Successful Repair of a Pseudoaneurysm of Renal Allograft Artery

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ABSTRACT
Aneurysm of renal artery is a rare vascular complication after renal transplantation. A 60 years man showed an aneurysm of the renal artery in the transplanted kidney was an incidental finding on routine abdominal ultrasound. The function of the allograft was stable. A magnetic resonance angiogram confirmed the diagnosis. Considering a very high risk of rupture due to its size (6.0 x 4.9 x 4.7 cm), and the organ being his only functional kidney, it was decided to perform an open surgical repair. Midline laparotomy was performed, allograft was mobilised, the aneurysm was resected and dacron patch arterioplasty was done. The patient had an uneventful recovery and his renal function returned to pre-operative levels by the fifth postoperative day. The patient was discharged home with regular monthly follow-up for 6 months.


INTRODUCTION
Vascular complications occur in 6.76% patients of renal transplant.1 Of these, aneurysm of the transplanted renal artery is extremely rare accounting for 0.35% cases.1 Symptomatic aneurysms, size larger than 2.5 cm, evidence of infection, progressive enlargement and impending rupture are indications for repair.2,3 Treatment options include open surgical repair, endovascular repair and ultrasound-guided percutaneous thrombin injection.4

Only few such cases have been reported worldwide.5,6 To the best of authors’ knowledge, this is the first ever case of postransplant renal allograft pseudoaneurysm to be reported from Pakistan.

CASE REPORT
A 60 years male with history of renal transplant was referred to the Combined Military Hospital, Lahore, for evaluation of a renal artery aneurysm. It was an incidental finding on routine ultrasound of the abdomen. The ultrasound showed renal artery aneurysmal dilatation of 44 x 51 mm just medial to the hilum of the transplanted kidney. A thrombus was also visualised within the lumen (Figure 1).

The patient has a solitary transplanted kidney in right iliac fossa. The transplant was performed 31 years ago. The patient has underlying ischemic heart disease and hypertension. An echocardiogram showed an ejection fraction of < 50% with anterior wall hypokinesia. He was placed in New York Heart Association (NYHA) classification grade 2.

The patient underwent magnetic resonance angiogram to assess the full morphology of the aneurysm. It showed a pseudoaneurysm measuring 6.0 cm (transverse) by 4.9 cm (craniocaudal) x 4.7 cm (antero-posterior); abutting the posterior-superior pole of the transplanted kidney and the hilar vessels (Figure 2). Considering the size of the aneurysm operative intervention was planned.

On pre-anaesthesia assessment, he was placed in ASA grade 3 with Malampatti score of 3. His pre-operative urea level was 7.6 mmol/l and creatinine was 138 mmol/l. His oral anticoagulants and antiplatelets were stopped one week prior to surgery and he was started on subcutaneous enoxaparin. His immunosuppressants were continued till the morning of the surgery.

Midline laparotomy was performed. Controls of the right external iliac artery and vein were individually taken both proximally and distally. Controls of internal iliac vessels were also taken. The kidney was mobilised in right iliac fossa from lateral side and inferiorly to identify the ureter and pelvi-ureteric junction. The clamps were applied to the external iliac artery and vein both proximally and distally. The renal artery aneurysm was resected and dacron patch arterioplasty was done. The patient had an uneventful recovery and his renal function returned to pre-operative levels by the fifth postoperative day. The patient was discharged home with regular monthly follow-up for 6 months.

Figure 1: Ultrasound abdomen showing a pseudoaneurysm of the allograft renal artery measuring 43.6 mm by 51.2 mm with intraluminal thrombus.
Pseudoaneurysm of renal allograft artery

Figure 2: MR angiogram showing the pseudoaneurysm of the renal artery abutting the superior pole and pushing the hilar vessels inferiorly.

distally, aneurysm was dissected and excised. A Dacron patch arterioplasty was done with prolene 4/0 continuous sutures; before releasing the clamps. During the clamps, the kidney was kept cool by ice packs and flushed with heparinised ice cold saline. Total clamp time was 1 hour and 40 minutes. On release of the clamps patient was given intravenous sodium bicarbonate and hydrocortisone sodium succinate as single dose.

The patient had an uneventful recovery. Patient had brief elevation of urea (12.8 mmol/l) and creatinine (158 mmol/l) on the second postoperative day. The renal functions returned to pre-operative levels by the fifth postoperative day. There was no need for emergency hemofiltration in immediate postoperative phase. The patient was discharged home on the fifth postoperative day.

**DISCUSSION**

With the increasing number of renal transplant being performed, there is definitely an increase in associated complications. Vascular complications are uncommon but are an important cause of allograft loss. These complications are transplant renal artery stenosis, thrombosis of transplant renal artery or vein, hematoma formation, extra-renal and intra-renal false aneurysms and biopsy-induced arteriovenous fistulas. Early detection and prompt surgical or radiological intervention of these complications can salvage most of such renal allograft. Extra-renal false aneurysms are mostly located at the anastomotic site, and are commonly caused by poor surgical technique or perivascular infection. They can also occur due to a defective suture technique, suture cutting through; anastomotic leakage, vessel wall ischemia or arterial dehiscence caused by infection at the site of aneurysm. Orlic et al. has reported an incidence of renal artery pseudoaneurysms in transplanted kidney as 0.35%. Such aneurysms usually result in high rates of transplant nephrectomy.

Patients with false aneurysms after their renal transplant are usually asymptomatic and they are diagnosed as an incidental finding. In most cases, there are no identifiable physical findings specific to these false aneurysms. Few cases present with fever, anemia, compression of adjacent structures, hypertension, functional impairment, graft loss and life threatening haemorrhage due to acute rupture. The size of the false aneurysm is a direct factor to predict the risk of rupture; along with other factors such as the presence of active blood flow in the false aneurysm, the rate of expansion or growth, radial force on the lesion, or existence of trauma.

Different diagnostic tools have been used to identify false aneurysms of transplanted renal artery. Color flow Doppler and duplex Doppler scanning readily recognizes them. Computerised tomographic angiogram, magnetic resonance angiogram or conventional angiogram can be used to confirm the findings of ultrasound before embarking on treatment strategy. Conventional angiography carries the additional benefit of intervention. Intravascular graft stenting can be used for extra-renal false aneurysms with suitable anatomy. Currently, the indications for repair and management options available are subject to debate. Life threatening conditions e.g. haemorrhage due to acute rupture will require an emergency intervention. Recent literature advocates; that symptomatic false aneurysms, aneurysms larger than 2.5 cm in diameter, presence of focus of infection; are all indications for repair. Asymptomatic false aneurysms which are small can be managed conservatively with regular monitoring.

Current options for managing extra-renal false aneurysms complicating renal transplantation; include open surgical repair, endovascular repair and ultrasound guided percutaneous thrombin injection. In open surgical repair, false aneurysm is resected and arterial reconstruction can be done with either patch angioplasty or reanastomosis or an allograft autotransplantation.

In this patient, it was important to intervene as the false aneurysm was 6 cm in diameter. Due to insufficient proximal landing zone endovascular stenting was not possible. Secondly, the aneurysm has a wide communication with the external iliac artery and this carries a high risk of distal embolization in case of using ultrasound-guided percutaneous thrombin injection. The only option was that of open repair of the aneurysm. As this is his only kidney, the aim was to save the allograft and avoid the possible risk of any life threatening haemorrhage in future. The authors were successful in saving the allograft, hence avoided the allograft nephrectomy.

**REFERENCES**


