ORIGINAL ARTICLE

Spectrum of Glomerular Diseases in Adults: A Study from North Eastern India

Md Jamil[1*], PK Bhattacharya[2], Vandana Raphael[2], Yookarin Khonglah[3], Monaliza Lyngdoh[1], Akash Roy[4]

Abstract

Aims and Objectives: To study the clinical profile of patients with glomerular diseases and to study pattern of glomerular diseases in adults.

Methodology: A hospital based retrospective observational study from North Eastern India that includes biopsy proven glomerular disease (GD) in adults. Patients with inadequate biopsy sampling; incomplete medical data and biopsy of transplanted kidney were excluded.

Results and Observations: A total of 102 patients were included of which 25 (24.5%) were male and 77(75.5%) were female with M: F ratio of 0.32:1. The mean age of presentation was 30.6 years. Nephrotic syndrome (57.8%) was the commonest clinical diagnosis followed by acute nephritic syndrome (31.4%), unexplained AKI (5.9%), unexplained CKD with normal kidney size (2.9%) and asymptomatic urine abnormality (1.9%). On histo-pathological analysis primary GD and secondary GD was diagnosed in 46(45.1%) and 53(52.0%) respectively. Overall Lupus nephritis (LN) was found to be the commonest (41.2%) GD. Among the primary GD, MCD (11.8%) was the most frequent followed by MPGN (10.8%), Membranous Nephropathy, (5.8%), IgA nephropathy (5.8%) and Focal segmental glomerulosclerosis (5.8%). Three (2.9%) patients did not have any specific diagnosis and were labelled as chronic glomerulo- nephritis.

Conclusion: As the pattern of glomerular disease varies from one region to another, the pattern of glomerular disease in the north eastern India also varies from the other regions of India. Nephrotic syndrome remains the most common indication of renal biopsy in this region similar to the other parts of India. Unlike other studies from outside North Eastern India, this study show that females are more commonly involved with majority of them having secondary GD and this is due to LN which was diagnosed as the most common GD in the present study.

Background

Glomerular disease (GD) is one of the commonest forms of renal disease that may present clinically as varieties of syndrome but some times it may be diagnosed in patients who come for routine check-up and found to have asymptomatic urine abnormalities (AUA). Epidemiological study in relation to glomerular diseases (GD) requires good histopathological evidence along with clinical, biochemical and immunological correlation for proper diagnosis. It has been learned that pattern of GD varies from one country to another and also changes with time within the same country.[1] In countries like India with a population of more than 1.2 billion, the pattern of GD even may vary from one region to another. Published reports show that membranous nephropathy (MN) is the commonest cause of GD in North India,[2,3] report from South India shows minimal change disease(MCD) as more predominant,[4,5] and in Western India among young adults, primary IgA nephropathy is more common.[6] Published data also shows that pattern of GD varies among different ethnic groups of the world.[7] As the population in north eastern India is different from the rest of the country genetically,[8] with different socio cultural practice, we do expect that the pattern of the GD or any other disease will different from the pattern of diseases prevalent in other parts of India. As publish data is not available to the best of our knowledge, relating to the pattern of GD in adult population from north eastern India, we hereby present a study to find out the pattern of GD prevalent in North Eastern India among adult population.

Aims and objective of the present study are

a. To study the clinical profile of patients.

b. To study pattern of glomerular diseases.

Procedures

The present study is a hospital based retrospective study conducted in a tertiary care medical institute from North Eastern India. The study was approved by the Institute Ethical Committee. Data for the present study were collected from the patient's medical record file and renal biopsy record from the histopathology section of department of Pathology. The study includes only adult patients (above 18 years of age) with biopsy proven GD, who attended the institute from January 2013 to September 2015. Patients with inadequate biopsy sampling, incomplete medical data and biopsy of transplanted kidney were excluded.

Renal biopsy in the institute is done under ultra-sonographic guidance with the help of disposable automated biopsy gun by department of radio-intervention and biopsy samples

[1]Assistant Professor, [2]Professor, [3]Associate Professor, [4]PGT, North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences, Mawdiangdiang, Shillong, Meghalaya; *Corresponding Author
Received; 22.05.2017; Revised: 11.02.2018; Accepted: 11.04.2018

Table 1: Age and Sex distribution in different type of glomerular diseases

	18-30 years		31-40 years		41-50 years		51-60 years		>60 years		Total	
	M n(%)	F n(%)	M n(%)	F n(%)	M n(%)	F n(%)	M n(%)	F n(%)	M n(%)	F n(%)	M n(%)	F n(%)
MCD	2(2.0)	5(4.9)	1(1.0)	1(1.0)	0(0)	2(2.0)	0(0)	1	0(0)	0(0)	3(2.9)	9(8.8)
MN	2(2.0)	1(1.0)	1(1.0)	1(1.0)	0(0)	0(0)	1(1.0)	0(0)	0(0)	0(0)	4(3.9)	2(2.0)
FSGS	3(2.9)	3(2.9)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	3(2.9)	3(2.9)
MPGN	2(2.0)	3(2.9)	2(2.0)	0(0)	1(1.0)	1(1.0)	2(1.9)	0(0)	0(0)	0(0)	7(6.8)	4(3.9)
MesGN	0(0)	2(2.0)	0(0)	0(0)	0(0)	0(0)	1(1.0)	1(1.0)	0(0)	0(0)	1(1.0)	3(2.9)
DN	1(1.0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	2(2.0)	0(0)	0(0)	1(1.0)	2(2.0)
LN	1(1.0)	33(32.4)	0(0)	5(4.9)	0(0)	2	0(0)	1(1.0)	0(0)	0(0)	1(1.0)	41(40.2)
IgA	1(1.0)	3(2.9)	1(1.0)	1(1.0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	2(2.0)	4(3.9)
Anti GBM	1(1.0)	1(1.0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	1(1.0)	1(1.0)
Hep C GN	0(0)	0(0)	0(0)	0(0)	1(1.0)	0(0)	0(0)	0(0)	0(0)	1(1.0)	1(1.0)	1(1.0)
Pauci GN	0(0)	0(0)	0(0)	0(0)	0(0)	1(1.0)	0(0)	0(0)	0(0)	0(0)	0(0)	1(1.0)
CGN	0(0)	3(2.9)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	3(2.9)
HTN Nep	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	1(1.0)	0(0)	0(0)	0(0)	1(1.0)
HSP	0(0)	1(1.0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	1(1.0)
Crescentric GN	1(1.0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	1(1.0)	0(0)
LCDD	0(0)	0(0)	0(0)	0(0)	0(0)	1(1.0)	0(0)	0(0)	0(0)	0(0)	0(0)	1(1.0)
Total	14 (13.7)	55 (53.9)	5 (4.9)	8 (7.8)	2 (1.9)	7 (6.9)	4 (3.9)	6 (5.9)	0 (0.0)	1 (1.0)	25 (24.5)	77 (75.5)

n: number of patients, M:F: male to female ratio, GN: glomerular nephritis, HTN: hypertension, Sr creat: serum creatinine, MCD: minimal change disease, MN: membranous nephropathy, FSGS: focal segmental glomerulosclerosis, MPGN: membranoproliferative glomerulonephritis, MesPGN: mesangial proliferative glomerulonephritis, DN: diabetes nephropathy, LN: lupus nephritis, IgAN: IgA nephropathy, Anti GBM: anti glomerual basement membrane, Hep C: hepatitis C related, HSP: Henoch Scholein purpura, CGN: chronic glomerulonephritis, Nep: nephropathy. Cres: Crescentic, LCDD: light chain deposition disease

were collected in normal saline and formalin bottles. Renal biopsy samples were subjected to light microscopy (Haematoxylin and Eosin, Periodic acid Schiff, Masson's Trichrome and Periodic Methenamine Silver) and immunofluorescence study (Kappa light chain, Lambda light chain, IgG, IgA, IgM and C3). Electron microscopy could not be done due to non availability of the facility.

Patient related information collected in the present study were following: Central Registration no(CR no), In Patient no(IP no), name, age, sex, relevant medical history, indication for renal biopsy, histopathological diagnosis and laboratory reports that includes biochemical investigation reports (serum(sr) creatinine, blood urea, liver function test, lipid profile study, thyroid profile study, blood sugar), immunology and serology reports (antinuclear antibody(ANA), anti-dsDNA antibodies, C3, C4, pANCA, cANCA, anti GBM antibodies, RA factors, HBsAg, Anti HCV, HIV I&II), haematological reports, routine urine examination reports, 24 hours urinary protein estimation and other significant findings during data collection.

Indications for renal biopsy were categorized into following groups and standard definition for clinical syndrome was used: nephrotic syndrome, nephritic syndrome, acute kidney injury (AKI), chronic kidney diseases (CKD) and asymptomatic urinary abnormalities. In CKD, renal biopsy was performed if kidney size is within normal limit with intact corticomedullary differentiation for unexplained renal failure.

Data collected were entered in Microsoft Excel 2010 spread sheet for statistical analysis. Results are expressed as mean or median± standard deviation for continuous data and as percentage for categorical data.

Results

A total 108 number of patients who had renal biopsy were analysed. Out of 108 patients, 6(six) were excluded from the study because of inadequate data available for these patients. Out of 102 patients who underwent renal biopsy four patients developed major complication, three of them required blood transfusion due to haemorrhage and one developed psoas abscess post biopsy. Out of 102 patients 25(24.5%) were male and 77(75.5%) were female, male to female ratio was 0.32:1. The mean age of presentation was 30.6 years (male- 33.3 and female- 29.7 years). Age and sex distribution in different types of GD is shown in Table 1. Nephrotic syndrome (57.8%) is the commonest indication for renal biopsy in the present study followed by acute nephritic syndrome (31.4%), unexplained AKI (5.9%), unexplained CKD with normal kidney size (2.9%) and asymptomatic urine abnormality (1.9%). Lupus nephritis (LN) is the commonest GD in the present study (41.2%), followed by MCD (11.8%) and MPGN (10.8%). Primary GD and secondary GD was diagnosed in 46(45.1%) and 53(52.0%) number of patients respectively. Three (2.9%) patients did not have any specific diagnosis for GD type, as biopsy specimen show advance diseases and were levelled as chronic glomerulo nephritis. Different clinical manifestations at the time of presentation in different types of GDs are shown in Table 2.

Discussion

The present study provide pattern of GD in adults (18 years or above) from North Eastern part of India. Population in this region differ from the rest of India. Genetically majority of the people in this region are more similar to east Asian population along with different cultural and food habit from the other parts of India.[9] In present study, GD was found to be more common in female patients that is in contrast to other study reported from other part of India where it was reported to be more common in males[10] but female predominance has been reported in studies from South Africa and Oman.[11,12] In the present study commonest indication for the renal biopsy was nephrotic syndrome

Table 2: Different clinical manifestations at the time of presentation in different types of glomerular diseases

	n(%)	M:F	Mean age	Nephrotic proteinuria n(%)	Subnephrotic proteinuria n(%)	HTN n(%)	Haematuria n(%)	Raised sr creat n(%)	Dyslipidemia n(%)
MCD	12(11.8)	0.3:1	32.1	12(100)	0(0)	6(50)	0(0)	0(0)	9(75)
MN	6(5.9)	2:1	33	5(83.3)	1(16.7)	4(66.6)	1(16.7)	0(0)	6(100)
FSGS	6(5.8)	1:1	22.2	4(66.6)	2(33.3)	4(66.6)	2(33.3)	2(33.3)	5(83.3)
MPGN	11(10.8)	1.7:1	37.1	10(90.9)	1(9.1)	8(72.7)	8(72.7)	6(54.5)	8(72.7)
MesPGN	4(3.9)	0.3:1	38.5	2(50)	2(50)	3(75)	2(50)	2(50)	2(50)
DN	3(2.9)	0.5:1	47	1(33.3)	2(66.6)	3(100)	3(100)	3(100)	1(33.3)
LN	42(41.2)	0.02:1	26.3	14(33.3)	28(66.6)	21(50)	20(47.6)	10(23)	9(21.4)
IgA	6(5.8)	0.5:1	28.2	4(66.6)	2(33.3)	4(66.6)	5(83.3)	3(50)	4(66.6)
Anti GBM GN	2(2.0)	1:1	23.5	1(50)	1(50)	2(100)	2(100)	2(100)	0(0)
Hep C GN	2(2.0)	1:1	54	1(50)	1(50)	2(100)	1(50)	2(100)	0(0)
HSP	1(1.0)	-	-	1(100)	0(0)	0(0)	1(0)	0(0)	0(0)
Wegener GN	1(1.0)	-	-	1(100)	0(0)	1(100)	1(100)	0(0)	1(100)
CGN	3(2.9)	3:0	25	1(33.3)	2(66.6)	3(100)	2(66.6)	3(100)	0(0)
HTN Nep	1(1.0)	-		1(100)	0(0)	1(100)	0(00)	1(100)	1(100)
Cre GN	1(1.0)	-		1(100)	0(0)	1(100)	1(100)	1(100)	1(100)
LCDD	1(1.0)	-	-	0(0)	1(100)	1(100)	0(0)	1(100)	1(100)

n: number of patients, M:F: male to female ratio, GN: glomerular nephritis, HTN: hypertension, Sr creat: serum creatinine, MCD: minimal change disease, MN: membranous nephropathy, FSGS: focal segmental glomerulosclerosis, MPGN: membranoproliferative glomerulonephritis, MesPGN: mesangial proliferative glomerulonephritis, DN: diabetes nephropathy, LN: lupus nephritis, IgAN: IgA nephropathy, Anti GBM: anti glomerual basement membrane, Hep C: hepatitis C related, HSP: Henoch Scholein purpura, CGN: chronic glomerulonephritis, Nep: nephropathy. Cres: Crescentic, LCDD: light chain deposition disease

Table 3: Comparison of patterns of glomerular diseases of present study with other studies from India and one neighbouring country

	Present study	Golay et al[10]	Sunita et al[2]	Das et al[4]	Habib MA et al[14]
Total no of cases	102	666	58	1849	95
Mean age/age group (in years)	30.06/-	28±14.62/-	-/15-76	32.27/10-80	30.29/18-70
M:F	0.32:1	1.05:1	1.3:1	1.4:1	1:1.5
MCD	11.8%	20%	8.6%	15.1%	10.53%
MN	5.8%	12.01%	25.8%	7%	7.37%
FSGS	5.8%	18.02%	6.8%	10.5%	11.58%
MPGN	10.8%	5.25%	-	3.9%	4.21%
IgAN	5.8%	8.11%	5.2%	4.4%	6.32%
MesPGN	3.9%	0.6%	6.8%	5.2%	15.79%
LN	41.2%	15.32%	12.1%	14.6%	6.32%
DN	2.9%	0.15%	1.7%	1.2%	1.05%
Amyloidosis	-	0.75%	6.8%	1.5%	1.05%
CGN	2.9%	3%	-	6.7%	2.11%
HSP	0.98%	-	-	0.3%	-
LCDD/MM	0.98%	0.45%	-	0.4%	-

M:F: male to female ratio, MCD: minimal change disease, MN: membranous nephropathy, FSGS: focal segmental glomerulosclerosis, MPGN: membranoproliferative glomerulonephritis, IgAN: IgA nephropathy, MesPGN: mesangial proliferative glomerulonephritis, LN: lupus nephritis, DN: diabetes nephropathy, CGN: chronic glomerulonephritis, , HSP: Henoch Scholein purpura, LCDD: light chain deposition disease, MM: multiple myloma

followed by nephritic syndrome, similar to the finding reported in the other studies from India and other SAARC countries.[13-15] AUA as an indication for renal biopsy was found only in 1.9% of patients in our study but other studies shown AUA as an indication for renal biopsy in higher proportion of cases.[16,17] In our study, primary glomerular disease constitute 48% and secondary GD 52.0% of the cases, this finding differs from the reports of other studies from other parts of India, where they reported primary GD as more common than secondary GD.[18] The high proportion of secondary GD and female predominance in the present study may be due to a very high prevalence of lupus nephritis in the region, as LN was found to be the commonest cause of GD in the present study which mostly affect the females. Similar finding of female predominance in association with high proportion of LN has been reported from Oman.[12] Among the primary GD, minimal change disease diagnosed as most frequent with an overall percentage of 11.8% followed by MPGN (10.8%). MN, IgA nephropathy and FSGS rank third among the primary GD with 5.8% each. Comparison of the present study with some other studies from Indian and neighbouring Bangladesh has been shown in Table 3. Among the secondary causes of GD majority are due to LN that constitute almost 41.2% of the total GD. DN was diagnosed in three (2.9%) cases, all of them had microhematuria at presentation and two out of three had AKI. The present study shows a higher prevalence of DN compared to other studies. Secondary GD due to chronic infection was found in 2% of cases, all of them were due to chronic hepatitis C infection. One limitation of the present study was that none of the biopsy sample has been examined by electron microscope and this may be one of the reasons that disease like Alport's syndrome, thin membrane diseases could have been missed.

Conclusion

As the pattern of glomerular disease varies from one region to another, the pattern of glomerular disease in the north eastern India also varies from the other regions of India. Nephrotic syndrome remains the most common indication of renal biopsy in this region similar to the other parts of India. Unlike other studies from outside North Eastern India, this study show that females are more commonly involved with majority of them having secondary GD and this is due to LN which was diagnosed as the most common GD in the present study.

References

1. Hanko JB, Mullan RN, O'Rourke DM, McNamee PT, Maxwell AP, Courtney AE. The changing pattern of adult primary glomerular disease. *Nephrol Dial Transplant* 2009; 24:3050-4. doi: 10.1093/ndt/gfp254. Epub 2009 Jun 1.
2. Singh S, Marwah N, Sen R, Sangwan M, Verma R, Ralli M. Profile of renal biopsies in a tertiary care hospital. *International J of Healthcare and Biomedical Research* 2014; 2:53-59.
3. Mannan R, Bhasin TS, Singh PA, Misra V, Manjari M. The Pattern of Glomerulonephritis in the North Indian Gangetic PlainA 13-Year Epidemiological Study. *Journal of Clinical and Diagnostic Research* 2012; 6:855-858.
4. U. Das, K. V. 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: 250-257.
5. Jeganathan J, Kumar S, Khalid M, Maroli C. Pattern of glomerular diseases in a tertiary care center in south India: A prospective study. *Saudi J Kidney Dis Transpl* 2013; 24:168-71.
6. Vanikar AV, Kanodia KV, Patel RV, Trivedi HL. Primary IgA Nephropathy in western India. *Indian J Nephrol* 2005; 15:227-31.
7. Francesco Pesce and Francesco Paolo Schena. Worldwide distribution of glomerular diseases: the role of renal biopsy

registries. *Nephrol Dial Transplant* 2010; 25:334–336 doi: 10.1093/ndt/gfp620.

8. Reddy BM, Langstieh BT, Kumar V, Nagaraja T, Reddy ANS, Meka A, et al. Austro-Asiatic Tribes of Northeast India Provide Hitherto Missing Genetic Link between South and Southeast Asia. *PLoS ONE* 2007; 2:e1141. doi:10.1371/journal.pone.0001141.
9. Cordaux R, Saha N, Bentley GR, Aunger R, Sirajuddin SM, Stoneking M. Mitochondrial DNA analysis reveals diverse histories of tribal populations from India. *European Journal of Human Genetics* 2003; 11**:**253–264. doi:10.1038/sj.ejhg.5200949.
10. Golay V, Trivedi M, Abraham A, Roychowdhary A, Pandey R. The spectrum of glomerular diseases in a single center: A clinicopathological correlation. *Indian Journal of Nephrology* 2013; 23:168-175. doi:10.4103/0971-4065.111833.
11. Okpechi I, Swanepoel C, Duffield M, Mahala B, Wearne N, Alagbe S, Barday Z, Arendse C, Rayner B. Patterns of renal disease in Cape Town South Africa: a 10-year review of a single-centre renal biopsy database. *Nephrol Dial Transplant* (2010) 1 of 9 doi: 10.1093/ndt/gfq655
12. Al Riyami D, Al Shaaili K, Al Bulushi Y, Al Dhahli A, Date A. The Spectrum of Glomerular Diseases on Renal Biopsy: Data From A Single Tertiary Center In Oman. *Oman Medical Journal* 2013; 28:213-215. doi:10.5001/omj.2013.58.
13. Khakurel S, Agrawal R K, Hada R. Pattern of glomerular disease in Nepal: A single-center experience. *Saudi J Kidney Dis Transpl* 2015; 26:833-8.
14. Habib MA, Badruddoza SM. Pattern of glomerular diseases among adults in Rajshahi, the Northern Region of Bangladesh. *Saudi J Kidney Dis Transpl* 2012; 23:876-80.
15. Preethika Angunawela. Diagnosis of glomerulonephritis using light microscopical, immunological and ultrastructural techniques. *Journal of the Ceylon College of Physicians* 1995; 28:46-49.
16. Aatif T, Maoujoud O, Montasser DI, Benyahia M, Oualim Z. Glomerular diseases in the Military Hospital of Morocco: Review of a single centre renal biopsy database on adults. *Indian Journal of Nephrology* 2012; 22:257-263. doi:10.4103/0971-4065.101244.
17. López-Gómez JM, Rivera F, on behalf of Spanish Registry of Glomerulonephritis. Renal Biopsy Findings in Acute Renal Failure in the Cohort of Patients in the Spanish Registry of Glomerulonephritis. *Clinical Journal of the American Society of Nephrology : CJASN* 2008; 3:674-681. doi:10.2215/CJN.04441007.
18. Reshi AR, Bhat MA, Najar MS, et al. Etiological profile of nephrotic syndrome in Kashmir. *Indian Journal of Nephrology* 2008; 18:9-12. doi:10.4103/0971-4065.41281.