

A “Real-time Ultrasound-Guided Percutaneous Renal Biopsy with an Automated Biopsy Gun” Experience in an Incipient Pediatric Nephrology Unit

Behcet ŞİMŞEK

Haydarpaşa Numune EAH Çocuk Nefrolojisi Ünitesi İstanbul

Introduction:

Renal biopsy is an important diagnostic procedure for pediatric nephrologists; however it has added difficulties of patient size and ability to cooperate in children. Percutaneous renal biopsy (PRB) is currently the standard of technique. Although safety of the procedure and diagnostic yield, considerably improved with “automated spring-loaded biopsy device”, serious complications might still be observed. There is paucity of data on PRB outcomes in children (1,2,4,5,6).

On the other hand, A renal biopsy is regarded as one of the essential skills to be acquired by pediatric nephrology trainees, however; in recent years PRBs have been taken over by non-nephrologists in many institutions. Eventually young nephrologists are faced with the risk of missing the technical expertise to perform a renal biopsy due to lack of training and feeling dissatisfaction with their career choice (3).

The aim of this study is to investigate biopsies carried out in an incipient Pediatric Nephrology Unit of a tertiary hospital with regard to sample adequacy and complications.

Methods:

Institutional database from 2015 to November 2019, for records of 27 patients who underwent PRB were retrospectively searched. A standard preparation procedure was followed: before kidney biopsies a complete blood count, international normalized ratio/ prothrombin time, activated partial thromboplastin time, serum creatinine, and a type and screen were obtained. Medications were quized for agents that might increase bleeding risk and signed informed consents from a parent were acquired. Thereafter, a pre-biopsy renal ultrasound, vital signs of each patient were checked and indication for biopsy was confirmed. Adequate intravenous access was provided.

All biopsies were performed using a “Bard automated spring-loaded biopsy gun” loaded with a 16 Gauge needle. Under real-time-ultrasound guidance (RTUG) with a 3.75-MHz transducer, as the patient was kept in prone position, the needle was advanced by a pediatric nephrologist, until reaching the lower pole of the kidney and subsequently fired and removed to check for tissue specimen. Post-PRB, we monitored vital signs according to local practice for 24 hours: we prescribed bed rest for 6 hours, and we monitor vital signs every 15 minutes for 2 hours, every 30 minutes for 4 hours, and then, 2 hourly for the remainder of the observation period. A complete blood count is checked 1-4-8 hours after PRB, and voiding is checked for gross hematuria.

An adequate biopsy is defined as one in which the pathologist could achieve a confident diagnosis, and generally included ≥ 10 glomeruli (1-5).

IBM SPSS Statistics V22 was used for statistical analysis

Results:

Of 27 patients, 14 were girls (51.9%), 13 were boys (48.1%). Median age was 15 years (3-17 years). Biopsy was performed under sedation with local anesthesia or conscious sedation in 26/27(96.3%) patients, and under general anesthesia in 1/27(3.7%). Median glomeruli number obtained from specimens was 18 (7-54 glomeruli). Median body mass index is 23.1 kg/m² (16.1-34.1 kg/m²). A diagnosis was achieved in all 27 (100 %) cases by a histopathologist,

despite 2 cases (7%) having 7 glomeruli each. Only a 16 year old boy who had lost his cooperation at the time the biopsy gun had fired, suffered from gross hematuria (3%) in only one urination occasion without a hemoglobin (Hb) descent, but 10 mm thick subcapsular hematoma which resolved spontaneously in a week. All patients were discharged after 24 hours.

Conclusion:

This study shows that, “Real-time ultrasound-guided PRB with an automated biopsy gun” provides superior yield and is a safe consolidated technique in children when performed by nephrologists per se. In addition, this approach is beneficial as it saves the time of shifting from nephrology ward to radiology centre, preventing inappropriate monitoring during transfer between unit and it offers the comfort of continuous visualisation of the needle’s position in the renal parenchyma, without posing a risk of radiation for the patient, a shortened biopsy time, and obtaining sufficient diagnostic material. Finally, kidney biopsy has always been considered a characteristic of nephrologist’s job description and young nephrologists and trainees should be encouraged for performing.

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