

## Pattern of glomerular diseases in biopsy proven native kidney in Western Nepal

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### Abstract

**Background and Aims:** Kidney biopsy is decisive while evaluating for the diagnosis of glomerular, vascular, tubulointerstitial and genetic diseases. There is paucity of data on prevalence and pattern of various types of kidney diseases in Nepalese population. We describe various types of kidney diseases in patient population undergoing kidney biopsy at our centre.

**Methods:** This is a prospective analysis of all patients, who underwent percutaneous renal biopsy at Manipal teaching hospital, over a duration of 30 months, i.e. August 2017 to January 2019. All kinds of kidney disease patients were included for kidney biopsy, irrespective of their clinical syndromes and underlying diagnosis.

**Results:** A total of 175 consecutive biopsies were analyzed. The mean age of the patient was  $35 \pm 15$  years. Majority of the biopsy performed were in females. The majority of biopsy cases were age between 21-30 years of age. The youngest case to undergo renal biopsy was a child with asymptomatic isolated hematuria. The most frequent histological pattern observed in our study was IgA nephropathy (34.6%), followed by Focal segmental glomerulosclerosis (15.45%) and Membranous nephropathy (14.85%). Regarding complication macroscopic hematuria was seen in 15 (8.5%) cases and 8 (4.5%) cases had perinephric hematoma. There was no death related to renal biopsy.

**Conclusion:** IgA nephropathy was the commonest histological pattern. Subnephrotic proteinuria was the commonest indication for biopsy. Complication of kidney biopsy is rare and considered safe procedure in clinical practice to determine diagnosis, prognosis and treatment.

### Introduction

Glomerular diseases are the major cause of end stage kidney disease. Kidney biopsy remains an irreplaceable tool in the clinical practice of nephrologists to determine diagnosis, prognosis and treatment of several glomerular diseases.<sup>1</sup> kidney biopsy is a relatively safe procedure, with life-threatening complications occurring in less than 0.1% of biopsies.<sup>2</sup> Various studies conducted in central parts of Nepal has shown different pattern and prevalence of glomerular diseases.<sup>3,4</sup> The prevalence of the

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kidney diseases changes with the time.<sup>5</sup> This study is conducted to identify the patterns of the glomerular diseases in native kidneys in patients in western Nepal.

**Materials and methods:**

A prospective, descriptive study of kidney biopsy was conducted. All kinds of kidney disease patients, irrespective of clinical syndromes, who underwent kidney biopsy were included in the study. Data was collected over a period of two and half years, from August 2017 to January 2019 in the Nephrology Unit, Manipal teaching hospital, Nepal.

The indications of renal biopsy was as per the standard indications. Patients with clinical features suggestive of diabetic nephropathy were excluded unless they had atypical features.

Using the self-adjustable, automated, spring loaded gun biopsy needle of 18 Gauge size, kidney biopsy was performed under ultrasonographic guidance. Two cores of renal tissue were taken during the biopsy procedure, one for light microscopy which was kept in 10 % formalin and another core for Immunofluorescence in normal saline. Third core of renal tissue was obtained in very selected cases for electron microscopy. All the samples were sent to Dr. Lal’s Path labs New Delhi, India to be reported by renal histopathologists.

Patients were monitored in the nephrology ward for 24 hours after the biopsy for observation of any complications. variable including various clinical renal syndromes, histological patterns, complications and outcomes associated with kidney biopsies were entered in preset proforma. A written consent was taken from each patient prior to the biopsy procedure, after explaining the risk and benefit of the procedure and the possible complications of the procedure.

After 24 hours of biopsy, USG-Kidney ureter and bladder (KUB) and urine routine microscopy were repeated for perinephric collection or hematoma and microscopic hematuria respectively. If there were no complication, then the patient was discharged after 24hrs of the procedure .

**Results**

Age ( years)	Number Count (%)	Male	Female
11-20	34 (19.44)	19	15
21-30	48(27.43)	24	24
31-40	35(20)	14	21
41-50	31(17.71)	14	17
51-60	14(8)	7	7
61-70	7(4)	2	5
71-80	6(3.42)	4	2
Total	175	84	91

Histopathological pattern	Count	Percentage
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IgA Nephropathy	64	36.60
Focal segmental glomerulosclerosis	27	15.45
Membranous nephropathy	26	14.85
Minimal change disease	14	8.0
Lupus nephritis	13	7.42
Diffuse proliferative glomerulonephritis	9	5.14
Membranoproliferative glomerulonephritis	4	2.28
Acute interstitial nephritis	3	1.71
Hypertensive nephropathy	3	1.71
Pauci immune glomerulonephritis	3	1.71
Myeloma kidney	2	1.14
Diabetic Nephropathy	2	1.14
Chronic glomerulonephritis	1	0.57
Idiopathic nodular glomerulosclerosis	1	0.57
Alport syndrome	1	0.57
Thin basement membrane disease	1	0.57
Amyloidosis	1	0.57

Indication for biopsy	Number	Percentage
Subnephrotic proteinuria	75	42.85
Nephrotic syndrome	69	39.42
Isolated hematuria	1	0.57
Rapidly progressive renal failure	8	4.57
Lupus nephritis	13	7.45
Acute nephritic syndrome	9	5.14

Complications	Number	Percentage
Macroscopic hematuria	15	8.5
Perinephric hematoma	8	4.5
Blood transfusion for biopsy related bleeding	1	0.6
Death	0	0
Lupus nephritis	13	7.45
Acute nephritic syndrome	9	5.14

A total of 175 consecutive biopsies were analyzed over a period of one and half years. The mean age of the patient was 35 ± 15 years. The age range of the patient undergoing renal biopsy was 11 years to 80 years. Majority of the biopsy performed were in females.

The majority of biopsy cases were age between 21-30 years of age. The youngest case to undergo renal biopsy was a child with asymptomatic isolated hematuria.

The most frequent histological pattern observed in our study was IgA nephropathy (64), followed by FSGS and MGN and so forth which is depicted in table

In our study 15 cases had macroscopic hematuria, 8 patients had perinephric hematoma. One case needed blood transfusion related with biopsy complication. There was no death related to renal biopsy. Subnephrotic proteinuria was the most common indication for renal biopsy.

## Discussion

Pattern of glomerular disease varies worldwide. Studies from various parts of Nepal showed different incidence and prevalence of glomerulonephritis. There is paucity of data on biopsy proven native kidney disease in western Nepal.

In our study, we observed that two-third of patient undergoing biopsy were age less than 40 years. This is similar to studies done in Nepal by Ghimere et al and Manandhar et al.<sup>3,4</sup> Likewise studies conducted in our neighboring countries like India and Pakistan had mean age of 38 years and 32.27 years respectively.<sup>6,7</sup> This indicates disease burden in younger age group.

Our study showed that kidney disease were slightly higher in the female population compared to males. Similar findings were seen in studies conducted by Mukunda et al and Abhushan et al in Nepal.<sup>8,9</sup> However, study done in Italy by Roccatello D et al and in India by Singh P et al and in Nepal by Sharma A et al showed male predominance in their study.<sup>10,11,12</sup>

Various studies done in Nepal by khakurel S et al, Aryal G et al, Kafle et al, Manandhar et al showed MPGN (21%), MGN (42.3%), Lupus nephritis (21%), MCD (26%) respectively as their most common histopathological pattern.<sup>4,8,13,14</sup> However, our study showed IgA Nephropathy (36.6%) as the most common pattern. This shows there is heterogeneity in histopathological pattern of biopsy proven kidney disease signifying variation of kidney disease in central and western Nepal.

IgAN is the most common form of GN worldwide comprising 45% of all primary GN cases.<sup>15</sup> There is high prevalence of IgAN in Asian countries.<sup>16</sup> The frequency with which it is diagnosed varies between and within countries, mostly according to local protocol regarding the indications of kidney biopsy.<sup>17</sup> Our findings are consistent with other European (22%) and around 32 to 42% in East/ Southeast Asia where prevalence of IgA N is higher than Europe.<sup>18,19,20</sup>

Our study showed FSGS (27%) to be the second common histological pattern. Likewise, studies done by Khakurel et al and Sharma et al also showed FSGS as second common disease.<sup>12,13</sup> In African country, where there is predominance of black race, FSGS accounted for 67% of primary glomerulonephritis.<sup>21</sup> Various studies have shown that FSGS as the commonest cause of primary nephrotic syndrome in the US.<sup>22</sup>

Barden et al reported an increasing incidence of FSGS when compared to membranous nephropathy.<sup>23</sup> Membranous nephropathy is the leading cause of NS in adults. MN accounts for 26% of all cases in our study. Studies done by Mukunda et al and Manandhar et al showed 8.2% and 18.2% respectively.

Idiopathic nodular glomerulosclerosis is an enigmatic condition that resembles nodular diabetic glomerulosclerosis but occurs in nondiabetic patients. Only one case (0.57%) was found to have idiopathic nodular glomerulosclerosis. Our patients had history of hypertension and smoking however no history of diabetes mellitus. Similar results was observed in study done by Marokowicz et al.<sup>24</sup>

The most common indication for renal biopsy was subnephrotic proteinuria which consists of 42.85% of total biopsied patients. Similar findings were observed in study done by Ghimere et al. however, nephrotic syndrome was the commonest indication of biopsy in study done by Imtiaz et al and Mukunda et al.<sup>4,7</sup>

Kidney biopsy is safe procedure and the risk of development of major complications is very rare. Biopsy related complication in our study were few and comparable with other studies. Macroscopic hematuria and perinephric hematuria was seen in 8.5% and 4.5% respectively. Medelsoohn and Cole found an overall complications rate of 5.3% in their study. One patient with lupus nephritis needed blood transfusion after biopsy. Various predictors for bleeding in lupus nephritis has been studied. Among them, prebiopsy platelet count strongly predicts the risk of bleeding.<sup>25</sup>

This study is not without limitation. Our biopsy sample were not examined with electron microscopy in majority of the patient.

In conclusion, IgA nephropathy was the commonest histological pattern in our study. Subnephrotic proteinuria was the commonest indication for biopsy. Complication of kidney biopsy is rare and considered safe procedure in clinical practice to determine diagnosis, prognosis and treatment.

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