Brief Report

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Incorporating Real Time Ultrasound Guidance to Kidney Biopsy by the Nephrologist: An Educational Video

Afagh Hassanzadeh Rad
Hamidreza Badeli*

Pediatric Diseases Research Center, Guilan University of Medical Sciences, Rasht, Iran.

***Corresponding Author**
Dr. Hamidreza Badeli
Email: Badeli@gums.ac.ir

Abstract
Kidney biopsy is an important technique for diagnosis and management of patients with kidney diseases. Point of care ultrasound which is the use of US at the bedside by physicians can be used for kidney biopsy as well and in this article authors aimed to show a video to visualize a sample of kidney biopsy under guidance of US on a 14-year-old girl.

Keywords: Kidney Biopsy; Educational Video; Kidney Ultrasonography.

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Introduction
Kidney biopsy is an important technique for diagnosis and management of patients with kidney diseases (1). Performing blind kidney biopsy which was the method of choice until a few years ago may induce high rate of unsuccessful samples and complications (2). But by the advent of imaging techniques such as ultrasound (US) and CT scans, the higher success rate of sampling was obtained. Now Real-time US with guided renal biopsy is a consolidated method. This method obtained over 90% of adequate samples (1, 3-4). Even reduction of complications has been obtained from blind technique (10%) to an ultrasound-guided method (2-6%) (5-7).
Point of care ultrasound (POCUS) which is the use of US at the bedside by physicians (8) can be used for kidney biopsy as well and in this article authors aimed to show a video to visualize a sample of kidney biopsy under guidance of US on a 14-year-old girl.

Equipment
For performing kidney biopsy, clinicians need a spinal 23-gauge needle for infiltration, a 5 mL syringe, 1% Lidocaine for topical anesthesia, No. 11 Scalpel, topical antiseptic solution, sterile gauzes, perforated gown, sterile gloves, a blanket roll, an automated 16 or 18 gauges needles with or without coaxial introducer, 3 containers for light microscopy (LM), immunofleurscent (IF), and electromiroscopy (EM), and an US with curvilinear or linear probes.
Consider following steps to perform an appropriate kidney biopsy under guidance of US:

- Wear sterile gowns and gloves
- Lay patient in a prone position on a firm table and lay him/her over the blanket roll.
  Notice: The best site of needle insertion is the lower pole of left kidney. It has lower vessels composition.
- Place probe's indicator to the patient's head
- Slowly slide probe from left midscapular line of lower ribs until the preferred point in sagittal plane.
- When the middle part of the probe is placed precisely on the lower pole of left kidney, the preferred point is achieved.
- Mark the preferred point as the needle biopsy insertion site
- Mild sedative or even anesthesia is needed for anxious adults and children (inform

patients and/or guardians for the possibility of complications).

- Use Anti-septic solution and inject lidocaine 1% for local anesthesia.
- Make a small incision for inserting the needle.
- After incision, advance the needle biopsy by the real time guidance of US.
- Use sterile ultrasound probe cover for real time observation.
- For thin adults and children, linear probe is the preferred probe
- For overweight and obese patients, use curvilinear probe.
- Use the coaxial Tru-Cut needle to reduce the damage to the surrounding tissue and performing multiple samplings.
- During coaxial or needle insertion into the renal tissue, the patient should hold his/her breath.
- Based on the attached video, by POCUS, slowly introduce the coaxial needle next to the kidney cortex.
- Apply automated 16-18 gauges needles and insert in the coaxial introducer.
- After firing, obtain the first sample
- withdraw the needle
- Preserve coaxial introducer for further samplings.
- For different pathological assessments, use two to three obtained cores
- Remove the coaxial if the samples were adequate
- Press and dress the incision site
- Patient should rest for 12- 24 hours (there is no need for overnight hospitalization)

Ethical consideration

This study was approved by the ethics committee of the vice chancellor of research of Guilan University of Medical Sciences.

Conflict of Interest

The authors declare no conflicts of interest.

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