

HISTOLOGICAL PATTERN OF GLOMERULOPATHIES

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ABSTRACT

Background: Glomerulopathies result in a variety of signs and symptoms. The aim of this study was to determine the histological pattern of glomerulopathies in patients admitted to Nephrology unit. **Methods:** This study was conducted at Nephrology Department, Institute of Kidney Diseases, Hayatabad, Peshawar. One hundred nephrotic and nephritic patients were included. All patients were evaluated by history, clinical examination and relevant investigations. All the patients underwent renal biopsy under ultrasound guidance and tissue was examined for histopathological pattern. All the data were entered into a structured proforma and was analyzed on SPSS version 10. Frequency and percentages were calculated for histological pattern. Chi-square test was applied to compare the significance of proportions of histological patterns and P value < 0.05 level was considered significant. **Results:** Out of 100 patients 76 were males and 24 were females. The mean age was 27.63 ± 14.22 years. The common indications for renal biopsy were nephrotic syndrome, proteinuria/hematuria and nephritic syndrome in 73, 15 and 12 patients respectively. Focal segmental glomerulosclerosis was found in 22 cases (22%) followed by membranous nephropathy in 17 cases (17%), IgA nephropathy and mesangioproliferative glomerulonephritis in 10 cases (10%) each. The most common lesion noted in paediatric population was FSGS (26.66% n=8) while in adults the most common histopathological diagnosis was membranous nephropathy and FSGS (20% n=14 each). **Conclusion:** The most common glomerular pathology seen in our study is FSGS followed by MGN, IgA and mesangioproliferative GN.

KEY WORDS: Glomerulonephritis, Renal Biopsy, Histological pattern.

INTRODUCTION

Glomerulopathy results in a variety of signs and symptoms, including proteinuria, hematuria, azotemia, oliguria, edema and hypertension. Evaluation of pathologic features identified in a renal biopsy specimen may be required for definitive diagnosis. In 1934, Ball performed the first closed needle biopsy with an aspiration device.¹

Automated spring loaded guns have increased the yield of successful biopsies from 60–90% with associated minimal complications.² Situations in which renal biopsy serves an important diagnostic function include nephrotic syndrome in adults, steroid resistant nephrotic syndrome in children, glomerulonephritis (GN) in adults other than clear cut acute post streptococcal GN and ARF of unknown origin. The most common histopathological lesion in paediatric population age < 10 years is minimal change disease (MCD).³ One local study shows MCD the most common entity followed by focal segmental glomerulus sclerosis (FSGS) and membranous GN.⁴ Another local study shows mesangioproliferative GN the leading entity followed by membrano-proliferative GN and MCD.⁵ While in adults of 5th to 6th decade of life membranous nephropathy is most common worldwide.⁶ Similar audit of renal biopsy at JPMC showed FSGS as most frequently occurring GN.⁷

In nephrological practice renal histology often dictates treatment modalities. As nephrotic / nephritic syndrome are clinical manifestations of a variety of nephritides, which bear common clinical features of peripheral edema, hypertension, hematuria, and proteinurea.

The aim of this study was to determine the histological pattern of glomerulopathies in patients admitted to Nephrology unit.

MATERIAL AND METHODS

This Case series study was conducted at Nephrology Department, Institute of Kidney Diseases, Hayatabad Peshawar from 12th August 2008 to 11th February 2009. It included 100 patients by non-probability convenience sampling technique after their written informed consent and prior approval of the hospital ethical committee. The inclusion criteria were nephrotic patients with proteinuria of $\geq 3\text{gm}/24$ hours in adults and hypoalbuminaemia of $\leq 2.5\text{g}/\text{dl}$, non-nephrotic range proteinuria with evidence of hypertension/hematuria/deranged renal function or active sediments on urine microscopy (Nephritic syndrome in adults and children), steroid resistant nephrotic syndrome in children, steroid dependant nephrotic syndrome in children and relapsing nephrotic Syndrome. We excluded patients under 8 years of age,

long standing diabetics with proteinuria (>7 years of IDDM and >5 years for NIDDM), bilateral small echogenic or scarred kidneys (Kidney size ≤8 cm), adult polycystic kidney disease diagnosed on ultrasound and coagulation abnormality (Patient prothrombin time >3sec than that of control).

All patients were evaluated by history, clinical examination and investigations including urine routine examination, serum albumin, 24 hours urinary protein, serum cholesterol, blood urea and serum creatinine, anti nuclear factor, HBsAg, Anti-HCV Ab, and chest X-Ray.

All the patients underwent renal biopsy using 10 cm long, 18 Gauge Spring loaded Trucut biopsy needle (Monopty Gun®) under ultrasound guidance. Six microns of sections were done and specimens were stained with eosin and hematoxylin, Periodic Acid Schiff (PAS), Silver Nitrate and Congo red and the specimens were seen for the following histopathological pattern of glomerulopathies; minimal change disease, focal segmental glomerulosclerosis, mesangioproliferative glomerulonephritis, membranoproliferative glomerulonephritis, membranous nephropathy, renal amyloidosis, crescentic glomerulonephritis, proliferative glomerulonephritis and tubulo-interstitial nephritis.

All the data were entered into a structured proforma and was analyzed on SPSS version 10. Frequency and percentages were calculated for histological pattern. Chi-square test was applied to compare the significance of proportions of above mentioned qualitative variables and P value < 0.05 level was considered significant.

RESULTS

A total of 100 biopsies were done. Out of these 76 (76%) were males and 24 (24%) were females with male to female ratio of 3:1. The mean age was 27.63±14.22 years. The age distribution is shown in Table 1.

Table 1: Age distribution.

Age (years)	Number of patients	Percentage
9 – 19	30	30%
20 – 29	31	31%
30 – 39	18	18%
40 – 49	11	11%
50 – 59	6	6%
≥ 60	4	4%

The common indications for biopsy are shown in Table 2.

Table 2: Indications of renal biopsy.

Indications	Number of patients	Percentage
Nephrotic Syndrome	73	73
Proteinuria and Haematuria	15	15
Nephritic Syndrome	12	12

The histopathological pattern having proteinuria more than 3 gm are shown in Table 3.

Table 3: Twenty-four hours urinary protein in different glomerulopathies.

Pattern	> 3gms	≤ 3 gms
FSG	18	4
MGN	15	2
IgA	2	8
Mesangioproliferative GN	6	4
Crescentic GN	0	7
TIN	0	7
MPGN	2	4
Renal amyloidosis	5	0
Poliferative GN	0	4
Others	1	5

Keys: FSGS: Focal Segmental Glomerulosclerosis, MGN: Membranous Nephropathy,

GN: Glomerulonephritis, TIN: Tubulo Interstitial Nephritis, MCD: Minimal Change Disease, MPGN: Membrano Proliferative Glomerulonephritis

Histological Pattern of glomerulopathies in different age groups is shown in Table 4.

Focal segmental glomerulosclerosis was found in 22 cases (22%) followed by membranous nephropathy in 17 cases (17%), IgA nephropathy and mesangioproliferative glomerulonephritis in 10 cases (10%) each.

The most common lesion noted in paediatric population was FSGS (26.66% n=8), followed by mesangioproliferative glomerulonephritis (23.33% n=7), and IgA nephropathy (13.33% n=4).

The most common histopathological diagnosis in adults was membranous nephropathy and

Table 4: Histological pattern of glomerulopathies in different age groups.

	9-19	20-29	30-39	40-49	50-59	60 & above	Total
FSGS	8	10	4	0	0	0	22
MGN	3	5	4	1	2	2	17
IgA Nephropathy	4	5	0	0	0	1	10
Mesangioproliferative GN	7	0	2	0	1	0	10
Crescentic GN	2	4	0	1	0	0	7
TIN	0	1	2	3	1	0	7
MPGN	0	2	3	1	0	0	6
MCD	2	2	0	1	0	1	6
Renal Amyloidosis	1	0	2	1	1	0	5
Profiferative GM	2	1	0	1	0	0	4
ATN	1	1	0	1	0	0	3
Hypertensive Nephropathy	0	0	0	1	1	0	2
IGM Nephropathy	0	0	1	0	0	0	1

MGN – Membranous Nephropathy, MPGN – Membranoproliferative glomerulonephritis

FSGS – Focal Segmental Glomerulosclerosis, MCD – Minimal Change Disease, TIN – Tubulointerstitial Nephritis, ATN – Acute Tubular Necrosis

FSGS (20% n=14 each) followed by Tubulointerstitial nephritis (10% n=7), IgA Nephropathy and MPGN (8.57% n=6 each) each.

DISCUSSION

Renal biopsy is a useful procedure to understand the histological pattern of renal disease. It helps in establishing the accurate diagnosis, identifying the exact pathology and devising the appropriate management plan for patients suffering from different types of nephritides. Significant differences in the disease spectrum were found when this study was compared with national and international studies.

In our study, males (76%) outnumbered females (24%) (Male to female Ratio of 3:1) and the mean age was 27 years. This is validated in a study done by Muzaffar et al⁸ and Anwar N et al.⁹ A study in Japan showed female preponderance. This could be due to male dominant society and poor access of female to healthcare facilities in our region especially in Khyber Pukhtunkhwa.

The most common indication for renal biopsy was nephritic syndrome as in a study done by Anwar N et al.⁹ Contradictory to our results, a study in Okinawa Japan¹⁰ revealed proteinuria and hematuria to be the most common indications.

Regarding the nephrotic range proteinuria, FSGS followed by MGN was the leading cause which was showing some differences with study done by Anwar N et al⁹ in which MGN followed by FSGS was the most common cause.

According to Anwar N et al⁹, in paediatric population less than 10 years of age, minimal change disease was the most frequent entity followed by focal segmental glomerulosclerosis and membranous nephropathy. The paediatric population 9–19 years of age, in my study showed focal segmental glomerulosclerosis to be the leading glomerulopathy followed by mesangio-proliferative glomerulonephritis.

A recent study in adults by Anwar N et al¹¹ showed membranoproliferative glomerulonephritis to be the most common glomerulopathy followed by membranous nephropathy and Tubulointerstitial nephritis. While our study, in adults, showed membranous nephropathy and focal segmental glomerulosclerosis to be the most common entity, followed by Tubulointerstitial nephritis, IgA Nephropathy and membranoproliferative glomerulonephritis. This difference could be due to age factor.

Muzaffar et al⁸ has reported membranoproliferative glomerulonephritis as the most com-

mon entity followed by minimal change disease and mesangioproliferative glomerulonephritis. While my study showed quite differences in the disease pattern.

Study done by Lakhnana NK et al¹² in adults in PIMS Islamabad has shown the membrano-proliferative glomerulonephritis to be the most common glomerulopathy followed by membranous nephropathy, mesangioproliferative glomerulonephritis and crescentic glomerulonephritis which again is contradicting with our results.

In our study, in patients aged 60 and above, membranous glomerulonephritis was noted in 2 cases followed by MCD and IgA nephropathy in 1 case each. While Akhtar SZ et al¹³ has shown minimal change disease to be most common followed by membranous nephropathy and crescentic glomerulonephritis in elderly.

FSGS was most common entity in a study by Al Amiri¹⁴ renal centre Kuwait followed by MCD and IgA nephropathy, while my study showed FSGS to be on top followed by membranous GN and IgA nephropathy.

The Italian experience of the national registry of renal biopsies¹⁵ has shown higher frequency of IgA nephropathy, benign nephro-angiosclerosis and acute tubular necrosis in males. While our study in which males outnumbered females has shown gross differences. FSGS was most common followed by MGN and IgA nephropathy.

Study done by Rivera et al¹⁶ in Spain has shown results similar to our study. Nair R et al¹⁷ has studied population aged 80 years and older and has shown acute nephritic syndrome as the most common indication for renal biopsy and benign nephrosclerosis was found in elderly people. While in my study only one person of 80 years was biopsied and had IgA nephropathy.

Post infective Proliferative GN is declining in western countries. However it still, is a significant finding in our study, which was validated by Akhtar SZ et al.¹³ Significant number of secondary renal amyloidosis was seen in our study 5%.

Worldwide minimal change disease is most common in children and membranous nephropathy in adults while our study showed that focal segmental glomerulosclerosis was most common in children. In adults, membranous nephropathy was the commonest histopathological lesion in our study, which co-relates with the international studies. Since children below 8 years were excluded from my study. It might be the reason that FSGS

is the most common lesion as compared to MCD. This was a limited study in limited and selected number of cases.

This study does not apply to whole population and country, because this study was done only in one tertiary care hospital. The study should be done in larger population and there should be a national guideline for inclusion and exclusion criteria.

CONCLUSION

The most common glomerular pathology seen in our study was focal segmental glomerulosclerosis followed by Membraneous glomerulonephritis, IgA and mesangioproliferative glomerulonephritis.

In paediatric population focal segmental glomerulosclerosis was the most common entity followed by mesangioproliferative glomerulonephritis and IgA nephropathy.

Proteinuria more than 3 grams was most commonly observed in focal segmental glomerulosclerosis and Membraneous glomerulonephritis.

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