Stent-assisted coil embolization of a wide-necked renal artery aneurysm

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ABSTRACT

We present a case of stent-assisted coil embolization of a wide-necked renal artery aneurysm performed at our institution. The technique involved a stent being delivered over the neck of the aneurysm. Subsequently a catheter was placed into the aneurysm through the stent mesh and the aneurysm was then filled with detachable coils. Complete aneurysm occlusion was obtained and there was no evidence to suggest renal infarction on a follow-up contrast CT scan 6 months later. Our preliminary experience suggests that stent-assisted coil embolization of wide-necked renal artery aneurysms is a technically challenging but potentially effective renal-sparing endovascular approach.

CASE REPORT

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A 77-year-old male with a history of hypertension had an outside abdominal CT scan done which showed a right renal artery aneurysm (Figures 1-3). He was then referred to our institution for abdominal angiography which revealed a wide-necked, oval aneurysm measuring about 2.5cm in maximum diameter arising from the upper first divisional vessel of the right renal artery (Figure 4). Prior to angiography informed consent was obtained for a range of embolization techniques including stent-assisted coil embolization which was considered to be ideal for a patient with a symptomatic, wide-necked, oval aneurysm. Access site was the right femoral artery and a 6Fr 10cm sheath was used. Preliminary angiography demonstrated two major vessels arising from the aneurysm which had developed at a bifurcation point. Cannulation of the largest of these vessels was undertaken and after measurements a Leo 4.5 x 25mm self-expanding stent (Leo, BALT Co., Montmorency, France) was deployed in good position across the neck of the aneurysm. Following this multiple coils were deployed within the aneurysm (Figure 5). A final angiogram showed complete exclusion of the aneurysm from the circulation (Figure 6). There were no complications and the patient was asymptomatic on discharge. A follow-up contrast CT scan 6 months later showed normal renal perfusion with no evidence to suggest renal infarction (Figure 7).

DISCUSSION

A renal artery aneurysm is a dilated segment of renal artery that is more than twice the diameter of a normal renal artery. The first published report of such an aneurysm was in 1770 by Rouppe (1), who described the case of a sailor who fell onto his right flank and subsequently died due to aneurysm rupture. Autopsy studies show that the incidence rate of renal artery aneurysms is 0.01% (2). However, selected patients who undergo renal arteriography have an incidence rate of 0.3-1% (3). The formation of a renal artery aneurysm (RAA) can be due to trauma, infection, arteritides, Kawasaki disease, or vascular dysplasias (e.g. fibromuscular dysplasia or Ehlers-Danlos syndrome). Asymptomatic, small (< 2cm diameter) RAAs do not usually require treatment. Symptomatic RAAs can cause hypertension, flank pain, haematuria and renal infarction. Indications for intervention include symptomatic aneurysms, rupture, aneurysms in females contemplating

pregnancy, large (> 2cm diameter) or enlarging aneurysms and aneurysms associated with dissection (4-7). Surgical therapy includes emergency repair of ruptured renal artery aneurysms or elective operations such as tangential excision with primary repair or patch angioplasty, aneurysm excision with reconstruction using bypass or even nephrectomy.

With advances in endovascular techniques it was only a matter of time before investigators attempted endovascular therapy for renal artery aneurysms. Stent grafts need a length of non-dilated renal artery proximal and distal to the aneurysm in order to form a seal and exclude the aneurysm from circulation. They have limited use at renal artery bifurcations but can be used in fusiform or saccular aneurysms. Coil embolization on the other hand was only used in saccular aneurysms with small necks because of the fear of coil migration. Stent-assisted coil embolization is an interesting treatment option already in use for treating aneurysms at other sites in the body such as the brain, abdomen and pelvis (8-11). Only recently have investigators begun treating wide-necked saccular renal artery aneurysms by placing a bare metal stent across the neck and then filling the aneurysms with coils through the interstices of the stent (12). However, coil migration and incorrect stent graft placement with resulting thrombosis and renal infarction are potential complications.

TEACHING POINT

Stent grafts and coil embolization have revolutionised endovascular therapy of visceral aneurysms with very high clinical and angiographic success rates. Stent-assisted coil embolization is a combination of these techniques and a promising addition to the repertoire of treatment options for patients with wide-necked renal artery aneurysms. However, this technique is still in its infancy and more data needs to be collected as the long-term results remain unclear.

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FIGURES

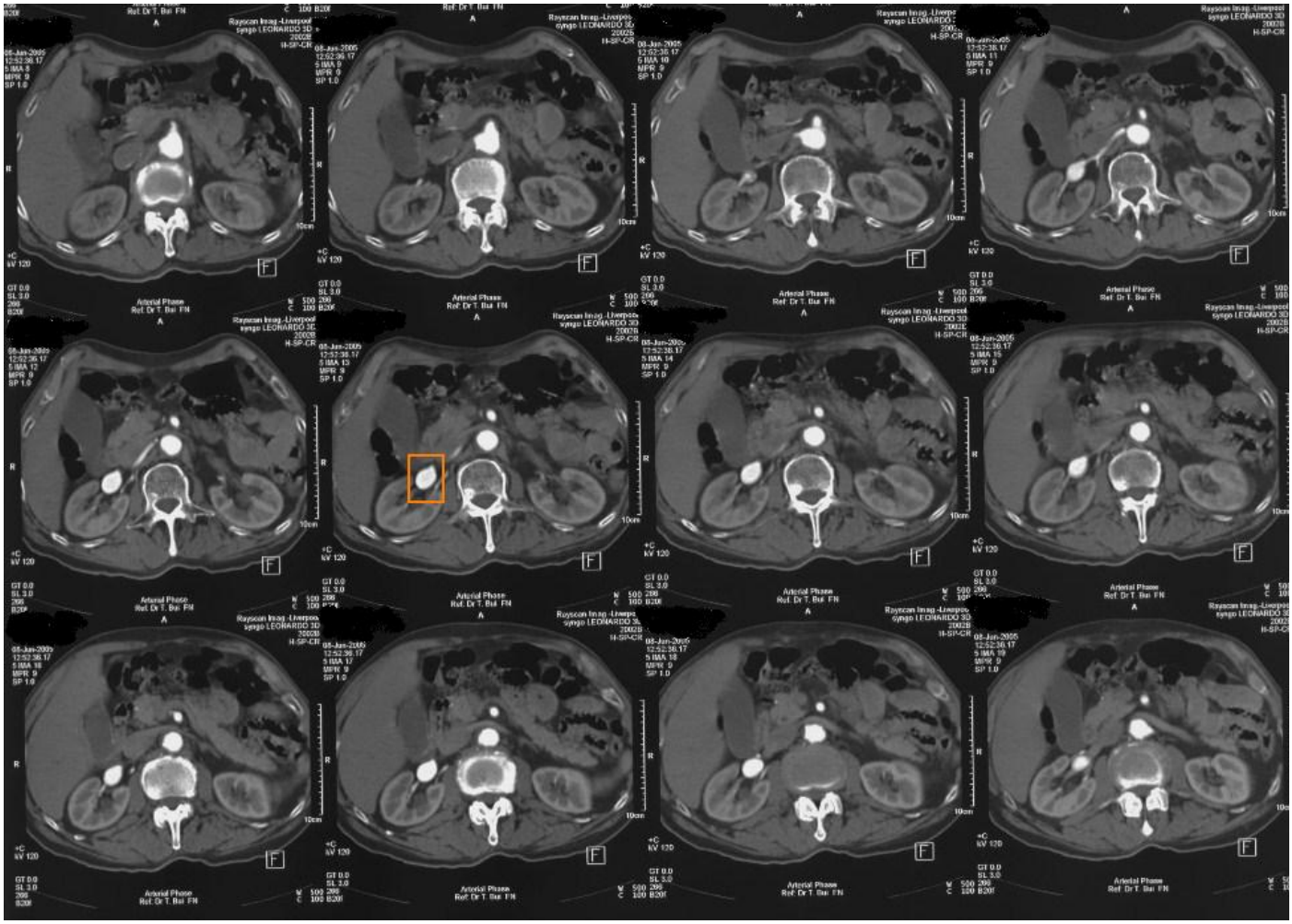

Figure 1: Axial images of contrast computed tomography of a 77-year-old male with hypertension showing an oval right renal artery aneurysm measuring 2.5cm in diameter (highlighted by orange rectangle).

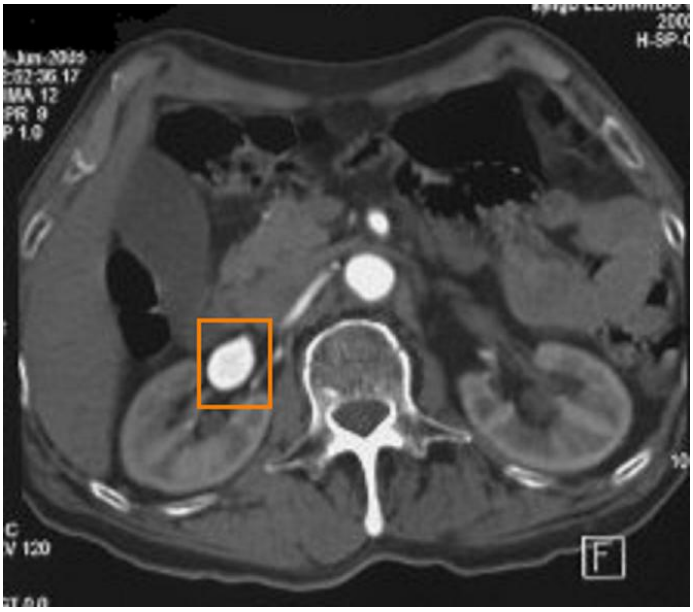

Figure 2: Axial image of contrast computed tomography of a 77-year-old male with hypertension showing an oval right renal artery aneurysm measuring 2.5cm in diameter (highlighted by orange rectangle).

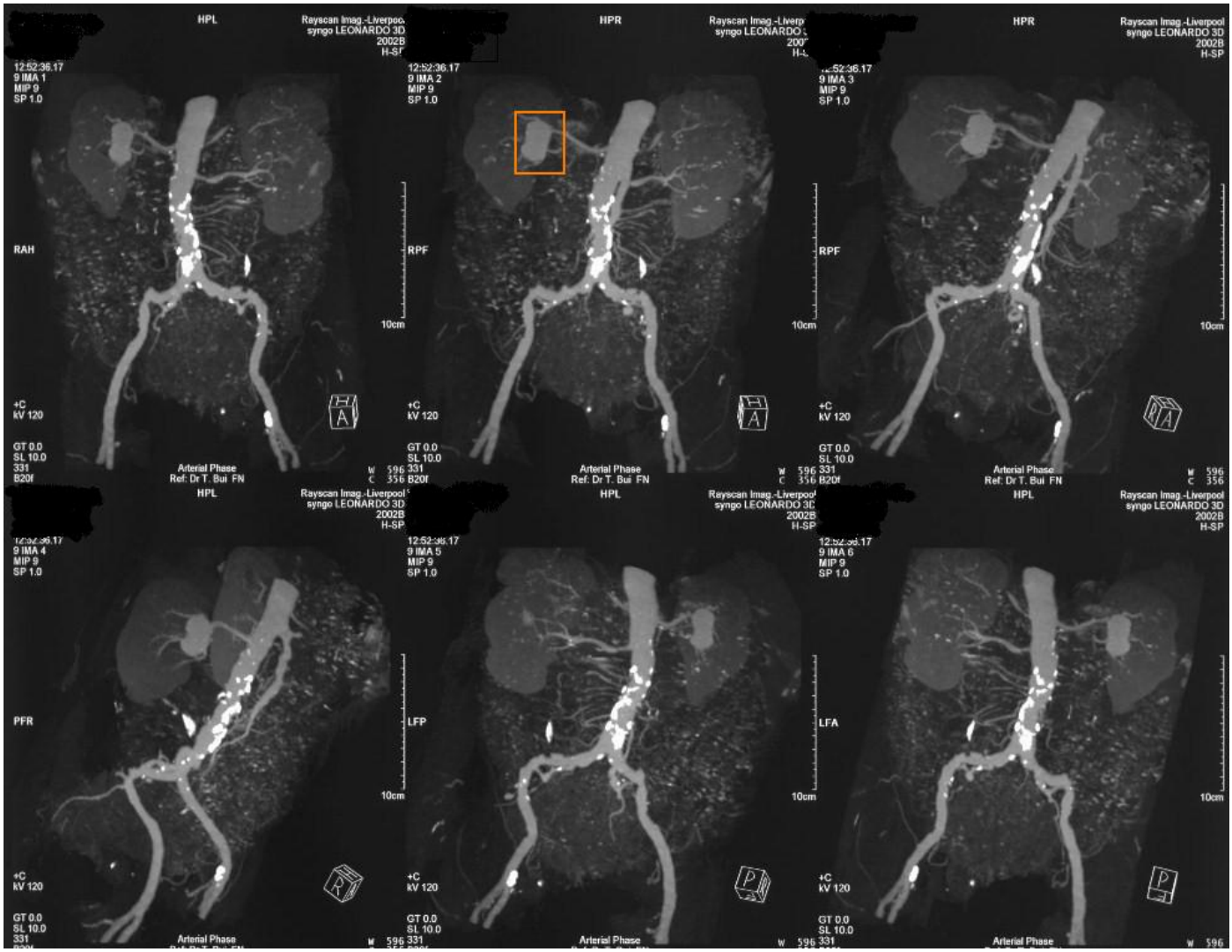

Figure 3: Maximum intensity projection (MIP) images of a 77-year-old male with hypertension demonstrating an oval right renal artery aneurysm measuring 2.5cm in diameter (highlighted by orange rectangle).

Figure 4: Abdominal angiogram of a 77-year-old male with hypertension showing an oval aneurysm measuring approximately 2.5cm in maximum diameter arising from the upper first divisional vessel of the right renal artery.

Figure 5: Renal angiography of a 77-year-old male with hypertension demonstrating a catheter positioned through the stent in the upper first divisional vessel of the right renal artery and deployment of the first coil within the aneurysm.

Figure 6: Renal angiography of a 77-year-old male with hypertension showing multiple coils filling the right renal artery aneurysm after stent-assisted coil deployment.

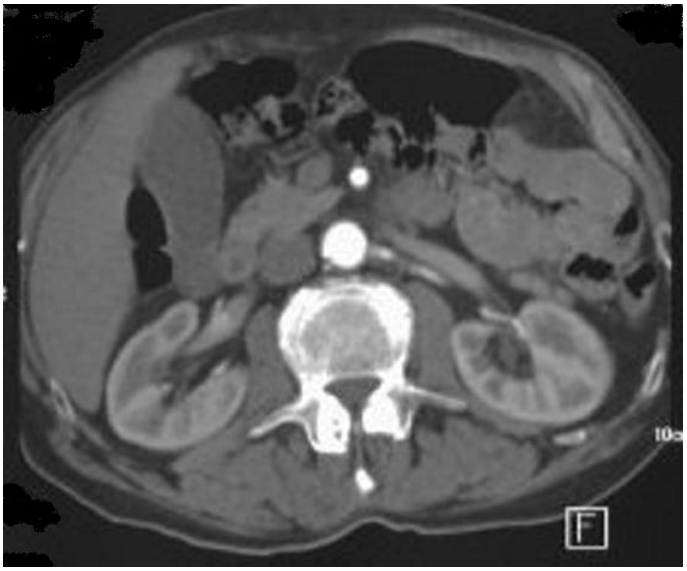

Figure 7: Axial image of contrast computed tomography of a 77-year-old male 6 months after stent-assisted coil embolization of a right renal artery aneurysm showing no evidence to suggest renal infarction.

ABBREVIATIONS

CT: computed tomography
RAA: renal artery aneurysm

KEYWORDS

Renal artery aneurysm; stent; coil embolization