



Case Report

# Endoscopic Ultrasound-Guided Renal Parenchymal Biopsy: A Series of Two Cases

Vivek Rathod<sup>1</sup>, Akshay Kulkarni<sup>1\*</sup>, Monali Sahu<sup>2</sup>, Bhushan Bhaware<sup>1</sup>, Atif Patel<sup>1</sup>, Shrikant Mukewar<sup>1</sup>, Saurabh Mukewar<sup>1</sup>

<sup>1</sup>Department of Medical Gastroenterology, Midas Multispeciality Hospital, Nagpur, Maharashtra, India

<sup>2</sup>Department of Nephrology, Midas Multispeciality Hospital, Nagpur, Maharashtra, India

\*Corresponding author: Akshay Kulkarni, Department of Gastroenterology Midas Multi-speciality Hospital, Nagpur, Maharashtra, India

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## Abstract

Renal parenchymal biopsy is essential in the management of many kidney diseases. The percutaneous route is most commonly used for access. However, some conditions such as altered mental status, coagulopathy and critically ill patients preclude the procedure. Some anatomical variations such as high-sitting kidneys can also render them inaccessible to percutaneous biopsy. While trans-jugular renal biopsy is a costly alternative; requiring radiation and contrast exposure, endoscopic ultrasound-guided fine needle biopsy (EUS-FNB) is a cheaper and safer method that can circumvent the exceptional difficulties in tissue acquisition. We present two successful cases of EUS-FNB from renal parenchyma that proved to be instrumental in the diagnosis and management.

## Introduction

Ever since the inception of kidney biopsy, it has been of paramount importance in diagnosing and managing glomerular diseases. It helps in the initial diagnosis, prognostication and also guides the management. While the simpler and safer percutaneous route is most commonly used, some anatomical variations (high sitting kidneys, para-spinal position) preclude a safe percutaneous access. The procedure is performed in prone or sitting position; and critically ill patients, those with respiratory distress or altered mental status may present difficulties in an otherwise run-of-the-mill job for the nephrologist. Recently, EUS-FNB of the renal masses has been observed to be safe and effective in obtaining an adequate tissue and establishing the diagnosis for benign and malignant renal lesions. However, renal parenchymal biopsy from morphologically normal kidneys has never been extensively evaluated as an alternative to the percutaneous route. We performed two cases of EUS-FNB for renal parenchymal disease, which were instrumental in the diagnosis and management.

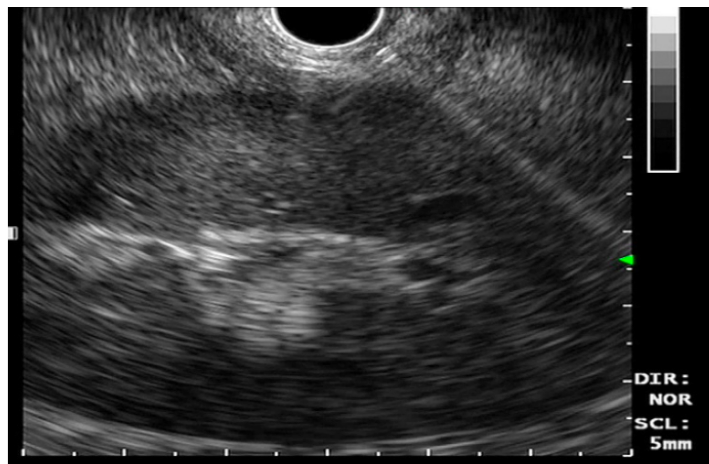
## Case 1

A 62 year-old male patient, with hypothyroidism, hypertension and psoriasis; presented with anasarca, dyspnoea and altered sensorium. On admission, he was found to have bilateral pleural effusion, severe hypo-proteinemia (total protein 4.5g/dL, albumin 2.0 g/dl), renal dysfunction with azotaemia (BUN 110, Creatinine 7.2) and gross proteinuria (24 hour urinary protein 600 mg). Hemodialysis was initiated. The nephrologist recommended a renal biopsy to determine the cause of nephrotic syndrome. However, due to the presence of gross ascites and altered mental status, percutaneous renal biopsy was deemed unsafe. Hence an alternative diagnostic procedure, endoscopic ultrasound-guided fine needle biopsy (EUS-FNB) was planned.

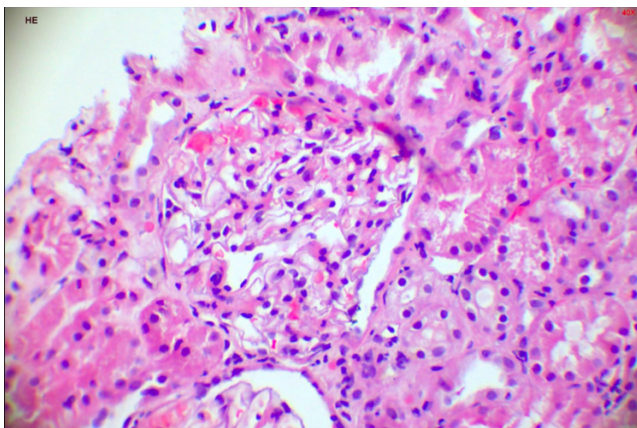
## Procedure

Echo-endoscope was advanced into the gastric lumen and the left kidney was identified. A 19-G FNB needle (Acquire, Boston Scientific) was advanced across the gastric wall into the left kidney

till the cortico-medullary junction. Using one pass, 4-actuation technique, EUS-guided right kidney biopsy was obtained (Figure 1). Doppler was performed for five minutes after the procedure; there was no evidence of bleeding. Trans-abdominal ultrasound was repeated 24 hours later; and did not show any evidence of bleeding. The biopsy sample was adequate; histopathology showed minimal change disease (Figure 2). Steroids were administered; he dramatically responded and regained consciousness. The oedema regressed with complete recovery of the kidney injury. He was discharged in stable condition.



**Figure 1:** The EUS shows the left kidney and a 19G FNB needle being used for parenchymal biopsy. EUS: Endoscopic ultrasound; FNB: Fine Needle Biopsy.



**Figure 2:** The histopathology showed minimal change disease. The sample was adequate, with 11 glomeruli per high power field.

## Case 2

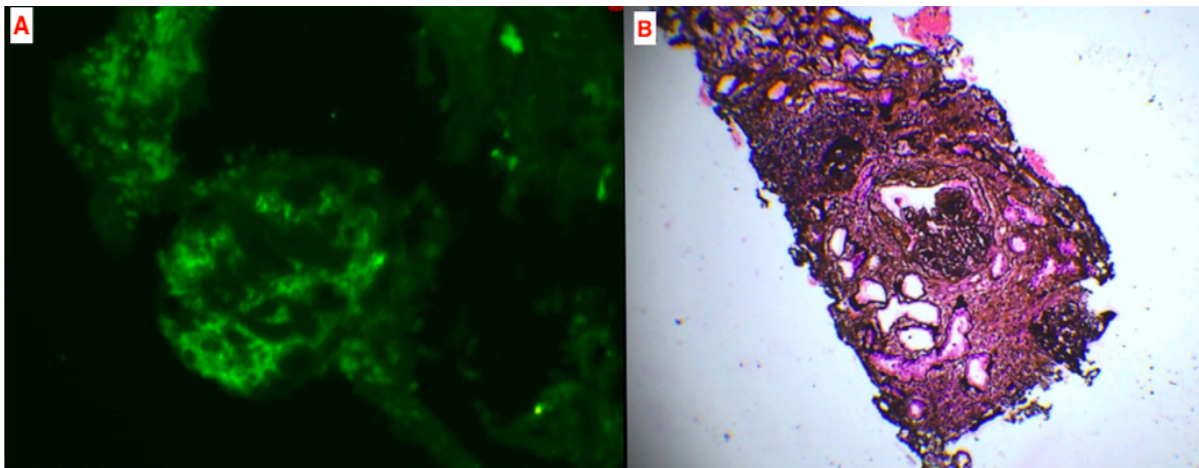
A 67 year old male with diabetes mellitus, hypothyroidism and liver cirrhosis secondary to non-alcoholic steato-hepatitis presented with haematemesis. Endoscopy showed large gastric ulcer; EUS showed no fundal varix. He underwent dual endotherapy (adrenaline injection and hemoclip deployment), following which bleeding stopped. However, the patient's kidney function deteriorated (Creatinine 4.8), leading to oliguria requiring haemodialysis. In view of persistent renal failure and oliguria, the nephrologist advised a renal biopsy. Due to the presence of gross ascites, percutaneous renal biopsy was not feasible. Therefore, EUS-FNB was planned as an alternative diagnostic approach.

## Procedure

The echo-endoscope was advanced till the gastric lumen. Left kidney could not be identified very well due to splenomegaly. The scope was advanced into the duodenum and the right kidney was identified. A19-G FNB needle (Acquire, Boston Scientific) was advanced across the duodenal wall into the right kidney till the cortico-medullary junction. Using one pass, 5-Actuation technique, EUS-guided kidney biopsy was successfully performed (Figure 3). Doppler was performed for five minutes after the procedure; there was no evidence of bleeding. Abdominal ultrasound was repeated 24 hours later; it did not show any evidence of bleeding. Histopathology and immunofluorescence showed fibro-cellular crescentic IgA nephropathy, and underlying diabetic nephropathy with tubulo-interstitial changes (Figure 4A&B). He was discharged in stable condition after initiation of appropriate treatment for the liver disease and nephropathy.



**Figure 3:** EUS was used to target the right kidney for parenchymal biopsy. EUS: Endoscopic ultrasound.



**Figure 4:** The histopathology showed fibro-cellular crescentic IgA nephropathy (A), with underlying diabetic nephropathy and tubulointerstitial changes (B). The sample was adequate.

## Discussion

This study reports a single-centre experience of two cases of EUS-FNB of renal parenchyma. Both procedures were technically feasible, safe and provided an adequate sample for diagnosis. Percutaneous renal biopsy is performed under ultrasound or computed tomography guidance. We demonstrate the feasibility and safety of EUS-FNB for renal parenchymal biopsy as an alternative approach, especially in those considered high-risk for percutaneous or CT guided biopsy. Despite improved biopsy techniques and imaging guidance, percutaneous approach is not always feasible. In specific clinical situations such as coagulopathy, the option of Trans-Jugular Kidney Biopsy (TJRB) is used. However, with EUS-FNB, avoiding radiation and contrast exposure in compromised renal function is an advantage. The anatomical relationship between the upper GI tract and both the kidneys allows safe & adequate tissue acquisition with EUS. The right kidney may be targeted by placing the endoscopic ultrasound probe in the descending part of the duodenum, while the left kidney could be accessed with the endoscopic ultrasound probe located along the greater curvature in the gastric lumen.

EUS-FNB from liver parenchyma has gained popularity, as it is safe and gives good result. Similarly, it could be safe and feasible to target the renal parenchyma for a guided biopsy. Most of the literature till date describes EUS-FNB from renal tumours, with a diagnostic accuracy more than 90% and a complication rate of less than 1%, with the most common being a sub-capsular hematoma [1,2]. Few other reports describing complications such as hematuria [3] also included cases where EUS-FNB was obtained from the renal tumours. To the best of our knowledge, there is only one report of EUS-FNB from the renal parenchyma to establish

the etiology of the kidney disease [4]. It resulted in a small self-limited subcapsular hematoma, but it did provide adequate tissue for the histologic diagnosis. We hereby describe two cases where renal parenchymal biopsy was safe and accurate in the diagnosis, without any complications.

## Conclusion

In summary, we conclude that EUS-FNB of renal parenchyma is a safe and effective technique, yielding diagnostic results comparable to the percutaneous approach while minimising the occurrence of complications. It also has some disadvantages such as the need for sedation, and a higher cost than US-guided percutaneous puncture. Therefore, large prospective studies are needed to compare the percutaneous versus EUS access in terms of diagnostic accuracy, adverse events, costs, and patient satisfaction.

## References

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