Acute Kidney Injury in a Patient following Percutaneous Kidney Biopsy

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Case Description
A 49-year-old woman with diabetes and its complications of retinopathy and nephropathy developed generalized anasarca with a 30-pound weight gain over 2–3 weeks and was noted to have >12.5 g/d of proteinuria. After ultrasound localization, she underwent a kidney biopsy because of sudden worsening of proteinuria, and four cores were obtained using a spring-loaded (Biopty) gun with an 18-gauge needle. She was transferred to medical day care for observation as per protocol. At 3 hours postprocedure, she started experiencing pain in the left flank and was given 1 g acetaminophen. Her BP was 136/80 mm Hg. She did not experience gross hematuria. Due to worsening flank pain, a computed tomography scan of the abdomen was performed. The scan showed a large left perinephric hematoma encasing the left kidney (Figure 1) with active contrast extravasation, consistent with active hemorrhage. The coagulation parameters were normal the day before the biopsy. Her BP remained normal, and serum creatinine increased from 1.4 mg/dl (before biopsy) to 2.25 mg/dl 8 hours after kidney biopsy and before embolization. She underwent emergent embolization of the inferior posterior segmental arterial branch of the left renal artery. After embolization, the patient became hypotensive and was managed with intravenous fluid resuscitations. The following day, the patient became anuric and developed progressive decline in kidney function and required supportive hemodialysis for 2 weeks before recovering kidney function.

Bleeding is the most common complication after kidney biopsy, with gross hematuria occurring in on average 4% following kidney biopsy (range in different studies is 0.3%–15%) (1) and perinephric hematomas in up to 86%, with 13% being >2 cm in size (2), and most perirenal hematomas resolve spontaneously. AKI after kidney biopsy is rare and is often secondary to acute tubular necrosis from prolonged hypotension from bleeding or secondary to obstruction from the “clot.” However, like cardiac tamponade, where acute accumulation of fluid within the pericardial cavity results in compromised heart function, it is possible that the development of a large perinephric hematoma, within 6–8 hours after kidney biopsy, compromised the perfusion and function of the kidney by encasing and compressing it. Page kidney (3) or Page phenomenon—the induction of systemic hypertension by external compression of the renal parenchyma—is described in 0.8% of patients undergoing kidney allograft biopsies (4).

AKI in this patient was multifactorial, secondary to a combination of reduced perfusion of renal parenchyma due to external compression by the rapid development of a large hematoma (tamponade), local ischemic injury after embolization, and acute tubular necrosis from an episode of postembolization hypotension. However, because the kidney function started to decline before embolization and the episode of hypotension, the perinephric hematoma may have contributed to AKI by compressing the renal parenchyma, thereby causing renal ischemia.

Teaching Points
- Asymptomatic, small perinephric hematomas are common after percutaneous kidney biopsy, although 13% are >2 cm in size.
- AKI is rare after kidney biopsy; however, when it occurs it may be due to severe bleeding (ischemic tubular necrosis) or obstruction from the blood clot.
- Page kidney represents the development of systemic hypertension by external compression of renal parenchyma, often occurring after blunt trauma to the kidney, and can occur in <1% of individuals after kidney biopsy.

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Author Contributions
M.S. Parmar conceptualized the study, wrote the original draft, and reviewed and edited the manuscript.
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Figure 1. **CT scan of abdomen with contrast.** (A) Axial view showing encasement of the left kidney with a large hematoma, displacing the kidney anteriorly, with a hyperdense active extravasation at the posterior and inferior aspect of the left kidney (arrow). (B) Coronal section of CT scan showing left perinephric hematoma.