



A Study of Safety Profile of Renal Biopsy Procedure in Children With Nephrotic Syndrome

KEYWORDS

Renal biopsy, Nephrotic syndrome, Complications of Renal Biopsy.

Dr Trupti Joshi

Department of Pediatrics, Shri M.P Shah Medical College & Guru Gobind Singh Hospital Jamnagar, Gujarat

Dr Amol Joshi

Department of Pediatrics, Shri M.P Shah Medical College & Guru Gobind Singh Hospital Jamnagar, Gujarat

Dr Sonal Shah

Department of Pediatrics, Shri M.P Shah Medical College & Guru Gobind Singh Hospital Jamnagar, Gujarat

ABSTRACT **Introduction:** Percutaneous renal biopsy (PRB) of native kidneys has become an essential tool in the management of patients with renal disease. Renal biopsy can be used as a diagnostic tool in view of multifactorial etiology and variable structural derangements in Nephrotic syndrome. Since the introduction of PRB in the 1950s, technical advances in imaging and biopsy needles have simplified and improved the success of the procedure with minimal complications.

Aims and Objectives: Study of safety profile of renal biopsy procedure in children with Nephrotic syndrome.

Methodology: This was a cross-sectional study of children with Nephrotic syndrome, who underwent PRB procedure at a tertiary health care center during one year period. Total 22 pediatric patients of Nephrotic syndrome with indication of renal biopsy were included in the study. Ultra Sound guided PRB procedure was performed with a biopsy gun (Bard Max Core Disposable Instrument) and complications of the procedure were observed for 24 hours in these children and repeat Ultrasound was done at discharge.

Result: Most common indication for renal biopsy in this study group was "Atypical (<1yr & > 8yrs) age of diagnosis in 10/22 (45.5%) patients, followed by (5/22 (22.7%) children presenting with hypertension & hematuria. Only 2/22 (9%) patients who underwent PRB procedure had complications. One of them had gross hematuria and the other one had perirenal hematoma, both resolved spontaneously.

Conclusion: Ultrasound guided PRB procedure is reasonably a safe procedure in children with Nephrotic syndrome.

Introduction:

The percutaneous renal biopsy (PRB) of native kidneys has become an essential tool in the management of patients with renal disease. In Nephrotic Syndrome PRB procedure can be used to establish histopathological diagnosis and etiology, as the conventional investigations yield little information about the underlying cause. PRB can be used as a diagnostic tool in view of multifactorial etiology and variable structural derangements in Nephrotic syndrome.

Some serious complications such as hematoma and profuse bleeding have been documented after renal biopsy.¹ Success of the procedure is defined not only by the ability to obtain adequate tissue for diagnosis but equally by the safety profile. Technical advances in imaging and biopsy needles have simplified and improved the rate of successful sampling in upto > 99% of the procedures with minimal complications.^{2,3} Overall, PRB has become a relatively safe procedure with life-threatening complications occurring in <0.1% of biopsies^{4,5}.

The standard of care after renal biopsy involves bed rest with close observation for 24 hours⁶. However, because of the current safety profile of the procedure and an ongoing desire for cost containment, it has been proposed that PRB be performed as an "outpatient procedure," discharging patients after only 6 to 8 h of observation.^{7,8}

We conducted this study to establish the safety profile of ultrasound guided PRB in children with nephrotic syndrome.

Aims and Objectives:

Study of safety profile of renal biopsy in children with Nephrotic syndrome

Methodology :

This was a cross-sectional study of children with Nephrotic syndrome, who underwent PRB procedure at a tertiary health care center during one year period.

INCLUSION CRITERIA:

1. Age of first episode of Nephrotic Syndrome <1yr or >8yrs.
2. Nephrotic patients presenting with hematuria, hypertension and renal insufficiency.
3. Steroid Dependent Nephrotic Syndrome(SDNS).
4. Frequently Relapsing Nephrotic Syndrome(FRNS).
5. Steroid Resistant Nephrotic Syndrome.

EXCLUSION CRITERIA:

1. Active urinary infection
2. Uncontrolled hypertension
3. Coagulation disorder
4. Solitary kidney
5. Renal mass
6. Advanced chronic renal failure
7. Perinephric abscess
8. Renal artery aneurysm
9. Total 22 patients of Nephrotic syndrome with indication of renal biopsy were included in this study.

Ultra Sound guided PRB procedure was performed with a biopsy gun (Bard Max Core Disposable Instrument, having 16- gauge biopsy needle, 16 cm length and 22 mm penetration depth). Children were observed for 24 hours to document post biopsy complications (if any) and managed accordingly. Repeat Ultrasound was done at discharge.

Result:**Table 1: Indications of renal biopsy in children with nephrotic syndrome:**

S.No	Indication	Total No. of children (n=22)	Percentage%
1	Atypical age(<1yr & > 8yrs) of diagnosis	10	45.45
2	HT* & Hematuria	5	22.7
3	Steroid dependent NS#	4	18.18
4	Frequency Relapsing NS	3	13.6
5	Steroid resistant NS	0	0

***Hypertension, #Nephrotic syndrome**

Table 1: Depicts that the most common indication for renal biopsy in this study group was "Atypical (<1yr & > 8yrs) age of diagnosis in 10/22 (45.5%) patients, followed by children of nephrotic syndrome presenting with "hypertension and hematuria" in 5/22 (22.7%). "Frequently relapsing nephrotic syndrome" was that least common, 3/22 (13.6%) indication for renal biopsy in this study group.

Table 2: Complication of renal biopsy

Complications	Total No. of patients	Percentage
Hematuria	1	4.5
Perirenal hematoma	1	4.5
Local bleeding	0	0
Hypotension	0	0
Infection	0	0
Arteriovenous fistula	0	0
Cardiac arrest	0	0

Table 2: Shows that only 2/22 (9%) patients who underwent biopsy had complications. One of them had gross hematuria and the other one had perirenal hematoma which resolved spontaneously. No other complication was observed in the study group.

Discussion:

This study shows post PRB procedure complication rate of 9% (2/22) [refer table 2], which is in concert with the available evidence that suggests an overall biopsy-related complication rate in pediatric patients to be around 5-23%.^{9, 10, 11}. The complications observed in our study were minor in form of macroscopic hematuria in 1/22(4.5%) patient and perirenal hematoma in 1/22(4.5%) which resolved spontaneously without any active management. Literature search reveals that the minor bleeding complications post-PRB, include macroscopic hematuria which may occur in 3-10% and perirenal hematoma in 12-42% of children. However, some may present with profuse bleeding (0.8-7%) necessitating blood transfusion or emergent surgical intervention.¹²

In view of overall low complication rate observed with PRB, a number of reports have advocated the safety of "early" (6 to 8 h after biopsy) or "same day" discharge after PRB^{6, 7, 8}. But, we observed all the study participants for 24 hrs post biopsy, as the evidence of early discharge is based on evaluations of small numbers of select patients and the biopsies are generally performed by a limited number of experienced nephrologists. In general, the rationale for this practice is strictly driven by the potential cost savings. In several reports, a post-biopsy ultrasound was done before discharge to screen for potential complications, a measure that would significantly reduce any real cost saving.^{13, 14, 15}

Conclusion:

As this study shows, Ultrasound guided PRB post procedure complication rate of only 9% (2/22) it seems to be a reasonably a safe procedure in children with Nephrotic syndrome.

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