnsullivan@rcsi.ie

References