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Safety of Percutaneous Kidney Biopsy as a Daycare Procedure: A Single Centre Experience

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Abstract

Introduction: kidney biopsy is a commonly performed procedure. ***Methods and materials:*** Data was obtained regarding performance of outpatient and in-patient biopsy. ***Results:*** A total of 179 biopsies were done in the study period, of which 107 were planned to be done on a daycare basis and 72 were preemptively planned for overnight observation. ***Conclusion:*** We conclude, out patient renal biopsies can be performed safely.

Keywords: Kidney; Biopsy; Artificial arteriovenous fistula; Shock; Visceral; Vascular injuries.

INTRODUCTION

Kidney biopsy is widely accepted as the gold standard in the diagnostic armamentarium in nephrology.[1] Ever since the inception of diagnostic kidney biopsy 60 years ago, the technique of obtaining tissue from the kidney for analysis has evolved significantly. It is now considered to be a safe procedure, with life threatening complications being very rare.[2] There is a steady decline in the incidence of common complications like pain and small hematoma owing to better knowledge, training and equipment. The profile of complications after a percutaneous kidney biopsy can range from simple pain at the site, small perinephric hematoma and transient macrosopic hematuria to rarer complications like artificial arteriovenous fistula, page kidney, shock, visceral and vascular injuries.[3]

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Despite such advancements, there are no clear guidelines on duration of post biopsy monitoring. There are many recommendations ranging from 2 hours to more than 24 hours, studied in various patient groups,[4-7] with no clear data available on the Indian population.

In our centre, patients who had uncomplicated percutaneous kidney biopsies were either sent home on the same day on a daycare basis or the coming morning after overnight observation. This distinction was based on the preference of different nephrologists and patient profile had no impact on the same. We aimed to study the occurrence of serious complications in each subset of patients, and thereby attempt to lessen the ambiguity surrounding the duration of post biopsy monitoring.

METHODOLOGY

We conducted a retrospective study in our centre on patients who underwent a percutaneous kidney biopsy over a period of one year starting from the December of 2022. Patient demographics including age, gender, BMI, and prevalence of diabetes, hypertension, heart disease, antiplatelet and anticoagulant use was noted. Incidence of serious complications like persistent gross hematuria (> 6 hours), large hematoma (>5cm), need of blood transfusions, need of intervention and biopsy related mortality were observed. Adequacy of the biopsy was noted in terms of sufficiency of the sent sample to concur diagnosis.

Biopsy technique

All patients were found to have been screened for platelet count and coagulation profile, and were taken up for the procedure only if within acceptable range. Antiplatelets and anticoagulants were stopped for appropriate duration pre procedure. Biopsies were done by nephrology residents under supervision of a consultant nephrologist. Spring loaded automatic biopsy guns with 18G calibre were used. Two techniques for biopsies were followed in our centre. Biopsy was done either by real time ultrasound guidance or as a blind pass following surface marking by an expert radiologist. Choice of the technique was based on consultant preference, and was not influenced by patient profile. Every biopsy was followed by an immediate ultrasound screening of the site by the operator. All patients were placed in a strict supine position for 6 hours where their vitals, pain, and urine for gross hematuria was monitored. If there was any hypotension, persisting or severe pain, large hematoma or persistent hematuria for more than 6 hours, they were admitted for subsequent management. If there was no such occurrence, they were either discharged immediately or after an overnight hospital stay. Routine ultrasonographic screening of the kidney at the time of discharge or check of hematocrit post biopsy was not done.

STATISTICAL METHODS

All the patients who underwent biopsy in the study period were included as subjects. Categorical variables were expressed as frequency of occurrence with percentage, and continuous variables as mean with standard deviation. Unpaired t-test was used to assess significance of association between the two groups, with P value of ≤ 0.05 being considered statistically significant.

RESULTS

A total of 179 biopsies were done in the study period, of which 107 were planned to be done on a daycare basis and 72 were preemptively planned for overnight observation. Distribution of age and gender was comparable between the two groups as was that of mean blood pressure and presence of comorbid conditions (Table 1).

Table 1: Baseline characteristics

Variable	Daycare, n=107	Admission, n=72	P value
Age (years)	47.1 ± 14.2	43.6 ± 13.6	0.11
Male gender	77 (72%)	45 (62.5%)	0.18
Sys BP (mmHg)	138.1 ± 18.2	133.2 ± 30.8	0.19
Dia BP (mmHg)	81.2 ± 10.8	82.3 ± 15.1	0.56
Diabetes	40 (38.1%)	14 (19.4%)	0.08
Hypertension	79 (75.2%)	53 (73.6%)	0.80
Obesity grade I	21 (20.2%)	37 (52.9%)	0.001
Obesity grade II	6 (5.7%)	14 (20.3%)	0.03
Heart disease	15 (14.3%)	8 (11.1%)	0.53
Antiplatelet use	9 (8.7%)	7 (9.7%)	0.82
Creatinine (mg/dL)	2.7 ± 2.3	3.1 ± 2.8	0.31
Haemoglobin (g/dL)	11.2 ± 2.1	10.9 ± 2.4	0.41

Percentage of people with grade 1 obesity was found to be more in the admission group. Mean baseline creatinine and haemoglobin were comparable between the two groups. Gross

hematuria was seen in three patients from the daycare group, (Table 1.2) of which two had persisting gross hematuria and warranted admission and blood transfusion. One patient from the admission group had persisting gross hematuria and was transfused with packed red blood cells. None of them required any further invasive intervention, with hematuria resolving spontaneously within 12 hours. There were no large hematomas or biopsy related mortality noted in the study. All samples sent for histopathology were sufficient to obtain diagnosis.

Table 2: Outcomes

Outcome	Daycare, n=107	Admission, n=72	P value
Gross hematuria	3	1	0.28
Persistent gross hematuria	2	1	0.78
Invasive intervention	0	0	-
Blood transfusion	2	1	0.78
Large hematoma	0	0	-
Mortality	0	0	-
Insufficient sample	0	0	-

DISCUSSION

Despite minor complications, kidney biopsy is a safe procedure with historical evidence of serious complications being less than 0.1%. Optimum duration of post procedure monitoring has been a topic of debate with varied examples and polarising suggestions. A retrospective analysis in 118 patients undergoibiopsy by Habas E et. al.[6] concluded that 2 hours of observation period is sufficient to diagnose possible complications. On the other end of the spectrum, there are reports suggesting that more than 90% of biopsy related complications that occur are seen close to 12 hours after biopsy[7] and that a minimum of 24 hours of in hospital observation is warranted. Most studies have shown benefit with an intermediate time period of observation with 4 to 6 hours.[4,5]

In our study we found that incidence of complications was comparable between patients who underwent kidney biopsy on daycare basis and those who were admitted in-hospital for overnight observation. Those who did not have a major complication within 6 hours did not develop any further complications overnight. We therefore infer that this extended period of observation did not have a significant benefit to the patient. On the contrary, overnight stay resulted in a 50% increase in patient expenses in our centre.

CONCLUSION

We conclude from our experience that shorter observation times are sufficient to detect possible biopsy related complications, and further hospitalisation might only add to the patients' financial burden rather than provide any clinical benefit. Percutaneous kidney biopsies can, therefore, be safely done on a daycare basis by a trained operator, with no additional benefit arising from overnight in-hospital observation.

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