Section: Pathology

Original Research Article

A STUDY OF HISTOPATHOLOGICAL SPECTRUM OF GLOMERULAR LESIONS IN ADULT NEPHROTIC SYNDROME IN A TERTIARY CARE HOSPITAL - TAMILNADU

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ABSTRACT

Background: Nephrotic syndrome is a major contributor of CKD. The etiology, pathogenesis and clinical behaviour of nephrotic syndrome has been fascinating and intriguing the pathologists and nephrologists alike Studies have shown that the etiology of NS in adults varies depending on many factors like age, sex, race, etc. **Materials and Methods:** This was a prospective analytical study in renal biopsies of adult patients presenting with nephrotic syndrome conducted over a period of 15 months. The total number of biopsies received were 70 in Madras Medical College & Rajiv Gandhi Govt. General Hospital, Chennai. The clinical features were correlated with the Light microscopy, special stains and Immunofluorescence findings of the renal biopsies. **Conclusion:** Mininmal change disease was the most common cause of nephrotic syndrome in adults.

INTRODUCTION

Indian chronic kidney disease (CKD) registry shows that 13.8% of CKD are caused by chronic glomerulonephritis. This data indicates the high burden of glomerular disease in a country like India. A correct diagnosis, appropriate management and follow up prevent or prolong the progression of disease. Nephrotic syndrome is a major contributor of CKD. The etiology, pathogenesis and clinical behaviour of nephrotic syndrome has been fascinating and intriguing the pathologists and nephrologists alike Studies have shown that the etiology of NS in adults varies depending on many factors like age, sex, race, etc. Focal segmental glomerulosclerosis (FSGS) has been seen to be emerging as the commonest cause of adult NS in the recently published data from around the world. But there are regional variations, with minimal change disease (MCD) being the commonest cause of adult NS.

Aims & Objectives

1. To determine the morphological patterns and incidence of glomerular lesions in nephrotic syndrome
2. To evaluate the clinicopathologlical correlation of different types of nephrotic syndrome.
3. To correlate the Histopathological findings with immunofluorescence examination
4. Comparative Analysis of data of the present study with those from other study centers

MATERIALS AND METHODS

The present study was a prospective analytical study in renal biopsies of adult patients presenting with nephrotic syndrome. The study was conducted over a period of 15 months from August 2017 to October 2018. The total number of biopsies received were 70. The biopsies were received from the Institute of Nephrology, Madras Medical College & Rajiv Gandhi Govt. General Hospital, Chennai.

The clinical features were correlated with the Light microscopy, special stains and Immunofluorescence findings of the renal biopsies.

RESULTS

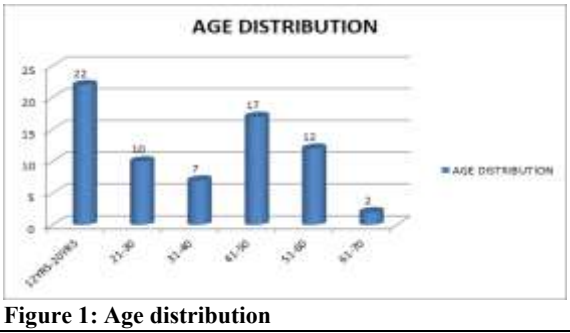

Figure 1: Age distribution

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In the present study, maximum number of patients belonged to Group I (12- 20 years) which constituted 31.4% (2 nos.), followed by Group IV (41-50 years) which constituted 24.3% (17 nos.), Group V (51-60 years) 17.1% (12 nos.), Group II (21-30 years) 14.3% (10 nos.), Group III (31-40 years) 10 % (7nos.) and the least common was Group VI (61-70 years) 2.8% (2 nos.).

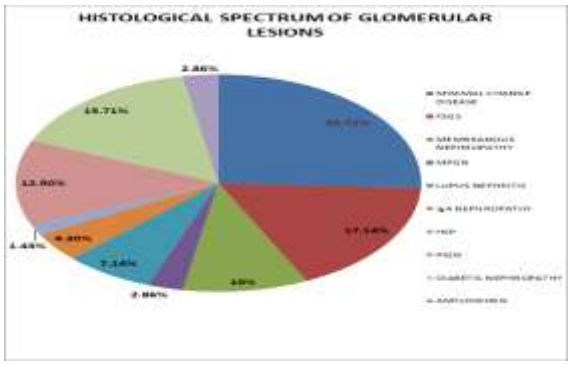

Figure 2: Histological spectrum of glomerular lesions

On Histopathologic Examination of renal biopsies, Primary glomerulonephritis accounts for 72.91%, Secondary glomerulonephritis accounted for 27.14%. Overall the most common Histological type of nephrotic syndrome in adults noted was Minimal Change Disease which constituted 25.71% (18 nos) followed by Focal Segmental Glomerulosclerosis and Diabetic Nephropathy each constituted 17.14% (12 cases). Post Infectious Glomeruonephritis constituted 12.9%, membranous nephropathy 10%, Lupus Nephritis was 7.14%, IgA Nephropathy was 4.3%, MPGN & Amyloidosis accounted for 2.86% each and HSP and collapsing glomerulopathy accounted for 1.43% each.

In present study primary glomerular lesions accounted for 72.91%(51/70), secondary glomerular lesions accounted for 27.14% (19/70). Among secondary glomerular lesions Diabetic nephropathy (15.71%) was the most common type followed by lupus nephritis (7.14%), amyloidosis (2.86%) and Henoch Schonlein purpura (1.43%)

In the present study, out of 70 patients the most common histological type of nephrotic syndrome in adults was minimal change disease (MCD) which constituted about 25.71% (18 nos) of which 55.6% were males,44.4 % were females; particularly minimal change disease was most frequent in Group I (12-20 years) of age patients (18.6%). The incidence of MCD was decreasing to 2.86 % in Group II (21-30 years), Group III (31-40 years) each and 1.43% in Group V (41-50 years).

The second most common histological lesion in our study was Focal Segmental Glomerulosclerosis (FSGS) which constituted about 17.14% (12/70 cases). Focal Segmental Glomerulosclerosis (17.14%) showed a slight predilection to males (11.43%) when compared to females (5.71%). FSGS was present equally in Group I,II,IV of 4.3% followed by Group V of 2.86% and Group II 1.43%.

The third most common histologic type was Diabetic Nephropathy (15.71%) being slightly female predominant (8.6%) compared to males (7.14%). which was most common in Group IV (41-50 years) of age constituted 7.14% followed by Group V (51-60 years) constituted 5.71% and 1.43% in Group II & Group VI.

The fourth most common lesion in present study was Post Infectious Glomeruonephritis which constituted about 12.9%, followed by membranous nephropathy about 10%, Lupus Nephritis was about 7.14%, IgA Nephropathy was 4.3%, MPGN & Amyloidosis accounted for 2.86% each and HSP accounted for 1.43%.

Table 1: Histopathological spectrum of glomerular lesions

HISTOLOGICAL TYPE	TOTAL (70)	PERCENTAGE
MINIMAL CHANGE DISEASE	18	25.71%
FOCAL SEGMENTAL GLOMERULOSCLEROSIS	12	17.14%
MEMBRANOUS NEPHROPATHY	07	10%
MPGN	02	2.86%
LUPUS NEPHRITIS	05	7.14%
IgA NEPHROPATHY	03	4.3%
PIGN	09	12.9%
HSP	1	1.43%
DIABETIC NEPHROPATHY	11	15.71%
AMYLOIDOSIS	02	2.86%

DISCUSSION

Studies worldwide have shown that the etiology of NS in adults varies depending on many factors like age, sex, race, etc. Focal segmental glomerulosclerosis (FSGS) has been seen to be emerging as the commonest cause of adult NS in the recently published data from around the world.[1,2,3,4] But there are regional variations, with minimal change disease (MCD) being the commonest cause of adult NS and FSGS being much less common in studies from Denmark and Korea. On the other hand, the Spanish, Japanese and Italian, registries report membranous nephropathy (MN) as the most common etiology for adult NS. There are many factors for this variation, one Indian study also showed MCD was the commonest cause of NS.[1,2,3,4,5]

There has been a changing trend in the histologic spectrum of NS in the last few decades, in India as well as worldwide with a notable increase in

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incidence of focal segmental glomerulosclerosis (FSGS) with a decrease in the incidence of minimal change disease (MCD).[1,2,3]

This morphological variation warrants different modality of clinical approach, laboratory workup and treatment. Further, it has prognostic implications and the renal biopsy will provide information regarding the type of NS and severity of lesion which helps in the lesion specific optimal therapy to the patients.[1,2,3] Therefore the histological interpretation of renal biopsies will guide the nephrologists on timely intervention and appropriate therapy to delay the progression to endstage kidney disease in NS patients. The present study aims to analyse the morphological patterns in renal biopsy of patients presenting with NS and correlating the histomorphology with clinical features in South Indian population, coming to the Government General Hospital in Chennai and thereby aiding in the choice of treatment modalities to delay the progression and complications in these patients.

Table 2: Comparison of glomerular lesions in various studies in India

Authors Year of study, Ref. No	Sample Size	Study place	MCD	FSGS	MN	IGAN/HSP	LN	PIGN	AM	DN
Gandra D and Chennamaneni B et al (2015) [11]	50	Telengana	20.6	3.4	22.2	2.7	13.6	1.9	13.2	6.2
N Balakrishnan et al (1990-2001)[12]	4035	Vellore	10.8	16.8	9.5	8.4	6.9	13.5	1	2.8
Mayur suryawanshi et al (2007-2010)[1]	227	Pune	15.9	11.01	12.3	9.25	8.3	0.88	8.35	9.69
Golay etal (2010-2012) [2]	410	Kolkata	27.1	27.4	24.6	7.3	6.5	1.46	1.2	0.49
Rathi et al (2002-2007) [10]	364	Chandigarh	14.8	30.6	24.4	1.8	6.9	-	3.3	0.3
wilfred et al (2008-2014) [9]	213	Bangalore	42.7	17.8	24.4	1.9	2.8	-	0.9	0.9
Present study	70	Chennai	25.71	17.14	10	5.73	7.14	12.9	2.86	15.71

Studies in various parts of India on the spectrum of glomerular diseases causing adult onset nephrotic syndrome have shown that MN and MCD were the predominant primary glomerular disease, although an increasing trend of FSGS has also been recently observed .FSGS is the most common cause in the study by Rathi et al.[10] In earlier studies done in various parts of India (Aggarwal HK et al,[13] Golay et al,[2] MCD was found to be the most common cause of nephrotic syndrome in adults.In Recent years also MCD has been found in a few studies Wilfred et al,[9] to be the most common overall cause of nephrotic syndrome.

In our study the most common lesion encountered was Minimal Change Disease which accounted for 25.71 % (18/ 70 patients). Similarly Gandra D and Chennamaneni B et al,[11] observed 20.6%, Golay et al,[2] observed 27.1%, Out of 18 patients majority were between 13 to 20 years; the incidence of MCD was found to be decreasing after 21 years. Light microscopically all of them had normal findings. Immunofluoresecnce (IgG, IgA, IgM, C3c, C1q, fibrinogen, kappa, lamda) were negative in all of the patients.

This study throws light on the changing trends of glomerular lesions presenting with NS. MCD was a major type of primary glomerulonephritis in studies conducted in India, mainly in South India, whereas the incidence of MCD was found to be reducing in the other parts of the world. From the clinical standpoint these patients respond well to steroid therapy and have a better prognosis.

In our study FSGS was the second most common histologic subtype identified in renal biopsy in 12 / 70 patients (17.14%) similarly observed by N Balakrishnan Etal,[12] 16.8%, wilfred etal,[9] 17.8%. Primary (Idiopathic) FSGS was found in 83.3% (10/12) of patients, Secondary FSGS was found in 16.7% (2/12) patients. Light microscopically 2/12 renal bopisies had Tip variant of FSGS, both of them were of younger age group without associated comorbidities. 9/12 showed FSGS-NOS type, out of 9 patients one patient had SLE, 2 patients had hypertension, 1/12 had collapsing glomerulopathy which was presented in 58 years male with elevated blood urea & serum creatinine. In Immunofluoresecnce 3/12 renal biopsies had segemental C3 positivity in capillary walls, out of these 3 patients 2 of them were of FSGS NOS type, one was collapsing glomerulopathy, rest of the cases were negative for all the markers.

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We noted that the incidence of diabetic nephropathy (15.71%) and post infectious glomerulonephritis (12.9%) presenting with nephrotic syndrome was high in our study as compared to other studies.[1,2,,10,11,12]

Patients with postinfectious glomerulonephritis usually present with nephritic syndrome but some of them rarely may present with atypical features like nephrotic syndrome ,anuria, acute renal failure, persistent hypertension. In our study clinically 6 patients of PIGN presented with nephrotic syndrome, 2 of them presented with overlap between nephritic and nephrotic syndrome. One patient presented with rapidly progressive renal failure with nephrotic syndrome. 2 patients had associated diabetes mellitus and hypertension, all of them had light microscopic findings of endocapillary proliferation, 3 patients had less than 30% of glomeruli showed cellular crescents IF also showed IgG, C3 coarse granular capillary wall positivity in all of the biopsies. As with available data they need only supportive treatment and prognosis also good but long term follow up needed Among adult onset nephrotic syndrome.

CONCLUSION

In our study renal biopsy was done in 70 cases of adults who presented clinically with nephrotic syndrome. Final Diagnosis of specific histological type was arrived with correlation of Clinical , Laboratory findings ,Histological pattern of injury, Immunofluorescence panel of markers .Primary glomerular diseases are most common 72.91%.Most common Histologic subtype in adult nephrotic syndrome is Minimal Change Disease Maximum number of cases were in the age group of 12-20 years This study emphasises importance of renal biopsy with Light microscopy ,special stains and Immunofluorescence in all cases of nephrotic syndrome.

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