Original Article

Clinicopathological Profile of Glomerular Diseases: A Single Center Study

Profile of Glomerular Diseases

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ABSTRACT

Objective: The aim to design this study was to identify and highlight the frequency and histomorphological patterns of different glomerulopathies with their clinical and laboratory profiles in tertiary care hospital.

Study Design: A cross-sectional prospective study

Place and Duration of Study: This study was conducted at Histopathology Department, Dr. Ziauddin Hospital, Karachi during the period between March 2019 to September 2019.

Materials and Methods: A total of 100 renal biopsy samples with their complete relevant clinical information and other laboratory findings were included in this study. The biopsies were studied by using light and immunofluorescence microscopic techniques. The glomerular diseases were categorized as primary and secondary glomerulopathies.

Results: Among total of 100 cases, there were 57% female and 43% male, mean ± SD 1.43 ± 0.498. Minimum age was 3 years and maximum was 80 years with the mean ± SD of 31.11 ± 17.506.. The most common clinical presentation was nephrotic syndrome followed by protienuria, nephritc syndrome, SLE, hematuria, oliguria and unexplained renal failure. Primary glomerulopathy was present in 82% of cases. The most common morphological picture found was FSGS (27%), followed by membranous glomerulonephritis (19%), mesangiocapillary glomerulonephritis (18%), minor changes (11%), chronic sclerosing glomerulonephritis (5%), diabetic nephropathy (5%) and amyloidosis (5%), lupus nephritis (class-I lupus nephritis, class-III lupus nephritis, class-IV & V lupus nephritis) (4%), 2 (2%) chronic sclerosing glomerulonephritis and other rare patterns.

Conclusion: We conclude that primary glomerulopathy is predominant type and most common morphological pattern of glomerular disease is FSGS followed by membranous GN and mesangiocapillary glomerulonephritis with high affinity towards female.

Key Words: Primary and secondary glomerulopathies, histomorphology, immunofluorescence

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INTRODUCTION

Glomerular diseases are the worldwide public health issue (Xu et al., 2016; Alwahabi et al, 2018; Liu et al, 2018).[1-3] Damaged glomeruli cannot filter and excrete out waste products and extra fluid from the body. If injury continues, renal function ceases completely, ultimately leading to renal failure (Choudary et al., 2014).[4] The incidence and dispersal of glomerular diseases varies according to demographic elements, population, genetics and territorial factors. (Sim et al, 2016; Garau et al., 2018).[5,6]

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These are the diseases mediated by humoral and cellular immune mechanisms and presenting with various clinical pictures ranging from hematuria and asymptomatic protenuria, nephrotic syndrome, nephritic syndrome, acute nephritis, acute renal failure, rapidly progressive renal failure, which eventually develops chronic renal failure (Crensiglovsa et al., 2016)[7]. Glomerular diseases can be primary or secondary. FSGS is the most frequently reported primary pattern of glomerulopathy in United States whereas in Europe and Asia, the most commonly reported primary pattern is IgA nephropathy. Most frequently reported secondary pattern is lupus nephritis followed by Henosh Schonlien Purpura and Diabetic Nephropathy (Zhou et al., 2018)[8]. Many non-invasive techniques were used in the past to evaluate the renal diseases but renal biopsy is the gold standard method for the diagnosis and therapeutic approach to the glomerular diseases (Alfaadhel et al., 2019)[9]. However, currently there is poor concert for attestation and clinical utility for this approach. As the performance of renal biopsy totally depends on personal stance or institutional policies· Majority of the studies concluded that the renal core biopsy can ameliorate the management and treatment plan of glomerular diseases (Fiorentino et al., 2016)[10].

MATERIALS AND METHODS

This a cross-sectional prospective study design. A total of 100 biopsy samples of symptomatic patients of glomerular disease (either gender & aged between 1 to 80 years), sent to the histopathology department with complete relevant clinical information and other laboratory findings were included. This study was conducted during the period between March 1st 2019 to September 30th 2019 at Histopathology department, Dr. Ziauddin Hospital, Karachi. Samples of patients suffering from diseases other than glomerular disease like tubulointerstitial disorders, renal transplant biopsy and inadequate information on request card were excluded from the sample. All the samples evaluated using light microscopy and immunofluorescence. For light microscopy, tissue specimens were fixed in 10% neutral buffered formalin, Processed for 12 hours in semi-automated processor by providing the medium (Xylene, Alcohol, Formalin & Paraffin wax) manually, Embedded the fixed renal biopsy core in paraffin wax to make block for further proceedings, 11 serial sections were cut (at a thickness of 2mm) on microtome (Equipment used to make ribbons of embedded tissue in a paraffin block for slide), Stained by hematoxylin–eosin (HE) and special stains, like periodic acid-Schiff (PAS) and silver stains (Gomori's Methenamine Silver, GMS) for optimal evaluation of the morphological details. For Immunofluorescence studies, tissue cores stained by the direct method using fluorescein isothiocyanate (FITC)-conjugated antisera mono-specific for immunoglobulin (Ig)G, IgA, IgM, C3 and C1q (Dako, Glostrup, Denmark). The slides were visualized under an Olympus BX41-fluorescence microscope and graded semi-quantitatively as 0 to 3+ (on a scale of 0 to 3+, where 0 = absent and 3+ = brightest) and distribution will be described as membranous or mesangial in a granular or linear pattern. Sociodemographic and clinical data (such as patient's signs, symptoms, laboratory findings like degree of protienuria, hematuria, and urnianalysis results were retrieved from pathology request form of renal biopsy specimen received in histopathology laboratory or in the event of inadequacy about the history (more uncertain), contact were made to patient/alluded specialist. All the data (clinical, morphological and sociodemographic) was analyzed using the IBM SPSS v. 21.0 and M.S Excel 2013. Continuous variables such as age and laboratory data expressed as mean ± standard deviation (SD). Categorical variables such as gender and age categories expressed as proportion and percentages. Chi-Square test to assess the association between two categorical variables. A p-value of ≤0.05 was considered significant.

RESULTS

Total 100 cases were included in this study, among them 57 (57%) were female and 43 (43%) were male, mean ± SD 1.43 ± 0.498. The minimum age among total number of cases was 3 years and maximum was 80 years with the mean ± SD of 31.11 ± 17.506.

The most common clinical presentation was nephrotic syndrome in 61(61%) cases, followed by protienuria alone in 12 (12%) cases, nephritic syndrome in 7 (7%) cases, SLE in 6 (6%) cases, hematuria alone in 5 (5%) cases, oliguria in 5(%) cases, and unexplained renal failure in 4 (4%) cases.

Pathological profile showed minimum blood urea level 11 mg/dl and maximum 250 mg/dl, mean ± SD of 61.49 ± 51.948. Minimum serum creatinine level was 0.1 mg/dl and maximum was 10.8 mg/dl, mean ± SD of 1.889 ± 2.0948.

Microscopic hematuria was present in 8 (8%) cases and gross hematuria was also present in 8 (8%) cases for the duration of two weeks upto 8 weeks. Protienuria was present in 89 (89%) cases for the time period of 3 months upto 12 months. Hypertension was present in 14 (14%) cases, 8 (8%) were positive for diabetes. Among 57 of female cases none of them was pregnant.

All 100 cases were negative for Anti-HCV and HbsAg. Anti-Ds DNA level was raised in 4 (4%) cases, serum ANA level was raised in 5 (5%) cases, serum CANCA level was raised in 2 (2%) cases and C3 level was raised in 2 (2%) cases.

Out of total 100 cases, Primary glomerulopathies were found in 82 (82%) cases,among them 27 (27%) were diagnosed as FSGS, 19 (19%) Membranous glomerulonephritis (5 were diagnosed with spike formation), 18 (18%) Mesangiocapillary glomerulonephritis, 11 (11%) were found with Minor changes, 5 (5%) Chronic sclerosing glomerulonephritis, and only 2 (2%) Crescentic glomerulonephritis.

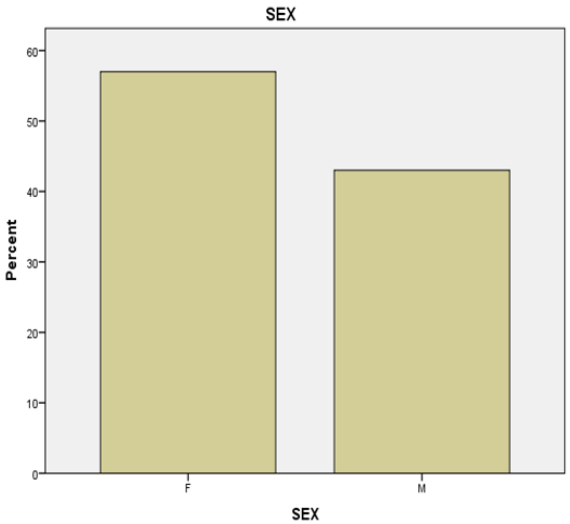

Figure No.1: Representing Gender Distribution

Secondary glomerulopathies were found in 18 (18%) cases among them 5 (5%) were diagnosed as diabetic nephropathy, 5 (5%) Amyloidosis of secondary reactive type, 4 (4%) Lupus nephritis (among them, 1 was Class-I Lupus nephritis, 1 class-III Lupus nephritis, 1 class-IV & V Lupus nephritis, and 1 class-III & V Lupus nephritis), 2 (2%) Patchy cortical infarction, 1 (1%) Hypertensive nephropathy, 2 (2%) and 1(1%) Hemolytic uremic syndrome.

Table No.1: Glomerulopathies Between Gender

Morphological patterns	Female	Male	Total
Focal segmental glomerulosclerosis	17	10	27
Membranous Glomerulonephritis	11	8	19
Mesangiocapillary Glomerulonephritis	8	10	18
Minor changes	7	4	11
Chronic sclerosing Glomerulonephritis	4	1	5
Diabetic Nephropathy	2	3	5
Amyloidosis	1	4	5
Lupus nephritis	4	0	4
Crescentic Glomerulonephritis	1	1	2
Patchy cortical infarction	2	0	2
Hyprtensive nephropathy	0	1	1
Hemolytic uremic syndrome	0	1	1
Total	57	43	100
P - 0.137, Mean ± SD 10.03 ± 4.704, CI : 95% (0.27-0.133)			

DISCUSSION

We hope that, our study fulfil the lacuna and provide the current profile of glomerular diseases in this region, which may aid to make health policies better and to provide the frame-work for future research in this very demanding field. In our study we observed, glomerular diseases were predominant in women and nephrotic syndrome was the most common clinical presentation in (61%) of cases which nearly coincide with the findings observed in the study of Beniwal et al., 2020[11] (49.6%) and Hu et al., 2020[11] (51.8%). Protienuria was the next common clinical presentation in our study in (12%) of cases followed by nephritic syndrome (7%) and other rare presentations as this finding is observed by Mittal in his study (Mittal et al., 2020)[12]. In our study we observed primary glomerulopathies (82%) are more common than secondary glomerulopathies (17%). According to Mittal they found primary glomerular diseases in (73%) of popluation and secondary glomerular diseases in (15.5%) of cases but Cresiglova et al., 2016 reported secondary glomerulopathy (53.3%) and primary glomerulopathy (46.7%) and the findings of Cresiglova were against the majority of studies in Pakistan and other countries. FSGS (Focal segmental glomerulosclerosis) was the most prevalent type of glomerulopathy in our series found (27%) and it is also reported by Beniwal et al., 2020 (13.0%) and by Chun et al., 2020[15] in (21%) of population. Therefore, FSGS becomes a common consequence of renal diseases worldwide this finding was compared with the study of Akhtar et al., 2020[14] reported (19.5%) in KPK. We reported second most common morphological analysis membranous glomerulonephritis and it is reported by Akhtar et al., 2020 in (16.6%) of cases and Tawfik et al., 2019 in Egypt population (2.9%) and in our case we observed (19%). Krishin et al., 2020 revealed in his work minor changes (20%) and Tawfik et al., 2020[16] (3.8%), as we found this (11%) in our study. In our results, chronic sclerosing glomerulonephrtis was (6%), but our analysis was not similar to results reported by Said et al.,2020 in international study (44%) and Sadaf et al., 2018 in Karachi, Pakistan (53.8%). We noted accountable difference among the studies, crescentic glomerulonephritis in our series (2%), Beniwal et al., 2020 (35.4%) and Mahajan et al., 2020 (32.9%). Diabetic nephropathy (5%) and amyloidosis (5%) noted by us in our study. In fact, diabetic nephropathy was more frequent in the series of Sharma et al., 2020 and Mubarak et al., 2011 (42.14%) and (8.1%) respectively. Amyloidosis reported by Beniwal et al., 2020 was (13.9%), Mubarak et al., 2011[22] was (42.1%). Lupus nephritis appeared (4%) in our series and it was reported by Gupta et al., 2020 (12.9%) and Saberafsharian et al., 2020 (8.8%). Hypertensive nephropathy, hemolytic uremic syndrome and patchy cortical infarction were the rare patterns observed in our as well as other studies (Kazi et al., 2012)[26] glomerular diseases are the illness with high morbidity and mortality rate, and its triggered when these are associated with common risk factors, such as low socioeconomic status and co-morbid conditions, this area of study demands the high attention towards the better management. (Zhang et al., 2020)[27].

CONCLUSION

Our examination accentuates the significance of renal biopsy and appropriate methodology towards the analysis of glomerular sicknesses. We finish up, examples of glomerular diseases changes over the world because of seriously puzzling social determinants of race/identity and related impacts of co-morbidities . Essential glomerulopathy mirroring the fondness of renal diseases and makes critical extent towards female. Primary glomerular diseases are predominant type. Nephrotic condition manufacture most noteworthy edge among clinical introductions. FSGS is the regularly

analyzed primary morphological example. Our examination face certain constraints, shortage of electron microscopy at our foundation is one of the huge among them. Our examination proposed a thought of range of glomerular illnesses at just those cases which were gotten in our research facility, hence, our investigation may not be altogether illustrative of the study of disease transmission of glomerulopathies in entire populace. It is making imperative to call attention to additional cases and reconsider the all out records of renal biopsy to set up the library for development in medical care polices.

Author's Contribution:

Concept & Design of Study:	Anam Shaikh
Drafting:	Fouzia Lateef, Talat Mirza
Data Analysis:	Rehan Ahmed Siddiqui
Revisiting Critically:	Anam Shaikh, Fouzia Lateef
Final Approval of version:	Anam Shaikh

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