Original Article

Spectrum of Renal Parenchymal Diseases: An Eleven Year Retrospective Review of Renal Biopsy Data from a Tertiary Care Hospital in Pakistan

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Abstract

Objective: To report our experience with renal biopsy and histopathological pattern of renal disease in a tertiary care hospital in Pakistan over 11 years period.

Methods: All the kidney biopsies performed in our unit from Jan 2001 to Dec 2011 were retrospectively reviewed. We recorded the following data for each patient: name, age, sex, indications for renal biopsy, histopathological diagnosis and lab investigations such as Serum Creatinine, 24 hour urinary protein, urine microscopy, virology (Hbs Ag, Anti HCV) and serology (anti-ds DNA, ANA, C3, C4, C-ANCA and p-ANCA) when indicated. Histopathological examination included Light Microscopy (LM) and Immunofluorescence Microscopy (IF). For LM, six sections were taken and stained with Haemotoxilin and Eosin, and special stains included Periodic acid-Schiff (PAS), Trichome and Grocott' Smethanamine Silver Stain (GMS). IF study was done using polyclonal antisera against human IgG, IgM, IgA, C3 and Cq. The renal biopsies were performed by a trained Nephrologist.

Results: A total of 329 consecutive percutaneous renal biopsies of native kidneys were reviewed. A total of thirteen specimens were unsatisfactory. Nineteen cases had incomplete data, therefore were excluded. There were 159 males (53.3%) and 138 females (46.46%). Age distribution showed a total no. of 34 (11.44%) of paediatric cases, 238 (80.13%) adult cases and 25 (10.5 %) elderly cases. The most common clinical indication for renal biopsy was unexplained renal failure (n = 116 39%) followed by nephrotic syndrome (n = 83 27.9%). Of the total biopsies included 248 (82.82%) had glomerular disease and 49 (16.49%) had non glomerular disease. The most frequently found primary glomerular lesion was membranous nephropathy (n = 51 17%) followed by focal segmental glomerulosclerosis (n = 26 8.7%). Amongst the non-glomerular lesions, CIN (chronic interstitial nephritis) was the most frequently found lesion (n = 24 8.08%).

Conclusion: Membranous Nephropathy followed by Focal Segmental Glomerulosclerosis were the most frequently found renal lesion.

Key Words: Renal disease, renal biopsy, nephrotic syndrome, haematuria, registries.

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Introduction

Histopathological examination of renal biopsy is a gold standard test for the diagnosis of renal parenchymal disease in patients with renal disease. Renal biopsy data analysis is very important to study the prevalence of biopsy proven renal disease and its

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variation as per geographical distribution. The correlation between clinical and pathologic findings and the knowledge of the epidemiology of renal parenchymal diseases is a source of useful information in clinical practice.[1]

There is lot of data on epidemiologic population based biopsy proven renal parenchymal diseases with detailed clinicopathologic correlations that could vary according to the country analyzed.[2-4]

We do not have central biopsy registry in Pakistan. Studies on the prevalence of renal disease in Pakistan are very scarce.[5-7] As many patients come from various regions all over the country, it might be taken as an illustration of the epidemiology of renal disease in our population and can also serve as a stimulus for follow up and prospective studies.

Methods

All the kidney biopsies performed in our unit from Jan. 2001 to Dec. 2011 were retrospectively reviewed. We recorded the following data for each patient: name, age, sex, indications for renal biopsy, histopathological diagnosis and lab investigations such as Serum Creatinine 24 hour urinary protein, virology (Hbs Ag and Anti HCV) and serology (ANA, Anti ds DNA, complements C3, C4, c-ANCA and p-ANCA when indicated according to clinical criteria. Renal biopsies were performed by a trained nephrologist using a Monopty gun or a trucut needle. Specimen were subjected to only light (LM) and immuneflourescent (IF) microscopic studies. For LM, three sections were stained with Hand E. Pas and special stains were used when warranted. IF study was done using polyclonal antisera against human Ig G, Ig M, IgA, C3 and Cq. Biopsy specimens were considered satisfactory for the diagnosis if they contained five or more glomeruli.

The biopsy requisition forms and medical charts (when available) were reviewed and clinical information was collected. Inclusion criteria included: biopsies performed and reported in the institute were included. Exclusion criteria included: cases with incomplete data, non conclusive results, kidney transplant and insufficient glomeruli.

Patients younger than 18 were included in the children group and those 18 years or older were categorized as adults. Patients aged sixty years were classified as the elderly group.

The syndromes were classified according to the following criteria commonly used in nephrology: Nephrotic Syndrome (proteinuria greater than 3.5 gm/24 hrs), Nephritic Syndrome (haematuria, hypertension and reduced renal function which was defined as S. Creatinine > 1.5 mg/dl), asymptomatic urinary abnormalities (AUA) (haematuria with or without proteinuria and normal renal function) and unexplained renal failure.

The Statistical Package for the Social Sciences (SPSS) 13.0 was used for analyzing the data. Microsoft Excel Spread Sheet 2007 was applied for generating the graphs.

Result

A total of 329 consecutive percutaneous renal biopsies of native kidneys were reviewed. Thirteen specimens were unsatisfactory. Nineteen samples had incomplete data, therefore were excluded. A total of 297 cases were included in the study.

There were 155 males (52.18%) and 142 females (47.81%). Age distribution showed a total no. of 34 (11.44%) of Paediatric cases, 238 (80.13%) adult cases and 25 (10.5 %) elderly cases.

Indications for performing renal biopsy among different age groups were nephrotic syndrome (n = 83 27.9%), unexplained renal failure (n = 116 39.05%), nephritic syndrome (n = 60 20.20%) and AUA (n = 38 12.79%).Of the total biopsies included 248 (82.82%) had glomerular disease and 49 (16.49%) had non glomerular disease. Glomerular diseases were broadly classified as Primary Glomerular Diseases and Secondary Glomerular Diseases. The most frequently found primary glomerular lesion was membranous nephropathy (MN 27.7%) followed by focal segmental glomerulosclerosis (FSGS 13.5%) (Graph 7). MN was also the commonest primary glomerular pathology amongst both the adult group (23%) as well as the elderly group (21%) Lupus nephritis (LN 60%) ranked first amongst the secondary glomerular diseases. Among the non glomerular lesions, chronic interstitial nephritis (CIN) was the most frequently found lesion in both the Paediatric as well as the adult group.

Discussion

Since renal histopathology turned out to be different in different age groups, so separate data analysis was done for children, adults and elderly group.

Our data shows that unexplained renal failure was the most common clinical condition for performing renal biopsy. In children, however the nephritic syndrome is equally predominant. (Fig. 1) which is quite

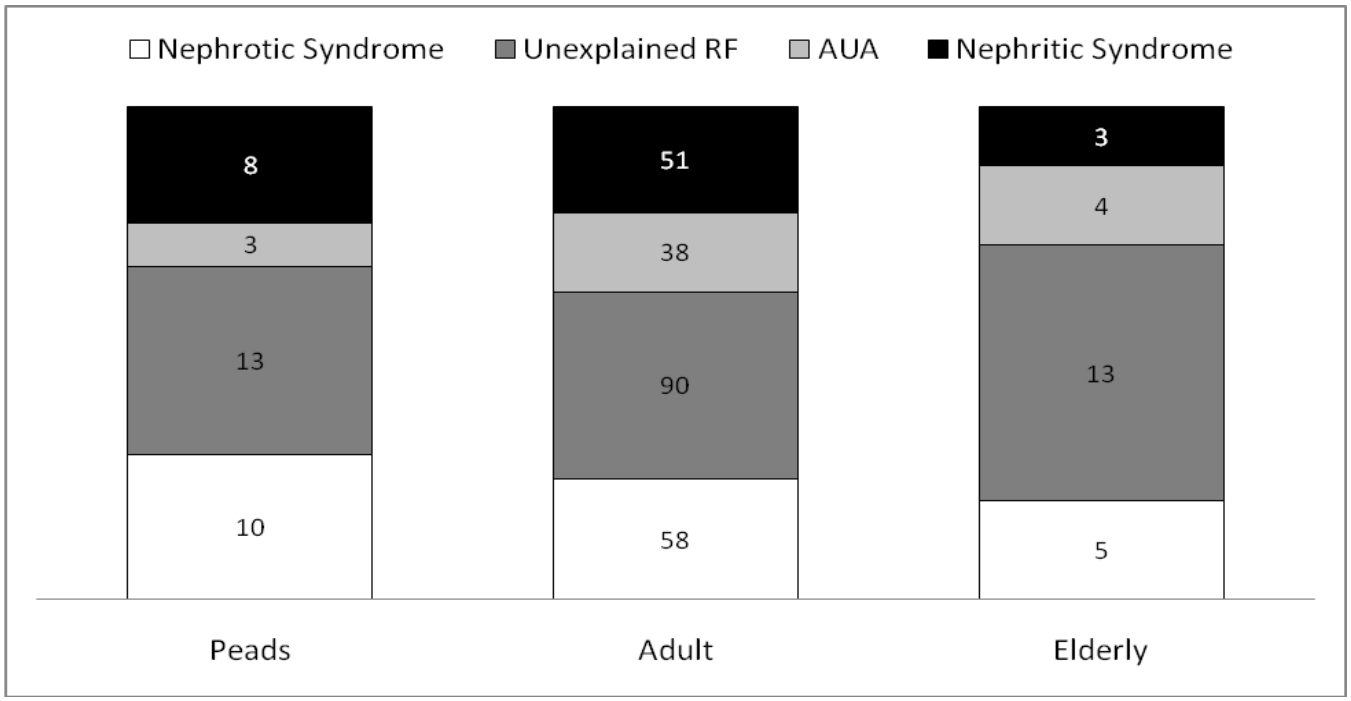

Fig. 1: *Indications for Performing Renal Biopsy.*

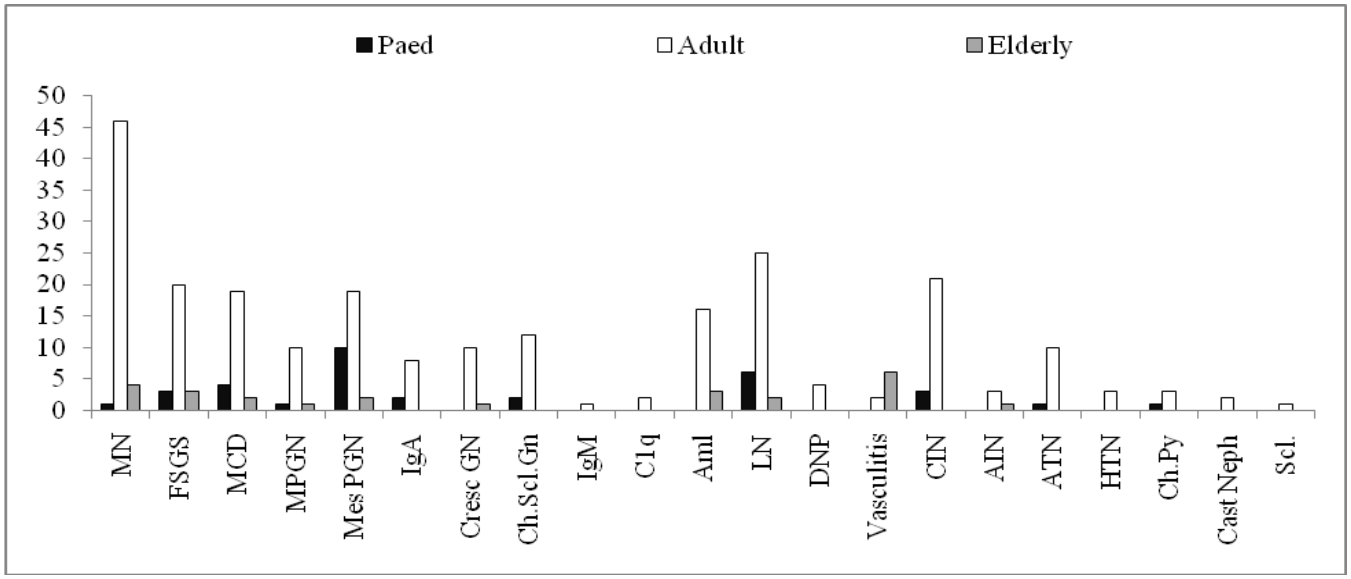

Fig.2: *Histopathological Lesions Found on Renal Biopsy.*

MN: Membranous nephropathy, FSGS: Focal segmental glomerulosclerosis, MCD: Minimal change disease, MPGN: Membranoproliferative disease, Mes PGN: Mesangio proliferative glomerulonephritis, IgA: IgA nephropathy, Cres. Gn: Crescentic Glomerulonephritis Ch. Scl. Gn: Chronic sclerosing glomerulonephritis, Ig M: Ig M nephropathy Ciq: Ciq nephropathy Aml: Amyloidosis LN: Lupus nephritis, DNP: Diabetic Nephropathy CIN: Chronic interstitial nephritis, AIN: acute interstitial nephritis ATN: Acute tubular necrosis, HTN: hypertensive nephrosclerosis Ch. Py.: Chronic pyelonephritis Cast Neph: cast nephropathy Scl: Scleroderma

similar to the data obtained from many countries around the world.[8,9] As expected, the incidence of renal failure increases with the age. However studies from Italy and Japan report a higher frequency of asymptomatic urine abnormalities which is in contradiction to our data.[10,11]

As mentioned above, the pattern of histological changes in our study varies among different age groups. Although in all age groups, Membranous Nephropathy (MN) was the leading entity present in all age groups, Mesangio proliferative glomerulonephritis (Mes. PGN) is the most frequently encountered lesion in children followed by minimal change disease (MCD) (Fig. 2) while most of the regional and international data suggest that Minimal change disease was the topmost entity among Paediatric population.[12-15] The relatively low incidence of Minimal change disease in our study can be explained by the higher threshold of some of the clinicians to consider renal biopsy as most of the children were first recommended empirical courses of steroids, biopsy was undertaken only for those who did not respond, were frequent relapsers, showed poor or delayed response.

Membranous Nephropathy (MN) ranked first among the adult group and comprised 23% of cases. This is in contrast to the lower incidence of this entity in the international and regional reports.[16,17] This is also due to the fact that in most international studies, the most common clinical indication to perform a renal biopsy was AUA but when nephrotic syndrome patients were taken Membranous Nephropathy ranked first followed by Focal Segmental Glomerulosclerosis (FSGS) similar to our study in which FSGS was second only to MN.[18]. There is low incidence of IgA nephropathy found in our study. Similar reports from neighboring countries as U.A.E.[19] S.A.[20] Bahrain[21] Iran[22] demonstrated lower rates among primary GN in contrast to reported rates from Europe[23] USA[24] Brazil[25] and Far East countries[26,27] where IgA nephropathy is one of the leading causes of Glomerulonephritis. Again this may reflect varying indications for performing renal biopsy, as many clinicians do not go for renal biopsy in case of asymptomatic urine abnormalities. Despite this we cannot ignore genetic, habitual or different environmental factors. Among the non glomerular diseases, Chronic Interstitial Nephritis (CIN) was the most common pathology found in both the Paediatric and the adult group; however in elderly group, diabetic nephropathy which is still the most common cause of renal disease in the elderly group, constitutes a very small proportion in our study. Similar incidence has also been reported from China.[28] This is because most of the diabetic patients are not biopsied considering high suspicion of diabetic nephropathy.[29]

Conclusion

With increasing incidence of renal disease, it has become very important to timely reach to the diagnosis by understanding the exact nature and pattern of the disease in the region. Renal biopsy serves as the gold standard to know the nature of renal abnormality and renal biopsy data can serve as an indispensible tool in understanding the pattern and prognosis of significant renal disease in the region. So the prompt and correct approach can help us to tailor the therapy accordingly and save one from possible adverse preventable consequences. So it is equally important to know the pattern of renal disease by having insight of renal biopsy data.

Despite the retrospective analysis of the study and the single center nature of the review, our results are in comparison with most of the international studies. Our study also serves as an important contribution to the epidemiology of renal disease in South East Asia.

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