



Trauma and reconstruction

Novel technique using amplatzer AVP I stent in management for giant renal artery pseudoaneurysm

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ABSTRACT

Renal artery pseudoaneurysm (RAP) is an uncommon vascular lesion. Early detection and treatment of renal artery pseudoaneurysm is important because it can rupture and lead to life-threatening hemorrhage. Recent advances in endovascular interventions can prevent potentially challenging open surgery. We describe a case 66 year old patient who presented with a painful abdominal lumbar mass. CT scan show a giant renal artery pseudoaneurysm. We discuss management of giant renal artery pseudoaneurysm, both open surgery and endovascular surgery. Endovascular arterial embolization and stent techniques is feasible. However, open surgical treatment remains to be most effective and radical method in emergency setting.

Introduction

Renal artery pseudoaneurysm (RAP) is an uncommon vascular lesion. Early detection and treatment of renal artery pseudoaneurysm is important because it can rupture and can lead to life-threatening hemorrhage. Recent advances in endovascular interventions can prevent potentially challenging. We describe a case of a 66 year old patient who presented with a painful abdominal mass. CT scan showed a giant renal artery pseudoaneurysm. We discuss the management of a giant renal artery pseudoaneurysm, both open surgery and endovascular surgery. Endovascular arterial embolization and stent techniques is feasible.

Case presentation

A 60 years old Malay gentleman presented with a painful abdominal mass for past 5 years, which was slowly growing over this period. He gave history of blunt trauma in which he was canded when he was in prison 5 years ago. On examination, patient reveals presence of mass measuring about 20 cm × 15 cm at right posterior lumbar region. It was firm with presence of echymosis over the suprapubic area and at posterior lumbar. Blood investigations were unremarkable. A CT Abdomen was done and a large enhancing mass with peripheral rim calcification at the right renal fossa was seen in continuity with the lower pole of the right kidney and communicating with a branch of the right renal artery (Fig. 1). Therefore, a diagnosis of a right renal artery pseudoaneurysm was made. An angiographic run was performed and it showed a large

pseudoaneurysm arising from lower division of right renal artery. An angiostenting of right renal artery aneurysm was performed subsequently. In view of the size of the lesion, a decision for endovascular approach to manage this patient was made. The feeding branch of the pseudoaneurysm was identified angiographically and multiple coils and stents were used in an attempt to seal the opening (Figs. 2 and 3). However at day 2 noted patient become hypotensive and the mass increased in size. An urgent bed side ultrasound was done and noted the Yin Yang sign still observed within pseudoaneurysm sac and the flow into pseudoaneurysm sac slow down but still patent. The Yin Yang sign which also known as the Pepsi sign, is a radiological sign described in both true and false aneurysms. It's indicates bidirectional flow due to the swirling of blood within the true or false aneurysm. Proceeded with exploratory laparotomy for ligation of right lower segment of renal artery with excision of pseudoaneurysm with evacuation of retroperitoneal clot. However, Intraoperative findings shows a huge right renal aneurysm, measuring 20 × 20cm approximately. In view of the lesion was adhered to the calyces of the kidney. Proceeded with nephrectomy. Postoperative he had a stormy recovery in ICU as patient develop Hospital acquired pneumonia with surgical site infection and was treated with antibiotics but was eventually discharge home well after 2 weeks of hospitalization.

Discussion

Renal artery Pseudoaneurysms (RAP) due to trauma are rare entities.

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Fig. 1. CT TAP Showed a large enhancing mass measuring 13.5 cm × 15.4 cm × 13.4cm (AP x W x CC) with peripheral rim calcification at the right renal fossa. It appears to be in continuity with the lower pole of the right kidney and communicating with a branch of the right renal artery.



Fig. 2. A selective right renal artery angiogram.



Fig. 3. A selective right renal artery angiogram with embolization using complex helical coils “Guglielmi Detachable Coil” packed at end artery (distal intrarenal) over the leaking site. coils packed at end artery over the leaking site.

In general, the incidence of this type of lesion as a consequence of penetrating trauma is common than blunt trauma. The etiology of lesion is often the violation of the abdominal cavity during partial nephrectomy, percutaneous procedures, renal biopsy or penetrating trauma. However, more recent literature has demonstrated that the overall incidence ranges between 0.01% and 1%^{1,2}

The treatment options to repair RAP are conventional open surgery and endovascular surgery. However, no consensus about which procedure should be chosen was found in our review of the literature. In our case we have decided for endovascular intervention. A selective right

renal artery angiogram with embolization using complex helical coils “Guglielmi Detachable Coil” (GDC, Boston Scientific) size 0.035” was packed at end artery (distal intrarenal) over the leaking site. The Guglielmi Detachable Coil is circular or multishaped soft platinum coils. The coil is attached to a Teflon-coated stainless steel delivery wire by a short portion of uninsulated stainless steel. This was to promote thrombosis thus sealing off the pseudoaneurysm. We used a double curve guiding catheter 6F (Boston Scientific) with an Excelsior-14 microcatheter (Boston Scientific) over a platinum tip 0.014 inch steerable guidewire (Transcend, Boston Scientific). We inserted this microcatheter tip into the renal aneurysm and the cavity was filled with multiple Guglielmi Detachable Coil. Some authors reported success of treatments using coils embolization for larger pseudoaneurysms lesion measuring 10 cm.³ Factors that may preclude endovascular management are size and multiplicity, although there have been reports of successful endovascular management for giant (10 cm) RAP endovascularly.

The role of liquid nonadhesive embolic agent such as Onyx (Ev3) for endovascular embolization is to obliterate the aneurysm sac completely and to seal the neck. Onyx is an ethylene vinyl alcohol copolymer dissolved in an organic solvent, dimethyl sulfoxide (DMSO).⁴ Theoretically, it should avoid aneurysm recurrence or regrowth. However, this embolic agent is used only in smaller renal artery pseudoaneurysms and it occlude small distal vessel, causing small area of renal parenchyma infarction.

The literature reports more frequent use of covered stents for the treatment of renal artery pseudoaneurysm. There is no evidence regarding long-term patency of stent grafts with respect to the treatment of pseudoaneurysm in the renal vasculature. The risk of stent stenosis due to intimal hypertrophy is unknown and these patients may need reviewing in the future. A previous study using stent grafts to preserve renal function in patients with renal artery stenosis and solitary functioning kidneys showed good patency results as well as good renal function at 24 months. The stent graft only can be used in the main renal artery pseudoaneurysm and it has to be straight and the edges of the aneurysm neck are located at least 15 mm away from the renal ostium and hilar bifurcation.

Conclusion

Literature data mentioned the dominance of endovascular techniques. However, surgical treatment remains to be the most effective and radical method. We advocate a Three-dimensional angiography is a very important technique for better understanding of the renal vascular anatomy. A complete comprehension of the renal aneurysm angioarchitecture is essential to choose the best therapeutic strategy planning. In our case as it was a very large aneurysm we should use liquid nonadhesive embolic agent such as Onyx to fill almost completely the aneurysm cavity and followed by finish the residual neck occlusion safely with helical coils “Guglielmi Detachable Coil.

Declaration of competing interest

We declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere.

We know of **no conflicts of interest** associated with this publication, and there has been no significant financial support for this work that could have influenced its outcome.

References

1. Porcaro AB, Migliorini F, Pianon R, et al. Intraparenchymal renal artery aneurysms: case report with review and update of the literature. *Int Urol Nephrol.* 2004;36: 409–416. <https://doi.org/10.1007/s11255-004-8871-2>.

2. Giannopoulos A, Manousakas T, Alexopoulou E, Brontzos E, Papadoukakis Kelekis D. Delayed life-threatening haematuria from a renal pseudoaneurysm caused by blunt renal trauma treated with selective embolization. *Urol Int.* 2004;72:352–354.
3. Carlos A, Gustavo A, Douglas C, Norma B, Romero M, Complex renal artery aneurysms: liquids or coils? *J. Tech Vasc Interventional Rad* 10:299-307 doi:10.1053/j.tvir.2008.03.009.
4. Andersen PE, Rohr N. Endovascular exclusion of renal artery aneurysm. *Cardiovasc Intervent Radiol.* 2005 19;28:665–667.