# Spectrum of Biopsy Proven Nephropathies in A Teritiary Care Hospital in Mysuru

Himamani. S[1], Suneetha. D.K[2], Raghavendra. B.L.[3]

**ABSTRACT**

**Introduction:** Renal diseases are common cause of increased morbidity and mortality. So making a definitive diagnosis in the initial stages of renal disease by renal biopsy helps in better management and better prognosis in these patients. This study has analysed the indication for renal biopsy, pathological patterns of kidney biopsies and clinic-pathological correlation for patients admitted in our hospital with a indication for renal biopsy and compared data with other centers.

**Material and method:** This is a retrospective analysis of kidney biopsies over a period of 1 year 3 month, from September 2014 to December 2015. A total of 6o kidney biopsies were included in the analysis

**Results:** The most common indication of kidney biopsy was nephritic syndrome.

The most common histopathology was membranoproliferative glomerulonephritis. The most common complications of the procedure were pain at biopsy site in 5(8%), gross hematuria in 3(5%), perirenal hematoma in 1(1.6%)% and no patients had life threatening hematuria requiring nephrectomy.

**Conclusion:** There is a changing trend in major histological groups in the primary glomerular diseases and in our study it is observed that MPGN is common. However, almost across the world, the most common secondary glomerular disease has been documented as LN. Renal biopsy findings has helped in better management of these patients.

**Keywords:** Nephrotic syndrome (NS), acute nephritic syndrome(ANS), acute renal failure (ARF), rapidly progressive renal failure (RPRF), PGN (primary glomerular nephropathy), Mcd (minimal change disease), Fsgs (focal proliferative glomerular disease), Mn (membraneous nephropathy), Mpgn (membranoproliferative glomerulnephritis), Pign (post infectious glomerulnephritis), Dpgn (diffuse proliferative glomerulnephritis), IgAN (IgA nepropathy), C3gn (C3 glomerulnephritis), CGN (chronic glomerulonephritis), SGN (secondary glomerular nephropathy), DMN (diabetic nephropathy), Ln (lupus nephritis), MM (multiple myeloma), TMA (thrombotic microangiopathy), AIN (acute interstial nephritis), CIN (chronic interstial nephritis), ATN (acute tubular necrosis), CPN (chronic pyelonephritis), HTN (hypertension) AUA (asymptomatic urinary abnormalities). TIN (tubulointerstial nephropathy), VN(Vascular nephropathy).

## INTRODUCTION

Renal biopsy helps in making specific diagnosis, assessing the level of disease activity, treatment and prognosis of disease. The indications for the renal biopsy are nephrotic syndrome (NS), acute nephritic syndrome (ANS), non re-

covering acute renal failure (ARF), rapidly progressive renal failure (RPRF), unexplained chronic renal failure (CRF), systemic diseases with renal dysfunction, non-nephrotic proteinuria, isolated microscopic hematuria, renal transplant dysfunction, and familial renal diseases.[1]

There is a changing trend in the occurrence of various renal disease including glomerular disease.[1] Glomerular diseases remain the most common cause of end-stage renal disease all over the world. Evaluation leads to better management and leads to decrease incidence of the ESRD in these patients. Study also evaluates the variation in these diseases in different geographic areas, variation according to race, age. Renal Biopsy analysis forms a foundation for further research in renal diseases. Proteinuria, hematuria, hypertension, impaired renal function, oliguria, anuria. polyuria, uraemia[2] are the main clinical presentation of tnese diseases.

## MATERIALS AND METHODS

We studied 60 subjects admitted with renal disease to K.R. Hospital and who underwent kidney biopsies with a definite indications in our institute from September 2014 December 2015. And their clinical data, biopsy report were retrospectively analyzed.

### Inclusion Criteria

All patients with an indication to do renal biopsy admitted in K.R. Hospital wards and who underwent renal biopsy.

### Exclusion Criteria

Biopsies of transplant kidney, tumor, inconclusive results. Details for each patient.

Data collected included name, age, sex, clinical findings, indication for renal biopsy, histopathological diagnosis and laboratory investigations such as serum creatinine, 24-hour urinary protein, urine microscopy, virology (HBsAg, anti-HCV, HIV) and serology [anti-dsDNA antibody, antinuclear antibody (ANA), C3, C4 were recorded. Renal biopsy specimens were analysed by pathologist. Analysis included

[1]Associate Professor and HOD, Department of Nephrology, [2]Associate Professor and Unit Chief, [3]Post Graduate Student, Department of Medicine, M.M.C and R.I, Mysuru, Karnataka, India

**Corresponding author:** Dr. Himamani.S., No. 8, JLB Cross Road, Doctors Qtrs, Behind Regalis Hotel, Mysuru 570 005, Karnataka, India

light microscopy (LM) and immunofluorescence (IF). Electron microscopy (EM) was done whenever it was indicated. Indications for renal biopsy were: Nephrotic Syndrome, acute nephritic syndrome (ANS), asymptomatic urinary abnormalities (AUA), hematuria, Non recovering Acute Renal Failure, Chronic Renal Failure (if biopsy was feasible), and Rapidly Progressive Renal Failure. Automated biopsy guns were used to do biopsy. Data were analyzed and compared with studies published from India and different regions of the world.

## STATISTICAL ANALYSIS

Simple descriptive statistics such as median and mean ± SD were used for variables such as age, clinical and laboratory features. Percentage was used for categorical data.

## RESULTS

A total of 60 renal biopsies were analyzed retrospectively from September 2014 to December 2015. Among them 56% were males and 44% were females. The mean age of patients was (40.4+-6.35 ) years. The number of patients who underwent renal biopsies had been increasing monthly.

The most common indication for renal biopsy was nephritic syndrome(41%), followed by nephrotic syndrome (30%)as seen in table 1.

From the data collected and analyzed, it can be seen that primary glomerular disease remained the most common important kidney disease in our patients and accounted for 61% of the total patients including SGN, TIN and VN. Among the PGN cases, MPGN ( 20 %) was the leading category, followed by IgAN (11.6%), PIGN (11.6% ), MCD (8.3%) followed by MN (6.6 %), chronicglomerular nephritis CGN ( 5 %), DPGN ( 3.3%), FSGS ( 3.3 %), C3gn (3.3%) The most common SGN was LN (5 %), followed by Mm( 3.3 %). ATN was seen 11.6% patients and most of it associated with other renal disease except only in 1 case(3.3%) only ATN was seen. VN was less common diagnostic categories. There were no hereditary glomerular diseases in this analysis.

In our study most frequent causes of nephritic syndrome was Mpgn and most frequent causes of nephrotic syndrome was Minimal change disease and our study mainly included adults. Membraneous glomerulopathy was second common cause of nephrotic syndrome. By the age of the patient, most of the Primary glomerular nephropathy was diagnosed between second and fourth decades and among secondary glomerular disease all lupus nepritis were seen in female patients in the age group between 20 to 40 years. Multiple myeloma was seen after fourth decade. In unresolving ARF two patients had ATN, one had chronic kidney disease and one post partum ARF biopsy done after 8 weeks with history of post partum hemorrhage (atonic ) had acute cortical necrosis. Cresentric glomerulonephritis was common in anti glomerular basement disease (100%) that is all cases had cresents, followed by mpgn (30%), IgA nephropathy (11%) and pign one case out of 7 case had cresents. With the definitive diagnosis the management has significantly changed.

In mpgn 33% have complete remission with recovered renal function with treatment. 16% gone for partial remission, 33% ckd, one person is dialysis dependant. All cases of IgAN, have recovered and on regular follow up. Among 3 LN case one complete remission, one died due to sepsis and on initial diagnosis on renal biopsy was having chronic renal disease and she is under follow up. DMN has progressed to ckd, all Pign cases recovered including one who had cresents but one patient is still dialysis dependant even after 3 weeks treatment. C3Gn one partial remission other complete remission. Multiple myeloma one referred to oncologist and other died. All Mn cases has recovered. All MCD recovered. Among 3 antiGBM disease one lost to follow up and two recovered with immunosupression and plasmapharesis. TMA case had CKD changes and died. Acute cortical necrosis case stable with dialysis support. Among Fsgs patients, they are under follow up and protenuria under regression. All ATN and AIN complete remission. Among CKD only one dialysis dependant others are non dialysis dependant.

| Indication of renal biopsy | Numbers (%) |
|---|---|
| Nephrotic syndrome | 18(30%) |
| Proteinuria non-nephrotic | 7(11%) |
| Nehpritic syndrome | 25(41%) |
| Acute renal failure(nonresolving or unexplainable) | 2(3%) |
| Chronic kidney disease | 6(10%) |
| RPRF | 2(3%) |
| Systemic disease | 2 (4%) |
| Isolated hematuria / asymptomatic urinary abnormalities | 0(0%) |
| **Table-1:** Indication for renal biopsy. | |

| Major categories | Renal diseases | Numbers (%) |
|---|---|---|
| PGN | Mcd | 5(8.3%) |
| | Fsgs | 2(3.3%) |
| | Mn | 4(6.6% |
| | Mpgn | 12(20%) |
| | Pign | 7(11.6%) |
| | Dpgn | 2(3.3%) |
| | IgAN | 7(11.6%) |
| | C3gn | 2(3.3%) |
| | CGN | 3(5%) |
| SGN | DMN | 1(1.6%) |
| | LN | 3(5%) |
| | MM | 2(3.3%) |
| | TMA | 1(1.6%) |
| | Anti glomerular basement membrane disease | 3(5%) |
| TIN | AIN | 4(6.6%) |
| | CIN | 2(3.3%) |
| | ATN | 7(11.6%) |
| | CPN | 1(1.6%) |
| VN | HTN changes | 1(1.6%) |
| | Acute cortical necrosis | 1(1.6%) |
| **Table-2:** Histopathological categories of renal biopsy | | |

| | Our study | Dakishinamurthy et al India | Pakisthan | Korea | Italy | Spain | Iran |
|---|---|---|---|---|---|---|---|
| a)PGN | 84 | 69.1 | 73 | 74 | 59.9 | - | - |
| MCD | 11.36 | 15.1 | 5.8 | 15.5 | 7.8 | 7.8 | 9.8 |
| MN | 11.36 | 7 | 17.2 | 12.3 | 20.7 | 9.7 | 23.8 |
| MPGN | 27.27 | 3.9 | 1.1 | 4 | - | 4.3 | - |
| IgAN | 15.9 | 4.4 | 1.5 | 28.3 | 34.5 | 15.2 | 13.5 |
| FSGS | 4.5 | 10.5 | 21.2 | 5.6 | 11.8 | 10 | 10.3 |
| b)SGN | 16 | 18.2 | 10.9 | 11.8 | 25.4 | - | - |
| DMN | 2.2 | 1.2 | 0.9 | 2 | - | - | - |
| LN | 6.8 | 14.6 | 4.9 | 8.7 | 51.6 | 8.8 | 10.6 |
| **Table-3:** Compasrison of some common glomerular disease in our study to other studies (in percentages) | | | | | | | |

## DISCUSSION

Our study gives information about the common indications of renal biopsy, clinical syndromes and pattern of kidney diseases diagnosed by renal biopsy during our study period in a single tertiary care referral institute in south India. Since there is bias regarding demographical, geographical, racial characteristics, differences in indications for renal biopsy, the analyzed clinical syndromes and variations in pathological classification, we have compared our data with different data already done. A comparison of the basic data and some common diseases in our series with those of other published studies from other parts of India and other countries is done and given in Table 3. It is obvious from the table that the distribution pattern of major histology of renal disease in our study reveals that primary glomerular nephropathy common than secondary glomerular nephropathy similarly seen in other studies.[1-4] Different histology pattern were seen in various studies within India and outside India.[1-4]

Our data show that Nephritic syndrome was the most frequent clinical presentation, accounting for 41 % of all cases. This is in contrast to other reported studies around the world, including India and Pakistan where nephrotic syndrome was common.[5,6,11,13,16,25] We also observed a male predominance in the overall cases except in SGN. Among SGN there is increased prevalence of LN in the female population. All recently published studies worldwide showed a similar pattern[7-19,25] Conversely, studies from Japan and Italy reported a higher frequency of AUA, which is quite different from ours.[9,12] The underlying etiology of Nephritic syndrome is variable across the world. In our study, the most common was MPGN followed by IgAN, Pign, AntiGBM disease, FSGS and rare in MN. This is in contrast to other studies where MPGN is rare.[1] The underlying etiology of NS is variable across the world. In our study, the most common cause was MCD, followed by, MN, MPGN, IgA N and FSGS. In other study in India the most common cause was MCD, FSGS followed by, MN, MPGN.[1] MCD was most common cause of NS in other studies done in japan and Korea.[9] MN was most frequent diagnosis in in Serbia[13,18], FSGS was the most common cause of NS in Brazil.[13,18]

MCD is more common in some Asian than the western countries and various studies have shown a decline in the relative frequency of MCD[6,8,14] similar to our study. In our analysis, however, it is one of the common PGD, which is in con-

cordance with other similar studies. The incidence of FSGS was also variable in other studies and in our study it was of lesser incidence. Our study showed MN to be one of the common PGD in adults similar to other studies.[5,7,9,11,15,16,22,25] Our results also support this incidence. IgAN was common in the present series and in other studies from this region of the world.[3-6] It is the most common primary renal disease in European countries and some Asian countries.[7-9,11] We have also observed that there is an increase in the incidence of PIGN and we also observed a higher percentage of CresGN. In addition to this, the number of biopsies in CRF patients is increasing when the kidneys are of normal size with intact corticomedullary distinction by ultrasonogram. Most of these patients turned out to be CIN and MPGN. Among all renal pathologies PGN is the most predominant renal disease as analysed in our study and other recent studies, followed by SGN and TIN.[7,8,-13,15,22,25] The vascular diseases are less frequent

The most common SGN in our study was LN which is comparable with that reported in many studies across the world.[4-8,11,18] Anti GBM disease was also common and incidence is increasing when studies are analysed. The incidence of other categories of SGN was very less.

TIN is found to be a relatively less frequent. We observed a higher incidence of ATN (11%) which can be explained by aggressive performance of biopsy procedure in patients with ARF with prolonged recovery without an obvious etiology. The study has less number of patients with obstetric complications. We did not find hereditary conditions like Alport Syndrome and thin basement membrane nephropathy, which reflects the lack of EM in our center.

## CONCLUSION

To conclude, our study has analyzed that there is a wide variation in renal disease especially among primary glomerular diseases as reported by renal biopsy report. MPGN was the commonest category of renal disease. LN was the most common secondary glomerular disease. Renal biopsy gives confirmatory diagnosis of these renal disease which further helped in better management and thus decreasing the incidence of these renal diseases going into CKD and ESRD.

## ACKNOWLEDGEMENT

Consultant Pathologist, JSS Medical College, Mysuru and all patients who underwent biopsy and Medicine Department Post Graduates, MMC and RI, Mysuru who helped during this study.

## REFERENCES

1. U Das, KV Dakshinamurty, A Prayaga. Pattern of biopsy-proven renal disease in a single center of south India: 19 years experience, Indian journal of nephrology. 2011;21:250-25.
2. W. K. Nadium Histological pattern of primary glomerular diseases among adult Sudanese patients: A single center experience, Indian J Nephrol. 2013;23:176–179.
3. A. Absar and et al. Ten year experience of pediatric kidney biopsies from a single center in Pakistan. Indian J Nephrol. 2010;20:190–192.
4. Francisco Rivera et al. Clinicopathologic correlations of renal pathology in Spain, Kidney International. 2004;66:898–904.
5. Balakrishnan N, John GT, Korula A. Spectrum of biopsy proven renal disease and changing trends at a tropical tertiary care centre1990-2001. Indian J Nephrol. 2003;13:29-35.
6. Narasimhan B, Chacko B, John GT, Korula A, Kirubakaran MG, Jacob CK. Characterization of kidney lesions in Indian adults: Towards a renal biopsy registry. Nephrol. 2006;19:205-10.
7. In Joon Choi, HyeonJooJeong, Dae Suk Han. An Analysis of 4,514 Cases of Renal Biopsy in Korea. Yonsei Med J. 2001;42:247-54.
8. Chang JH, Kim DK, Kim W. Changing prevalence of glomerular diseases in Korean adults: A review of 20 years of experience. Nephrol Dial Transplant 2009;24:2406-10.
9. Research Group on Progressive Chronic Renal disease. Nationwide and Long-Term Survey of Primary Glomerulonephritis in Japan as Observed in 1,850 Biopsied Cases. Nephron. 1999;82:205-13.
10. Yahya TM, Pingle A, Boobes Y. Analysis of 490 Kidney biopsies: Data from the United Arab Emirates Renal Diseases Registry. J Nephrol. 1998;11:148-50.
11. Rychlý´k1 I, Ova EJ, Tesa V. The Czech registry of renal biopsies. Occurrence of renal diseases in the years 1994-2000. Nephrol Dial Transplant. 2004;19:3040-9.
12. Gesualdo L, Maria A, Francesco L. The Italian experience of the national registry of renal biopsies. Kidney Int. 2004;66:890-4.
13. Polito MG, Antonio L, Mastroianni G. An overview on frequency of renal biopsy diagnosis in Brazil: Clinical and pathological patterns based on 9617 native kidney biopsies. Nephrol Dial Transplant. 2010;25:490-6.
14. Korbet SM, Rosangela M, Raphael Z. The racial prevalence of glomerular lesions in nephrotic adults. Am J Kidney Dis. 1996;27:647-51.
15. Arrayed A, George SM, Malik AK. The spectrum of glomerular diseases in the Kingdom of Bahrain: An epidemiological study based on renal biopsy interpretation. Transplantat Proc. 2004;36:1792-5.
16. Covic A, Schiller A, Volovat C. Epidemiology of renal disease in Romania: A 10 year review of two regional renal biopsy databases. Nephrol Dial Transplant. 2006;21:419-24.
17. Simon P, Ramee MP, Boulahrouz R. Epidemiologic data of primary glomerular diseases in western France. Kidney Int. 2004;66:905-8.
18. Naumovic R, Pavlovic S, Stojkovic D. Renal biopsy registry from a single centre in Serbia: 20 years of experience. Nephrol Dial Transplant. 2009;24:877-85.
19. Emily P. McQuarrie, Bruce Mackinnon, Barbara Young. Centre variation in incidence, indication and diagnosis of adult native renal biopsy in Scotland. Nephrol Dial Transplant. 2009;24:1524-8.
20. Ahmed H, Jamal S, AI Wakeel. Pattern of glomerular disease in Saudi Arabia. Am J Kidney Dis. 1996;27:797-802.
21. Braden G, Mulhern J, Germain M. Changing incidence of idiopathic glomerular disease in adults. J Am SocNephrol. 1995;6:413.
22. Rivera F, Lopez JM, Perez R. Frequency of renal pathology in Spain 1994-1999. Nephrol Dial Transplant. 2002;17:1594-602.
23. Floege J, Feehally J. Introduction to glomerular disease: Clinical presentations. Comprehensive clinical nephrology (3rd Edition)edited by John Feehally, Jürgen Floege and Richard J. Johnson.Philadelphia, PA, MOSBY ELSEVIER, 2007;193-207.
24. Churg J, Bernstein J, Glassock RJ. Renal Disease: Classification and atlas of glomerular disease. 2nd ed. New York: IkaguShoin Medical Publishers Inc; 1995. p. 1-359
25. Lei-shi li and Zhi-hongliu. Epidemiologic data of renal diseases from a single unit in China: Analysis based on 13,519 renal biopsies. Kidney Int. 2004;66:920-3.