CASE REPORT

Renal Artery Aneurysm: Endovascular Treatment by Coil Embolisation with Preservation of Renal Blood Flow

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Introduction

Surgical management of renal artery aneurysms (RAAs) is frequently complex, the most common operation performed being aneurysmectomy combined with an angioplasty or an aortorenal bypass.1 Aneurysmectomy can be successfully performed in more than 95% of extraparenchymal RAAs, while treatment of certain intraparenchymal aneurysms may entail partial nephrectomy.1 In recent years, percutaneous transcatheter occlusion techniques have been increasingly employed, mainly for intraparenchymal RAAs, avoiding partial nephrectomy, but resulting in segmental infarction of the kidney. In this report, we describe the endovascular treatment of a narrow-necked, saccular, extraparenchymal RAA by coil embolisation preserving the distal renal-arterial flow, and briefly review the literature.

Case Report

A previously healthy 53-year-old man presented with a 10-year history of intermittent painless macroscopic haematuria. He was normotensive, with normal serum urea and creatinine. Intravenous urography showed a large irregular filling defect occupying the left half of the bladder, but not causing any hold-up to the left ureter. A subtle curvilinear calcification was also seen at the left upper quadrant and was thought to be extrarenal in origin, representing possibly a splenic artery aneurysm. He underwent transurethral resection of the bladder tumour and histopathological examination confirmed this to be a moderately differentiated transitional cell carcinoma (WHO grade II). Three weeks later, arteriography demonstrated that the calcified lesion was a saccular aneurysm of the left renal artery arising from the first bifurcation and measuring 3 cm in diameter (Fig. 1a). We decided to treat this by endovascular means. Ten days later he was re-admitted for embolisation. Under local anaesthesia and via a right groin puncture, a 5-F sheath was inserted through the common femoral artery into the external iliac artery. A SIM II catheter (Cordis, Cordis Europa N.V., Rodem, The Netherlands) was advanced into the left renal artery. This was exchanged, over a guidewire, for a 5-F Cobra II catheter (Cordis, Cordis Europa N.V., Rodem, The Netherlands) which we were able to manoeuvre into the aneurysm sac. There was a small amount of thrombus within the aneurysm sac. Twenty-three MREYE™ steel embolisation coils (Cook, William Cook Europe A/S, Denmark) (5 cm in length and 8 mm in diameter) were inserted into the aneurysm sac (Fig. 1b). A completion angiogram showed the aneurysm to be completely excluded, with preservation of the distal flow. One of the coils was situated in the neck of the aneurysm. The whole procedure lasted approximately 1 hour and 50 min and the total amount of contrast used was 60 ml of ioxixanol (Visipaque 270 mgI/ml, Nycomed, Norway). Following the procedure, the patient had an uneventful
He was pain-free, apyrexial, and normotensive, with normal serum urea and creatinine and normal white cell count. He was discharged the following day. He was symptom-free during the follow-up. At 7 months, he was re-admitted for a repeat renal arteriogram which showed continued ablation of the aneurysm with no blood leakage into the sac, no increase in its diameter, and patency of the distal flow (Fig. 2). At 9 months, a contrast-enhanced computed tomography (CT) scan confirmed the successful exclusion of the aneurysm and showed no increase in its size. One year post-embolisation, the patient remains asymptomatic and normotensive. We are planning to follow him up with 6-monthly clinic appointments and CT scans.

**Discussion**

Transcatheter arterial embolisation is a well-established adjunct in cases of vascular neoplasms of the kidney and the treatment of choice for many patients with renal arteriovenous malformations or fistulas. Recently, it has emerged as a useful technique in the management of RAAs. Successful embolisation has been reported with small bleeding aneurysms, in patients with arteritis, false aneurysms following renal biopsy, intraparenchymal lesions, and in high-risk patients deemed unfit for aneurysmectomy.2±6

Embolisation of the feeding vessel will lead to segmental infarction of the renal parenchyma which may be followed by a transient “post-embolisation syndrome”, worsening renal function and secondary hypertension. Superselective embolisation of the aneurysm itself, rather than of its feeding artery, results in preservation of the proximal and distal arterial flow avoiding renal infarction and high-renin hypertension. To the best of our knowledge, there are only four published reports on RAA embolisation with preservation of renal blood flow.7-10 Of these, one was an urgent case of leaking RAA, which was denied surgical repair due to high operative risk.7 A further one was a giant aneurysm where embolisation was preferred to nephrectomy.8 Tateno et al.9 and Klein et al.10 reported superselective coil embolisation of extraparenchymal RAAs performed as an alternative to elective aneurysmectomy in otherwise low-operative-risk patients. Although our patient was asymptomatic, the aneurysm size (>2 cm in diameter), the incompletely calcified ring and the presence of thrombus within its sac prompted us to intervene in order to prevent rupture or embolisation of the kidney and preserve renal function.
A potential complication of the coil embolisation is occlusion of the main renal artery from migration of the coils. This represents the most serious complication with attempted embolisation and may be the reason that many vascular surgeons would prefer to treat these lesions surgically rather than by endovascular means. The durability of the repair is not known and, so far, there are no data to confirm that transcatheter thrombosis with preservation of blood flow decreases the risk of aneurysm enlargement or rupture. It may be possible that, despite the repair, the aneurysm is still pulsatile and, as such, has continued potential for expansion and rupture. These are more likely to occur in thrombosed aneurysms that have a wide neck or a prominent connection to the native circulation. The RAA in our patient appeared to have a long narrow neck that took off at almost a right angle from the native artery, and was, therefore, amenable to coil embolisation. During the 9-month follow-up there was no increase in the size of the occluded aneurysm sac. Long-term follow-up of the thrombosed aneurysm is warranted, to rule out expansion and confirm the advantages of the technique over open conventional surgery. Arteriography could be used for follow-up, but this may not always show the aneurysm size satisfactorily. Colour-flow duplex ultrasound or, even better, computed tomography, are more adequate imaging modalities in this respect. Magnetic resonance (MR) imaging could also have been used in this particular patient, as the embolisation coils used here are claimed not to degrade the quality of the MR scan.

Although surgical aneurysmectomy, in expert hands, has a very low operative morbidity and mortality, endovascular therapy with coil embolisation and preservation of renal blood flow may be considered as a realistic alternative surgery in narrow-necked, saccular, extraparenchymal aneurysms, even in low-surgical-risk patients. However, the durability of this innovative therapy remains to be established.

References


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