

Endovascular management of a large retroperitoneal haemorrhage resulting from dual testicular and intra-renal arterial injury after renal biopsy

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Abstract

Percutaneous renal biopsy is a minimally invasive procedure in the work up of a chronic kidney disease patient. However, it is not free from the complications. Hematuria and abdominal haemorrhage due to intra-renal artery injury are the common complications. We report and discuss the management of a rare case of retroperitoneal haemorrhage resulting from dual arterial injury involving left testicular artery and intra-renal artery.

Key words: Computed tomography angiography; embolisation; hematuria

Introduction

Percutaneous renal biopsy (PRB) is an important investigation in the work up of a patient with renal disease for planning optimum management. Although a minimally invasive procedure; however, it can have a number of significant complications including pain, hematuria, abdominal haemorrhage, and infection. These complications, specifically abdominal haemorrhage, can sometimes lead to loss of kidney and even death.^[1,2]

Haemorrhagic complications have drastically come down with advances in renal biopsy technique and with the use of ultrasound guidance or assistance. The source of haemorrhage is often intra-renal arteries and patients can present with pain, hematuria, and haemodynamic

instability. Rarely extra-renal arteries can be the source of haemorrhage and patient can present with retroperitoneal haemorrhage without hematuria. We present a rare case of major retroperitoneal haemorrhage due to dual, left testicular, and intra-renal arterial injury after renal biopsy and discuss the endovascular management.

Case Report

A 36-year-old gentleman presented to the nephrology department with 1 month history of renal dysfunction, generalised oedema, and decreased urine output, for which he had been initiated on haemodialysis elsewhere via a temporary jugular venous catheter. At presentation,

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he had fever and blood culture grew non-fermenting Gram-negative bacilli, suggestive of a catheter-related blood stream infection. The catheter was removed, he was given antibiotics according to sensitivity and admitted for renal biopsy after a week. Pre-biopsy lab parameters showed high creatinine (6.08 mg/dL), low haemoglobin (8.5 g/dL), and other lab parameters were normal.

For the biopsy, the patient was placed in prone position, lower pole cortex of the left kidney was selected under ultrasound guidance, depth and direction from the skin surface to lower cortex was determined, and overlying skin surface was marked. Renal biopsy was performed under local anaesthesia with free hand ultrasound-assisted biopsy. Two passes were made with 2.2 cm throw from a spring-loaded biopsy gun (18G × 16 cm, BARD Max Core, Bard Peripheral Vascular, Inc. AZ, USA). An adequate sample was obtained. After biopsy, patient was placed in supine position and complete bed rest was advised for next 12 h in the ward.

Three hours post-biopsy, the patient developed pain in left flank, tachycardia, and hypotension with a drop in haemoglobin (Hb 6.6 g/dL). He was resuscitated with IV fluid and oxygen. Urgent ultrasonography showed a large (300–400 mL) retroperitoneal haematoma posterior to the kidney. Blood transfusion was started. He was taken up for immediate catheter angiography. Initial catheter angiogram through right common femoral artery access in a biplane DSA machine showed no detectable arterial injury [Figure 1A]. Selective angiograms of the left side intercostals (from T10 to T12) and lumbar arteries (from L1 to L3) also showed no abnormality. Haemorrhage from an accessory renal artery was considered less likely initially as an apparently complete nephrogram was noted on main renal artery angiogram. Pigtail abdominal aortogram also did not show any accessory renal artery. As the haemorrhage was large and the drop in Hb was significant, a CT scan angiogram (CTA) was planned to identify the source of bleeding. Patient was directly shifted to CT scan room with introducer sheath in the right common femoral artery. CTA showed an accessory left renal artery arising from aorta at L2–L3 disc level and supplying the lower pole of the left kidney. There were two separate nodular areas of contrast extravasations, one in the lower pole of the left kidney [Figure 1B] and another in the posterior pararenal space [Figure 1C]. Patient was shifted back to DSA room. The accessory left renal artery angiogram showed a small pseudoaneurysm with arteriovenous fistula (AVF) in the lower pole of the kidney [Figure 2A]. It was selectively cannulated with Progreat coaxial microcatheter (2.7 F, Terumo, Japan) and embolised with five 3 mm × 3 cm pushable coils (0.018, Cook Medical) [Figure 2B]. The main renal artery was cannulated with a 4F cobra catheter and the capsular artery was selectively cannulated

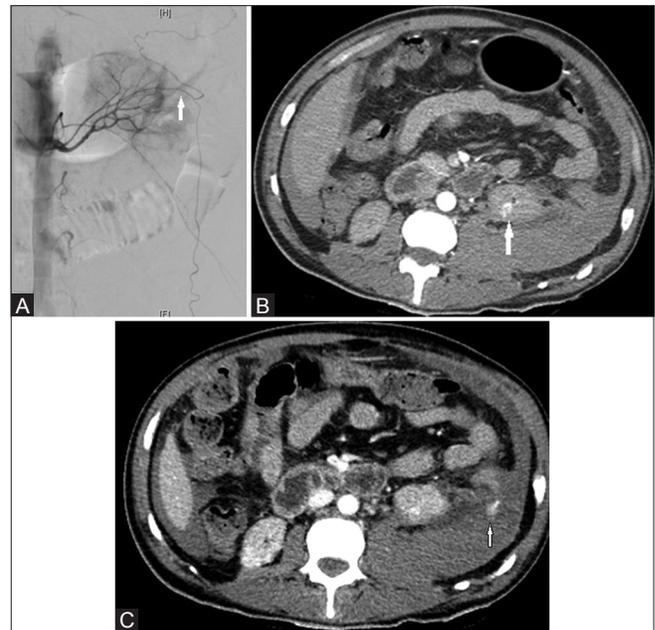


Figure 1 (A-C): (A) Catheter angiogram of left renal artery shows early branching pattern of the left renal artery and a capsular artery (arrow) arising from the superior division, coursing around the superior pole, and lateral aspect of the kidney. No obvious intra-renal and extra-renal abnormality is seen. (B) Computed tomography angiography axial arterial phase image shows small pseudoaneurysm in the lower pole of left kidney (arrow). (C) Computed tomography angiography axial venous phase image shows small area of contrast extravasation in the posterior pararenal space lateral to lower pole of left kidney (arrow)

with a Progreat microcatheter. Angiogram showed a left testicular artery arising from the capsular artery [Figure 3A and B]. Further selective angiogram of the testicular artery showed contrast extravasation corresponding to the CTA findings [Figure 3C]. This testicular artery was embolised near the site of contrast extravasation with two 3 mm × 14 cm pushable coils (0.018, Cook Medical) [Figure 3D]. The patient was closely monitored in the ward and did not show any further drop in Hb. He was discharged after 2 days in a stable condition and was advised to continue saline dialysis for the next 4–5 sessions. Ultrasound and Doppler of scrotum after 2 days showed good arterial flow without any infarct in the left testis. The kidney biopsy was reported as cortical parenchymal necrosis.

Discussion

Kidney being a highly vascular organ has a high incidence of haemorrhage after renal biopsy. Minor haemorrhage is usually self-limiting and often managed with conservative treatment. Incidence of major haemorrhage requiring blood transfusion with or without urgent intervention, either endovascular or surgical, is reported as 0%–6% and 6.4% in various studies.^[1,2] Endovascular management is now the treatment of choice in major haemorrhage, due to its

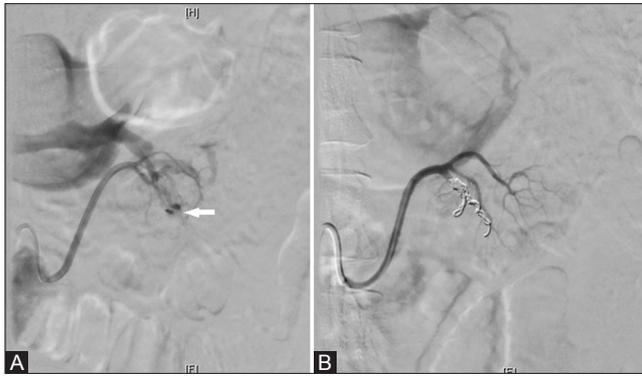


Figure 2 (A and B): (A) Pre-embolisation selective accessory renal artery angiogram shows small pseudoaneurysm (arrow) and early draining vein due to arteriovenous fistula. (B) Post-embolisation selective angiogram shows coil mass and complete obliteration of pseudoaneurysm and arteriovenous fistula

inherent quality of minimal invasiveness and morbidity compared to surgery.

Source of haemorrhage is often intra-renal arteries, however, rarely lumbar, intercostal, and capsular arteries can be the source of haemorrhage.^[3-6] Abed *et al.* reported a case of large retroperitoneal haemorrhage due to dual artery injury, where CTA showed two separate sources of haemorrhage due to intra-renal and subcostal artery injuries.^[5] Colic artery injury resulting in a large retroperitoneal haemorrhage after renal biopsy, is also reported.^[7] Gonadal artery injury as source of haemorrhage after renal biopsy is extremely rare and not reported in the literature to the best of the author's knowledge.

In our case, patient had a large haematoma due to dual arterial injury involving intra-renal branches from an accessory renal artery and left testicular artery. Testicular artery injury can be explained by its course in the retroperitoneum. Testicular artery on each side usually arises from the anterolateral aspect of the abdominal aorta at L2 vertebral level.^[8] Variations in origin include its origin from main renal artery, accessory renal artery, inferior phrenic artery, iliac artery, and inferior or superior epigastric artery.^[8] Sometimes, it can give rise to renal capsular artery, inferior phrenic artery, and suprarenal artery.^[9] It courses in the retroperitoneum over the psoas muscles and posterior abdominal wall, crosses the lower ureter and external iliac vessels and then enters the inguinal canal through the deep inguinal ring, runs in the spermatic cord, and supplies the testis. Testicular artery arising from the renal artery runs anterior to the lower pole of the kidney.^[10] In the present case, testicular artery arose from a capsular artery near the superior pole of the left kidney. It was possibly coursing close to the kidney and anterior to the psoas muscle, along the trajectory of the renal biopsy needle. However on CTA and catheter angiography, the testicular artery was displaced anterolaterally due to the large retroperitoneal haemorrhage.



Figure 3 (A-D): (A and B) Selective angiogram of the superior division shows testicular artery (arrow) arising from capsular artery, coursing inferiorly toward left testis (arrow). (C) Super selective angiogram of testicular artery shows small area of contrast extravasation (arrow). (D) Post-embolisation left testicular artery shows coil mass and no active contrast extravasation

Accessory renal artery was missed out in the initial pigtail aortogram due to apparent complete nephrogram on initial main renal artery angiogram. Immediate CTA with both arterial and venous phases showed two separate sources of haemorrhage, one being intra-renal from the accessory renal artery, and the other being in the posterior pararenal space from the left testicular artery. The extra-renal focal contrast extravasation better detected in the venous phase, was displaced laterally by the haematoma. During the second angiography, we could identify that the branch leading caudally from the capsular artery was actually the testicular artery. Based on the CTA findings, capsular artery was selectively cannulated and microcatheter was advanced further deep into the testicular artery to demonstrate contrast extravasation. CTA before catheter angiogram in a patient with post-renal biopsy haemorrhage is often not considered, as the commonest source of haemorrhage is an intra-renal artery and most patients have severely deranged renal function and high creatinine. Catheter angiogram can potentially miss the source of bleeding if it is extra-renal and from arteries other than intercostals and lumbar arteries. CTA can help in identifying these rare extra-renal and dual sources of haemorrhage.^[5,7]

Ultrasound Doppler of left testis after 2 days of embolisation did not show any area of infarct. This is probably due to double testicular arterial supply to the left testis^[10] or collateral supply to left testicular artery distal to embolisation.

Conclusion

CTA should be considered in the work up of any patient with significant post-renal biopsy retroperitoneal haemorrhage with a negative catheter angiogram, or if the patient continues to bleed even after satisfactory embolisation of a source of haemorrhage. In patients with large retroperitoneal haemorrhage, rare sources of haemorrhage from arteries other than the renal artery such as lumbar, intercostal, or even gonadal artery should be suspected and looked for.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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