Renal pseudoaneurysm formation post allograft biopsy: a case report

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BACKGROUND
Renal core biopsy remains the “gold standard” for the diagnosis of renal allograft dysfunction. The rate of transplant renal biopsy complications ranges between 0.06 and 13%.1-6 Arterial injuries, mainly haemorrhage, are the predominant complication related to transplant kidney biopsy; the rate of frank and occult haematuria secondary to renal biopsy has been reported to be between 5 and 40%.1-6 Other arterial injuries include arteriovenous fistula (AVF) or PSA. A PSA results from an injury to one or more layers of the arterial wall, and its incidence following percutaneous biopsy was estimated to be 5%.9 PSA is a serious condition because the arterial perforation is occluded solely by haematoma and connective tissue. It can easily become a life-threatening haemorrhage if the balance between the intraluminal hydrostatic pressure and the tamponade effect of the surrounding haematoma and connective tissue changes. We present a 48-year-old patient who underwent a renal biopsy following renal transplant that was complicated with a PSA.

Institutional Review Board approval was obtained before any step of this case report.

CASE PRESENTATION
A 48-year male with a history of end-stage renal disease secondary to focal segmental glomerulosclerosis received a kidney transplant from a living related donor in 2005 after 4 years of haemodialysis. Post transplant, the patient was placed on triple immunosuppressive therapy consisting of cyclosporine A, steroids and mycophenolate mofetil.

In 2011, routine laboratory workup showed an increase in serum creatinine. This was followed by renal allograft biopsy, which revealed evidence of cyclosporine nephrotoxicity. Cyclosporine A was stopped, and the patient was maintained on prednisone and mycophenolate mofetil. A progressive decrease in his serum creatinine level, back to its baseline value of 2.0 mg%, was then noted.

In 2012, the patient presented to our centre complaining of fatigue, nausea and decreased appetite of 10 days duration. Physical examination was unremarkable except for a bruit over the transplanted kidney in the right iliac fossa. Laboratory results revealed a haemoglobin concentration of 9.8 g l-1, serum creatinine level of 6.1 mg% and estimated Glomerular Filtration Rate (eGFR) by Modification of Diet in Renal Disease (MDRD) formula of 10 ml min-1 1.73 m-2. Urine analysis was normal.

Ultrasound Doppler study of the transplanted kidney was performed, which revealed a normal-sized kidney with normal corticomedullary differentiation, with its lower pole demonstrating a cystic structure measuring 1.7 cm. Colour Doppler imaging showed the typical “ying-yang” sign that was highly suggestive of PSA (Figure 1). Magnetic resonance angiography (MRA) without gadolinium was
performed to further confirm that the 1.4 × 1.7 cm PSA was located in the lower pole of the transplanted kidney and was supplied by the lower lobar artery (Figure 2). Because of the size of the PSA and the risk of rupture, a decision to embolize the PSA was taken in a multidisciplinary meeting and informed consent was obtained.

Intervention consisted of a selective right common iliac artery angiography using a 5 Fr cobra catheter that delineated the transplanted kidney PSA. Using a 3 Fr Progreat catheter, the single arterial supply for the PSA was selected. Two Tornado coils (one 2 × 3 mm, and one 3 × 4 mm) and two Nester coils (3 × 3 mm) were deployed (Figure 3). Contrast injection immediately post procedure confirmed the absence of flow to the PSA (Figure 4). The next day, a repeat ultrasound was performed and showed a decrease in the size of the PSA with no detectable flow (Figure 5). The patient’s serum creatinine level improved progressively to reach its baseline value over a few days.

DISCUSSION
Vascular complications requiring intervention account for 0.2–2% of graft biopsy-related injuries. AVF and PSA are the...
Figure 5. Doppler ultrasound of the transplanted kidney showing a decrease in the size of the pseudoaneurysm with no detectable flow.

Scintigraphy can be used to detect some large PSAs. The Doppler findings of PSA show highly turbulent pulsatile flow in their central lumen with classic "machinelike to-and-fro flow at their neck, with disorganized colour flow within an apparent cyst, it has the same surrounding parenchymal vibration colour as AVF flow." Angiography is considered the gold standard technique for the detection of AVFs and PSA, which appears as an extravascular spherical collection of contrast material. This case illustrates that transcatheter embolization is an effective endovascular technique to treat biopsy-related renal allograft vascular injury; embolization can be performed superselectively using a micro-catheter and an embolic agent micro-coils in most cases. Superselective embolization performed with a coaxial catheter and metallic coils minimizes the loss of functioning allograft tissue. It also allows the occlusion of targeted vessels in a precise and definitive manner, unlike embolization with particles that may reflux into non-targeted branches.

CONCLUSION
PSA is a rare but serious complication following percutaneous renal biopsy. A high index of suspicion should be prompted by symptoms and be followed by imaging for diagnosis. Treatment and complete reversibility of most renal PSA arising from small vessels can be achieved using a minimally invasive small trans-catheter embolization technique.

LEARNING POINTS
1. Transcatheter embolization, an effective endovascular technique to treat biopsy-related renal allograft vascular injury, allows the occlusion of targeted vessels in a precise and definitive manner, unlike embolization with particles that may reflux into non-targeted branches.
2. The intervention consisted of a selective right common iliac artery angiography using a 5 Fr cobra catheter.
3. Contrast injection immediately post procedure confirmed the absence of flow to the PSA.
4. A repeat ultrasound was performed and showed a decrease in the size of the PSA with no detectable flow.
5. The patient’s serum creatinine improved progressively to reach its baseline value over a few days.

CONSENT
Informed consent to publish this case was obtained and is held on record.

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