"Kidney Biopsy - An Important Tool In Diagnosing Kidney Diseases : A Single Centre Observation"

Prakash Khetan[1]

ABSTRACT

Introduction : Spectrum of native renal biopsy reports varies geographically. In this paper the prevalence of renal biopsy disorders was studied and was compared with other studies.

Material and Methods : Retrospective evaluation was done at Shravan Hospital, Nagpur, India. All the native kidney biopsies from January 2011 to December 2019 were included in the analysis. Demographic details of the patients along with indication for undergoing kidney biopsy were recorded. Renal diseases reported on kidney biopsy were classified as glomerular, tubulo-interstitial, predominant vascular involvement and other disease categories. SPSS software version 17 was used for statistical analysis.

Results : Total 687 native kidney biopsies were performed during the study period. Biopsies which revealed inadequate tissue for interpretation were excluded from analysis. Among the glomerular diseases, 71.35% were primary glomerulopathies and 28.65% were secondary glomerular diseases. Minimal change disease (41.56%) was the most common primary glomerular disease followed by focal segmental glomerulosclerosis (FSGS) (17.33 %) and membranous nephropathy (15.20%) in decreasing order. Among secondary glomerulopathies, lupus nephritis was the most common histopathological diagnosis (50.89%) followed by diabetic nephropathy (13.02%), infection related glomerulonephritis (12.42%), ANCA associated vasculitis (8.88%), amyloidosis (8.30%) & light chain deposition disease (1.18%).

In tubulointerstitial disease, 15.12 % had acute tubulointerstitial nephritis while 62.79% had acute tubular injury. Cast nephropathy was seen in 8.14 % & chronic tubulointerstitial disease was found in 13.95% patients.

Conclusions : The most prevalent diagnosis in our study was minimal change disease followed by FSGS. Data analysis at regular interval should be carried out to find the changing trend of prevalent native kidney disease.

Key-words : Renal biopsy spectrum, Minimal change disease (MCD), Focal segmental glomerulosclerosis (FSGS), Membranous nephropathy

Introduction :

Renal biopsy is important in diagnosis of kidney disease along with prognostication. There is scarcity of biopsy proven native kidney disease data in our region. We tried to assess the spectrum of biopsy proven renal disorders in our population in the decade of 2010 to 2020.

Materials and Methods :

Retrospective analysis was done at Shravan Hospital, Nagpur in the city of Maharashtra, India. All the native kidney biopsies from January 2011 to November 2019 were included in the analysis. Kidney biopsy was performed by nephrologist with Bard® Max core disposable core biopsy instrument after localization by the radiologist. Kidney tissue samples were collected for light microscopy (LM) and immunofluorescence (IF) studies in all the patients and for electron microscopy (EM) in selected patients. Tissue for light microscopy was stained using H and E, periodic acid-Schiff, silver methenamine, and Trichrome stains. Additional special stains were used as per indication. IF studies were performed with antibodies against IgA, IgM, IgG, C3, C1q and light chains (Kappa and Lambda). Staining for serum amyloid associated protein (SAA) was performed for cases of amyloidosis. A biopsy core was labelled as adequate sample if it

[1]Senior Consultant Nephrologist and Transplant Physician, Shravan Hospital and Kidney Institute, Nagpur

Address for Correspondence -
Dr. Prakash Khetan
E-mail : prakashkhe@gmail.com

Received on 14th October 2020 Accepted on 23rd December 2020

contained 5 glomeruli for glomerular lesions and 10 glomeruli in cases of tubulointerstitial disease.[1]

Renal diseases reported on kidney biopsy were classified as glomerular, tubulo-interstitial, predominant vascular involvement and other disease categories. Glomerular disease (GD) were further sub-classified as primary glomerular disease and secondary glomerular diseases. The final diagnosis was made for each patient on the basis of both clinical and histological investigations. Where a biopsy revealed more than one diagnosis, the most relevant one to the indication for renal biopsy was recorded. Biopsy samples having inadequate number of glomeruli for either LM or IF study were excluded from analysis. Transplant kidney biopsies were also excluded. Descriptive statistics was used and results were expressed as frequencies, percentages, and mean ± SD. SPSS software version 17 was used for statistical analysis.

Results :

Total 687 native kidney biopsies were performed during the study period.

Glomerular disease (GD)

Among the glomerular diseases, 71.35% were primary glomerulopathies and 28.65% were secondary glomerular diseases. MCD (n=175, 41.56%) was the most common primary glomerular disease (GD). FSGS, membranous nephropathy and chronic glomerulonephritis disease were the other common primary GD seen in 17.33%, 15.20% & 9.50% of the biopsies. Other reported primary GD were Ig A nephropathy (6.60%), immune complex MPGN (6.17%) & Alport syndrome was seen in one patient (0.5%). ***(Table 1)***

Among secondary glomerulopathies, lupus nephritis was the most common histopathological diagnosis (50.89%) followed by diabetic nephropathy (13.02%). Infection related glomerulonephritis (12.42%), ANCA associated vasculitis (8.88%), amyloidosis (8.30%) & light chain deposition disease (1.18%) were other secondary GD. ***(Table 2)***

Tubular pathology

Out of the 86 patients with tubulointerstitial involvement, 54 (62.79%) had acute tubular injury whereas 13 (15.12%) had acute tubulointerstitial nephritis. Cast nephropathy was seen in 7 (8.14 %) & chronic tubulointerstitial disease was found in 12 (13.95%) patients.

Vascular pathology

Eleven patients (1.60%) showed thrombotic microangiopathy.

Discussion :

Glomerulonephritis is the most frequent type of kidney biopsy proven disorder and is also common cause of end-stage renal disease (ESRD).[2] Our study highlights mainly primary, secondary glomerular pathologies and other pattern of biopsy proven kidney diseases.

Glomerular disease (GD)

Our data showed among the glomerular diseases, approximately 70% were primary glomerulopathies and around 30% were secondary. MCD was the most common primary GD followed by FSGS & membranous nephropathy. This observation is nearly similar to other studies from our country where the most common cause was MCD, followed by FSGS, MN, MesPGN, and MPGN. It has variable geographic distribution, incidence of MCD was more in other studies reported from India.[3,4,9]

In other Asian countries like Japan, the most common cause of NS was MCD, followed by MN and IgAN.[5] Our results are contrary to the result of Czech registry, where MN and IgAN were the most frequent diagnoses.[6] Primary GD was more common than secondary glomerulopathy in our study as seen in other studies too.[5-7]

IgAN was most common glomerular disease in few other studies as seen in some European and Asian countries.[5,6,8] This is in contrast to our & few other studies from this part of the world where IgAN was less common.[3-5] In our center, we perform renal biopsy in CKD with active urinary sediments if kidney size is within normal limit. A significant

proportion of such patients were found to have chronic glomerulonephritis (9.50%).

MN was third most common glomerular disease in our data analysis. Whereas it was more common in other few studies as reported in Latin America and the USA.[9,10] Other literatures have shown MN to be the third or fourth common cause of PGD.[5,6,8]

FSGS was second common primary GD in our study. Recently, there has been worldwide increase in the incidence of FSGS.[11,12] Our finding was similar to another study carried out in India.[3] It was the most common primary GD seen in other studies reported from neighbouring countries and Brazil.[7,13,14]

Secondary GD

The most common secondary GD in our study was lupus nephritis (LN) which is similar to other studies across the world.[5,8,13] Diabetic nephropathy, infection related GN, ANCA vasculitis and amyloidosis were the next frequent causes. High incidence of diabetic nephropathy was also found in other studies.[6,8] We found infection related glomerulonephritis (IRGN) accounting for 11.67 % of secondary GD. Recently, incidence of IRGN in children and adults in industrialized and developing countries has declined over past few decades.[15,16]

In similar studies from our and neighbouring country, they had reported a high incidence of secondary amyloidosis due to increased prevalence of chronic infectious disorders like tuberculosis.[3,13]

Tubulointerstitial Pathology

In our study, there was more incidence of acute tubular injury (62.79%) as compared to acute tubulointerstitial nephritis (15.12%). Similar less incidence of tubulointerstitial nephritis as primary pathology was seen in many other studies.[4,8,13]

Vascular Finding

Eleven patients (1.60%) showed thrombotic microangiopathy. Our study has found few patients presenting primarily as thrombotic microangiopathy. All these patients were hypertensive at presentation in our study.

Conclusions :

Minimal change disease is the most common primary glomerular disease in our study population. There is need of renal biopsy registry which can better show renal biopsy profile & will help in better understanding of epidemiology of renal diseases prevalent in our region.

Limitations :

Small sample size results could not be generalized.

Conflict of Interest :

Authors declare that there is no conflict of interest.

Funding :

None

References :

1. Agarwal SK, Sethi S, Dinda AK. Basics of kidney biopsy: A nephrologist's perspective. Indian J Nephrol 2013;23:243-52.
2. Naini AE, Harandi AA, Ossareh S, Ghods A, Bastani B. Prevalence and clinical findings of biopsy-proven glomerulonephritis in Iran. Saudi J Kidney Dis Transpl 2007;18:556-64.
3. Das U, Dakshinamurty KV, Prayaga A. Pattern of biopsy-proven renal disease in a single center of South India: 19 years experience. Indian J Nephrol 2011;21:250-7.
4. Chugh KS, Shakhuja V. Glomerular disease in the tropic. Am J Nephrol. 1990;10:437-50.
5. In Joon Choi, HyeonJooJeong, Dae Suk Han. An Analysis of 4,514 Cases of Renal Biopsy in Korea. Yonsei Med J. 2001;42:24754
6. Rychlík1 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.
7. 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.
8. Lei-shi li, 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.
9. Chávez Valencia V, Orizaga de La Cruz C, Becerra Fuentes JG, Fuentes Ramírez F, Parra Michel R, Aragaki Y et al. Epidemiology of glomerular disease in adults: A database review. Gac Med Mex 2014;150:403-8.
10. Murugapandian S, Mansour I, Hudeeb M, Hamed K, Hammode E, Bijin B et al. Epidemiology of glomerular disease in Southern Arizona: Review of 10-year renal biopsy data. Medicine (Baltimore) 2016;95: e3633.
11. Braden G, Mulhern J, Germain M. Changing incidence of idiopathic glomerular disease in adults. J Am SocNephrol. 1995;6:413.
12. Haas M, Spargo BH, Conventry S. Increasing incidence of focal segmental glomerulosclerosis among adult nephropathies. Am J Kidney Dis. 1995;26:740-50.

13. Mubarak M, Kazi JI, Naqvi R, Ahmed E, Akhter F, Naqvi SA, et al. Pattern of renal diseases observed in native renal biopsies in adult in a single center in Pakistan. Nephrology. 2011;16:87-92.
14. Ahmed H, Jamal S, AI Wakeel. Pattern of glomerular disease in Saudi Arabia. Am J Kidney Dis. 1996;27:797-802.
15. Ilyas M, Tolaymat A. Changing epidemiology of acute post-streptococcal glomerulonephritis in Northeast Florida: a comparative study. Pediatr Nephrol 2008; 23: 1101-1106.
16. Swaminathan S, Leung N, Lager DJ, Melton LJ 3rd, Bergstralh EJ, Rohlinger A et al. Changing incidence of glomerular disease in Olmsted County, Minnesota: a 30-year renal biopsy study. Clin J Am Soc Nephrol 2006; 1: 483-487