

Successful Treatment of Late Rupture of Kidney Biopsy Associated Pseudoaneurysm

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Abstract- Percutaneous renal biopsy is commonly used for diagnosis, prognosis, and management of nephropathies. Complications may arise after renal biopsy, most frequently in the form of bleeding. The majority of bleeding events occur within 24 h after the procedure, and reports of delayed major complications are very limited. Here, we report a patient who developed serious post-procedure bleeding, diagnosed by computed tomography (CT) 7 days after renal biopsy and was successfully treated by angiographic embolization.

Index Terms- Renal biopsy, Hemorrhage, Bleeding complication, Embolization

I. INTRODUCTION

Ultrasound guided percutaneous kidney biopsy has become part of clinical practice in nephrology as it helps in diagnosis and therapeutic guidance of kidney diseases. Kidney biopsy is considered minimal invasive method but is not without complications. Depending on the severity, such event can be classified as major and minor complications. Immediate (<24 h post-procedure) minor complications following a kidney biopsy are commonly witnessed. These include gross hematuria (3.5%) and hematoma formation visible on computed tomography (CT) scan (57–91%). These complications are minor and do not require invasive intervention [1]. The risks for major complications, such as need for blood transfusion, nephrectomy, bladder obstruction, or death, are considerably low, with an incidence of less than 1%. So, normal protocol is to discharge the patient after observation period of 12-24 h of procedure but post kidney biopsy period beyond 24 h is not without risk. Here, we report a patient who developed serious post-procedure bleeding requiring angiographic embolization, diagnosed by computed tomography (CT) 7 days after renal biopsy.

CASE:

A 27-year-old man with a history of hypertension for two months and was initiated on haemodialysis two week back from outside, presented to our hospital for evaluation of renal dysfunction. The patient has normal vitals with height (164 cm)

and weight (70 kg). Laboratory findings showed blood urea of 84 mg/dL, serum creatinine level of 4.5 mg/dL (estimated glomerular filtration rate of 17 mL/min/1.73 m²), hemoglobin concentration of 9.8 g/dL, platelet count of 23.9 × 10⁴/uL, international normalized ratio/prothrombin time of 1.00, and activated partial thromboplastin time of 25.6 s. Urinalysis revealed a urine protein level of 800 mg/day and urine red blood cell count of 11–20/high-power field. Ultrasound abdomen showed bilateral normal sized kidney with raised echogenicity. In view of normal sized kidney and urine showing active sediments, kidney biopsy was planned for evaluation of renal dysfunction. After preparing the patient skin in a sterile fashion, he underwent ultrasound-guided biopsy of the left kidney with a 16-gauge automated, spring-loaded needle. There were no post procedure complications. After the procedure, the patient was prescribed bed rest in a supine position and his vitals sign were monitored. After careful observation for 24 h, patients was discharged with no post procedure complications and haemoglobin of 9.6 g/dl. Light microscopy sections contained 14 glomeruli, seven of which were globally sclerotic. Four glomeruli revealed segmental to near total tuft sclerosis, fibrous / healed crescents are noted over 3 glomeruli. Interstitial fibrosis and tubular atrophy was estimated more than 50%. Immunofluorescence shows IgA (1+) consistent with IgA nephropathy (M0E0S1T2C0).

Seven days after the biopsy, patient returned to the emergency room with sudden left abdominal pain, with no history of trauma noted. His vital signs showed a blood pressure of 100/60 mmHg, heart rate of 112 bpm, and respiratory rate of 24 bpm. Pallor and Percussion tenderness of the left abdomen was present. Electrocardiogram showed a sinus tachycardia. Laboratory findings showed a hemoglobin concentration of 5.2 g/dL. USG Abdomen showed heterogeneous hypoechoic perinephric collection of vol ~ 82 cc seen along mid and lower pole of kidney. Large heterogeneous echogenic collection of size 11.7 x 10.1 x 9.7 cm, vol ~ 600 cc seen extending from left perinephric space to left iliac fossa, anterior to left psoas muscle – s/o organized hematoma. Urologist opinion was taken and advised for urgent CT scan abdomen with contrast which showed left lower pole vascular injury with pseudoaneurysm formation and large hematoma extending down upto iliac fossa region (**Fig.1**). In view of ongoing bleeding and impending hemorrhagic shock, we

performed angiographic embolization with coiling (**Fig. 2**). A microcatheter (2.9 Fr) was advanced to the lower branch of the left renal artery and two Tornado microcoils (2×3 mm, Cook Medical, USA) were deployed near the region of extravasation. After we confirmed the absence of further extravasation, his abdominal pain was gradually alleviated and patient improved symptomatically maintaining blood pressure. He was discharged from hospital one week later.



Fig 1: CT scan abdomen with contrast showed pseudoaneurysm formation and large hematoma extending down upto iliac fossa region.

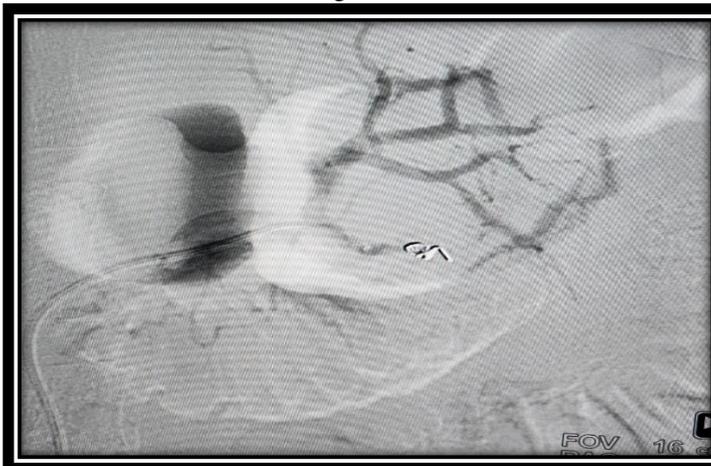


Fig 2: Angiographic image demonstrating the deployment of microcoils in the lower branch of left renal artery.

II. DISCUSSION:

Among all forms of complications, bleeding is the most frequent and occurs mainly within first 12-24 h after procedure [2]. Major complications post-kidney biopsy requiring radiological interventions are rare. A large meta-analysis conducted by Corapi surveyed 9,474 native adult ultrasound-guided renal biopsies performed with automated biopsy devices. Major complications included erythrocyte transfusion requirement (0.9%), angiographic intervention (0.6%), nephrectomy (0.01%), bladder obstruction (0.3%), and death (0.02%) [3]. In our patient, delayed major bleeding due to pseudoaneurysm formation and rupture, requiring radiological intervention developed despite the

fact that the patient was asymptomatic during the initial hospital stay. The formation and growth of pseudoaneurysms is influenced by endothelial changes following hemodynamic changes [4]. Unlike true aneurysm, in which luminal dilatation is encapsulated by the natural arterial walls, the pseudoaneurysm walls derive from the surrounding tissues adjacent to the injury site [5]. These tissues are formed by degradation of blood clots and necrotic tissues, resulting in recanalization of the blood vessels which sequentially leads to pseudoaneurysm. However, the integrity of this wall is fragile and prone to rupture when normal blood flow is restored [6]. Although the causal relationship between IgA nephropathy and pseudoaneurysm formation has not been fully established in the literature, it is possible that the inflammation induced by the trauma from core needle kidney biopsy would be exaggerated in patients with IgA nephropathy, leading to the formation of pseudoaneurysms.

Analyzing the timing of complications is important in determining the optimal post-kidney biopsy observation period. Whittier and Korbet found that 67% of major complications (need for transfusion or invasive procedure, acute renal obstruction or failure, septicemia, or death) occurred during the first 8 hours of observation, with 91% detected by 24 hours and 9% detected after 24 hours [7]. In a smaller retrospective series, Simard-Meilleur *et al.* found that 100% of complications in outpatients undergoing Percutaneous Renal Biopsy (PRB) occurred within 8 hours versus 72% of complications in inpatients and that 10% of inpatients had complications >24 hours after PRB [8]. Based on these data, monitoring native renal biopsy patients 24 hours' post-procedure is warranted.

Some renal conditions like acute tubular injury, amyloidosis, cast nephropathy, and hypertensive renal disease are associated with an increased risk of bleeding. However, such findings have not been consistent across studies. For example, a study by Soares *et al* attempted to verify the higher bleeding risk of patients with and without amyloidosis but found no evidence of intensified risk [9]. At present no studies have been reported showing any association between IgA nephropathy with increased risk of post-kidney biopsy complications. So, more research are required for this studies.

III. CONCLUSION:

Imaging-guided kidney biopsy is a safe technique which allows the evaluation of kidney diseases but is associated with post-biopsy complications. In biopsies where the kidney is having chronicity or fibrosis, the chance of post-procedure bleeding is higher. We suggest monitoring native renal biopsy patients 1-2 weeks post-procedure in patients having renal insufficiency or requiring haemodialysis.

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