

Trauma and reconstruction

## Emergency endovascular stent-graft repair of a traumatic ruptured renal artery aneurysm: A case report

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## ABSTRACT

To describe the endovascular treatment of a traumatic rupture of a renal artery aneurysm (RAA) in an unstable patient using a stent-graft. A 49-year-old patient presented following trauma to her right chest and flank. The patient was unstable on arrival and following resuscitation, contrast CT angiogram identified a rupture of a left RAA. To occlude the aneurysm, a graft-stent was placed successfully to arrest the haemorrhage. In this case of ruptured RAA, an endovascular approach allowed rapid control of bleeding and preservation of the kidney function, whilst avoiding open surgery and possible nephrectomy.

## Introduction

Renal artery aneurysms (RAA) are rare with a reported incidence of up to 1% on angiographic studies. They are mostly found in patients between 5th and 7th decade of life, and while mostly asymptomatic, clinical manifestations can include acute rupture, flank pain and hypertension. Rupture of an aneurysm presents the most threatening complication.<sup>1</sup>

Anatomically the majority of lesions are located extra-parenchymal, occurring at the main renal artery or at the bifurcation of the renal artery. Less than 10% are intra-parenchymal and these result in a different clinical picture and management options.<sup>2</sup>

The risk of rupture is relatively low and is reported as 3% in men and non-pregnant women with a slightly higher rate in pregnancy. Management of a ruptured renal artery aneurysm is conventionally by laparotomy and haemorrhage control, often leading to a nephrectomy, especially in unstable patients. Endovascular techniques by stent-grafting or embolization are usually performed in stable patients or in an elective setting.<sup>3</sup>

We present this case to highlight the role endovascular techniques can play in the management of a patient with a hypovolemic shock due to a ruptured RAA.

## Case presentation

A 49-year-old woman, with no significant past medical history, was

brought to the Emergency Department following a horse-kick to her left flank. On arrival she had a blood pressure of 117/94 mmHg and a haemoglobin of 122 g/L. Following initial resuscitation, she underwent CT scanning of her brain, chest, abdomen, and pelvis an hour after her arrival. As she returned from CT, her blood pressure dropped to 77/87 mmHg and repeat haemoglobin was 77 g/L. The CT scan revealed a large left retroperitoneal haematoma surrounding the left kidney, a 12 mm aneurysm in the proximal left main renal artery with adjacent active extravasation of contrast, multiple linear and wedge-shaped infarcts within the left kidney and an incidental 10 mm aneurysm in the distal right renal artery with classically observed beading effect. [Fig. 1].

These appearances suggested a rupture of a pre-existing left renal artery aneurysm secondary to trauma. Following discussion with Urology consultant, interventional team, anaesthetic team, and the patient, it was decided to move the patient to theatre to be intubated with an attempt to stent the aneurysm if the patient stabilised. In our hospital set up the Angio suite is opposite to main theatres, once the patient was stable, she was moved to Angio suite with the urology and theatre staff still on standby in theatre. The patient proceeded to have an emergency angiogram and insertion of a 6 mm × 22 mm stent graft in the left renal artery via right percutaneous femoral access under general anaesthetic, with a subsequent angiography showing successful exclusion of the aneurysmal sac [Figs. 2 and 3]. An anterior segmental branch of the left renal artery was sacrificed to allow successful endovascular treatment of the aneurysm. Overall, the patient received 8 units of PRBC, 6 FFP and 2 units of platelet as blood products before and during procedure.

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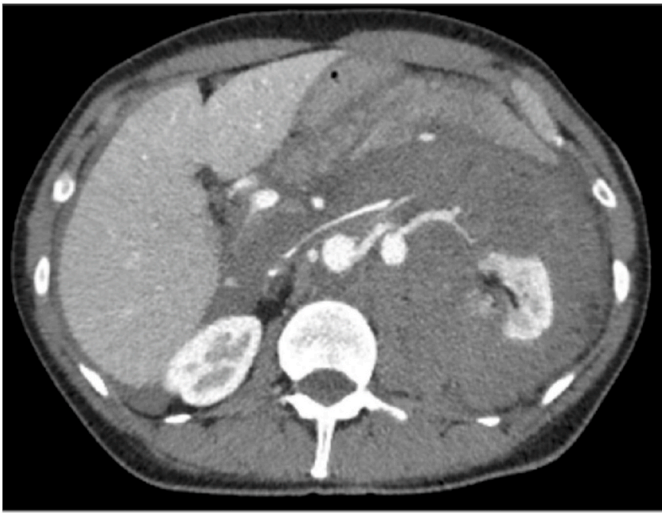


Fig. 1. CT scan of abdomen with large, left retroperitoneal haematoma visible.



Fig. 2. Pre stent insertion angiogram.

Her inpatient stay was prolonged due to hypoxic respiratory failure requiring non-invasive ventilation because of bilateral basal collapse and consolidation. She also developed, impaired left ventricular systolic function (ejection fraction reduced on echocardiogram) with BNP levels of over 10,000. This resolved after nine days with a return to normal limits on biochemical laboratory results, echocardiogram and she made a full recovery.

Follow-up Dimercaptosuccinic acid (DMSA) scan at three months showed that her left kidney contributed 41% of overall renal function and her creatinine was 77  $\mu\text{mol/L}$  5 year after the event from 89  $\mu\text{mol/L}$  when she was admitted. Repeat CT angiogram confirmed successful treatment of her aneurysm with a normally enhancing left kidney her 1cm right renal artery aneurysm has remained stable on annual follow-up, and she is on annual follow up with the vascular team.

On follow up the patient remains well and very active with no residual symptoms. She continues to be competitive equestrienne.

## Discussion

The use of stent graft in the management of this acutely ruptured



Fig. 3. Post stent insertion angiogram.

RAA was effective in arresting any further haemorrhage, whilst preserving the function of the affected kidney. Further, it avoided the need for a laparotomy, which we believe would have led to an emergency nephrectomy to arrest the bleeding.

## Conclusion

In conclusion, a ruptured RAA involving the main artery in a patient presenting with hypovolemia can be successfully managed by excluding the aneurysm using a stent graft to arrest further bleeding with good outcomes.

## Declaration of interest

None.

## Author statement

**Wesam Elbaroni:** Writing –original draft, writing – review and editing, supervision.

**Andrew McAdam:** Writing – Review and editing.

**Oskar Lepiarczyk:** Writing – review and editing, expanded the literature review.

**David Connolly:** Writing – Review and supervision.

**Peter Kennedy:** Writing – Review, selected and processed the appropriate images.

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