

KIDNEY WITH LOWER POLE SIMPLE CYSTS – IS IT AN ABSOLUTE CONTRAINDICATION FOR RENAL BIOPSY?

Tze Jian Ng¹, Christopher Thiam Seong Lim^{1,2}, Bak Leong Goh¹

¹Nephrology Department, Hospital Serdang, Jalan Puchong, 43000 Kajang, Selangor Malaysia

²Unit of Nephrology, Department of Medicine, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor Malaysia

ABSTRACT

A percutaneous renal biopsy is an essential tool for diagnosis, prognosis, and choice of treatment for primary and secondary renal disease, as well as transplant kidney. It is a core procedure of nephrologists done under ultrasound-guided. The lower pole of the left kidney is our usual approach as the risk of injury to the major vessels will be very minimal. However, the presence of renal cyst at the lower pole of the kidney may increase the difficulty of renal biopsy as there is

the possibility of puncturing the renal cyst during the procedure causing unstoppable bleeding. Here we present two case reports in which we were able to do percutaneous renal biopsy under ultrasound-guided for patients with simple renal cysts at the lower pole of the kidney without causing any significant complication. In the hand of expert personnel, a lower pole cyst can be avoided under ultrasound-guided biopsy.

INTRODUCTION

Imaging guided percutaneous renal biopsy is an essential tool used to establish the diagnosis of the cause of focal renal lesion, unexplained renal impairment or renal transplant rejection. The first radiographic guided renal biopsy was performed in 1944 by Nils Awall, and was later published in the literature in 1955 by Iversen and Brun (1). Instead of using a sitting position which was described in the 1950s, nowadays, a kidney biopsy is usually performed in the prone position. The lower pole of the left kidney is the preferred site for kidney biopsy as the risk of injury to the major vessels will be minimal, and any damage to the liver can be avoided (2). The presence of a renal cyst, especially at the lower pole, will increase the difficulty of getting adequate renal tissue during biopsy without puncture the renal cyst. This is one of the common dilemmas we faced during the procedure, and at times we might even have to cancel the biopsy as the risk might

outweigh the benefit. Here we report two cases that renal biopsy where we have demonstrated that can we have successfully biopsied two kidneys with lower pole cysts without any significant complications.

FIRST CASE REPORT

A 27 years old lady, with underlying lupus nephritis diagnosed at ten years old, was referred from another hospital for the continuation of care since April 2019. She was put on mycophenolate mofetil for eight years but only achieved partial remission with urine protein creatinine index ranging from 0.1 g/mmol to 0.3 g/mmol. Over six months of subsequent follow-up, her urine protein creatinine index was noted to have progressively worsened to 0.38g/mmol despite being compliance with the medications. Hence she was counselled for a repeat renal biopsy. Her creatinine level remained normal (79µmol/L) with eGFR 88.4 ml/min/1.73m². Ultrasound kidney was performed before the renal biopsy. Ultrasound report showed that the right kidney size of 9.59cm with cortical thickness 1.05cm and left kidney size of 10cm with cortical thickness 1.4cm (figure 1.1). Both showed an increase in echogenicity. There were also two simple

*Correspondence: Christopher Lim
 Nephrology Unit, Department of Medicine
 Faculty of Medicine and Health Sciences
 Universiti Putra Malaysia
 43400 Serdang, Malaysia
 Tel: +6-03-89472568
 Email: drchrislim@gmail.com



cysts seen at the lower pole of the left kidney measuring 1.1cm x 1.0 cm and 0.7cm x 0.5cm. There was no solid component, internal septation or wall calcification seen within the renal cyst. A decision was made to biopsy the left kidney instead of the right kidney as the right kidney was relatively smaller and more difficult to approach compare to the left kidney. By using real-time ultrasound-guided, a left lower pole renal biopsy was performed using the biopsy gun – u2013 Bard Magnum. Two cores of renal tissues were obtained without puncturing the renal cyst. There was no immediate complication after renal biopsy,

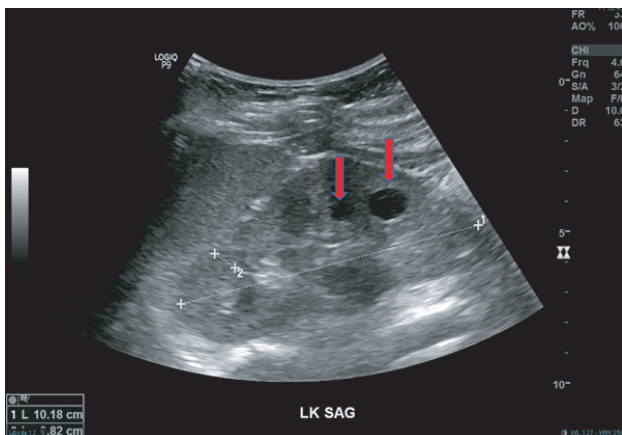


Figure 1.1 Ultrasound image of the left kidney. It showed bipolar length of 10.18cm with cortical thickness of 1.4cm. There were two renal cysts (red arrows) seen at the lower pole of the kidney.

and there was no perinephric hematoma detected. She was put on bed rest for six hours, and all three samples of her urine collections were clear. She was allowed home the same day. Her creatinine level was 87 μ mol/L with eGFR 78.7 ml/min/1.73m² during the clinic follow up.

There was a total of 7 glomeruli in the planes section of the renal biopsy sample. The biopsy results showed focal active proliferative and sclerosing pattern with mild to moderate mesangial hypercellularity, in keeping with ISN/RPS class III/V (A/C) lupus nephritis. Mild chronic tubulointerstitial damage and mild hypertensive vascular damage was detected. With the information obtained, her immunosuppressants were modified accordingly.

SECOND CASE REPORT

The second case was a 35 years old lady referred from another hospital for recurrent microscopic hematuria. She had a normal creatinine level (65 μ mol/L) with eGFR 105.8

ml/min/1.73m². She was a potential kidney donor for her husband, who was on regular hemodialysis. She had no family history of kidney disease. Ultrasound kidney done showed that there was a cyst measuring 1.1 x 0.9cm at the lower pole of the left kidney (figure 2.1), with bipolar length 9.2cm and parenchymal thickness 1.3cm. The right kidney bipolar length was 9.3cm and parenchymal thickness was 1.3cm. She was advised for a renal biopsy for investigation of the microscopic haematuria because of the fact she was a potential kidney donor. We managed to obtain two cores of renal tissues under real-time ultrasound-guided via a u2013 Temno biopsy gun. There was no immediate complication seen after the renal biopsy. However, she developed a transient gross hematuria post renal biopsy, which subsequently cleared up after 24 hours. Her haemoglobin level remained static (11-12g/dL), and repeated ultrasound post renal biopsy showed small perinephric hematoma measuring 0.8cm x 3.8cm at the lower pole of the left kidney and the preserved lower pole renal cyst (figure 2.2). She was allowed home one day later after renal biopsy. Her creatinine level remained the same (which was 64 μ mol/L) before discharge. Her renal biopsy report showed a total 18 glomeruli in plane sections with minimal change in light microscopy and mild tubulointerstitial changes. She was currently continuing her transplant workup in the referring hospital.

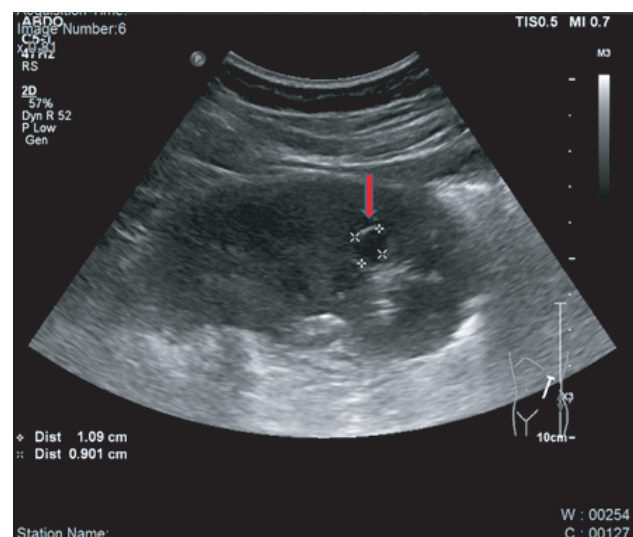


Figure 2.1 Ultrasound image of the left kidney pre-biopsy. There was a renal cyst (red arrow) measuring 1.09cm x 0.90 cm, located at the lower pole of the left kidney.

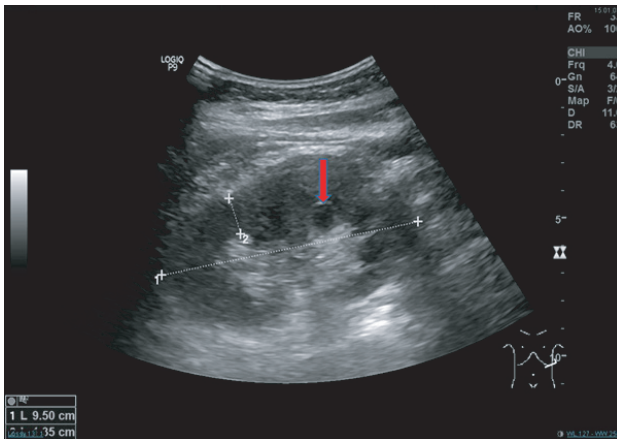


Figure 2.2 Ultrasound image of the left kidney post renal biopsy. There was small perinephric hematoma measuring 0.8cm x 3.8cm over the lower pole of the kidney. The renal cyst at the lower pole (red arrow) remained the same.

DISCUSSION

(figure 2).

Ultrasound-guided renal biopsy using an automated spring-loaded biopsy device is the standard method of kidney biopsy in most of the region. By using this technique, more than 99% of the renal sample was enough for diagnostic, and it also significantly reduced life-threatening complications from 0.12 to 0.02%. (3) Multiple renal cysts, especially at the lower pole, remained a big challenge for renal biopsy as the lower pole of the kidney is the preferred site for renal biopsy to avoid injury to the major vessels. So far, no study or guideline is mentioning what is the most appropriate approach when the presence of cyst at the lower pole of the kidney. Laparoscopic renal biopsy is the alternative method, especially in the presence of multiple renal cysts as homeostasis is better to achieve under direct view (2). Other alternative approaches include CT guided biopsy and transjugular method. The limitation for CT guided biopsy is that it does not assess any possible movement of the kidney related to breathing during the procedure. Similarly, a transjugular approach has a lower diagnostic yield due to the fact that biopsy needle has to pass through the medulla first, often resulting in inadequate glomeruli (which mainly in the renal cortex) in a tissue sample (4).

Even if the renal biopsy is a relatively safe procedure, it is not without complication. Minor complication includes asymptomatic haematoma, microscopic or gross haematuria, pain > 12 hours, perinephric infection, arteriovenous fistula and anaemia with haemoglobin drop

> 1g/dL. Major complications comprise of expanding hematoma requiring blood transfusion, urinary tract obstruction with or without acute kidney injury, hypotension related to bleeding, sepsis, nephrectomy, and death (4).

Though bleeding is the primary concern for this procedure, systemic review and meta-analysis showed that the risk is minimal. In essence, transient gross haematuria risk happened in 3.5% of cases, the need of transfusion therapy was 0.9%, embolization occurred in 0.6% of cases, nephrectomy for control of bleeding was 0.01%, and death risk was 0.02% (5).

In our case report, we showed that even in the presence of simple renal cysts at the lower pole of the kidney, a renal biopsy could be performed safely under real-time ultrasound-guided without puncturing the renal cysts. Though in the second case report patient developed gross haematuria post renal biopsy, it was a minor complication as no blood transfusion was required, and the patient was allowed home after 24 hours. Nevertheless, we suggest that percutaneous renal biopsy should be performed by experienced personnel and with necessary precautions if presence of renal cyst. Risk of complication is still relatively higher compare to those without renal cyst. Urology and interventional radiology back up are needed if complications occur.

CONCLUSION

Renal biopsy using ultrasound-guided is a safe procedure and the major complication is rare. Despite the conventional relative contraindication for renal biopsy in a cystic kidney patient, it still can be done safely by the skillful personnel using real-time ultrasound-guided, and it must be done in the facility equipped by urology and interventional radiology back up to ensure any possible mishap managed accordingly.

References

1. Uppot, Raul & Harisinghani, Mukesh & Gervais, Debra. Imaging-Guided Percutaneous Renal Biopsy: Rationale and Approach. AJR. Am J of roentgenology. 2010 Jun;194(6):1443-9
2. Agarwal SK, Sethi S, Dinda AK. Basics of kidney biopsy: A nephrologist's perspective. Indian J Nephrol. 2013;23(4):243-252.
3. Azmat R, Siddiqui AB, Khan MTR, Sunder S, Kashif W. Bleeding complications post ultrasound guided renal biopsy - A single centre experience from Pakistan. Ann Med Surg (Lond). 2017;21:85-88.
4. Visconti L, Cernaro V, Ricciardi CA, et al. Renal biopsy: Still a landmark for the nephrologist. World J Nephrol. 2016;5(4):321-327.
5. Corapi KM, Chen JL, Balk EM, Gordon CE. Bleeding complications of native kidney biopsy: a systematic review and meta-analysis. Am J Kidney Dis 2012; 60: 62-73