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Epidemiology of Renal Disease in Thrissur - A Biopsy Audit

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ABSTRACT

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The audit has thrown light into the prevalence of various kidney diseases occurring in population of Thrissur district. The younger age group needed biopsy the most. Primary glomerular diseases are the most common renal diseases in our setting. Among the primary glomerular diseases it is nephrotic syndrome which is the most commonly biopsied. FSGS is the most common cause of nephrotic syndrome. IgA nephropathy is the most common primary glomerular disease. Lupus nephritis is the most common cause for secondary glomerular disease. The proportion of males among the patients with lupus nephritis is slightly higher than usual. Crescentic Glomerulonephritis is an important cause of acute renal failure, while diabetes mellitus is the most common situation where biopsy is done for chronic renal disease. The elderly population has a greater incidence of post infectious proliferative Glomerulonephritis while compared to data from developed countries.

Keywords: Renal biopsy, IgA nephropathy, Glomerular diseases

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BACKGROUND

The epidemiology of renal disease in Kerala is not well documented and data on renal histology is limited. Therefore, a retrospective clinical analysis was conducted to study renal biopsies and get an insight into the prevalence of the various renal diseases in Thrissur district of Kerala.

INTRODUCTION

Renal biopsy remains the main investigation in the definite diagnosis of kidney diseases. In addition, it plays a major role in determining the management and prognosis of parenchymal renal disease particularly glomerular diseases. The collection of demographic, clinical and laboratory data at the time of biopsy and the set up of a database are useful tools for studying renal parenchymal diseases. The development of a renal biopsy registry in each country promotes many advantages and these include comparison in incidence of renal diseases, identification of different policies and practices in renal biopsy in different areas, linkage with other registries such as dialysis or transplant registry and identification of rare renal diseases. Thus, the registry is a source of epidemiological data that would provide useful information in the planning of health care and in organizing prospective clinical studies. There are several epidemiologic population based studies of biopsy proven nephropathies with detailed Clinicopathological correlations done in different parts of India. But such data are rare from Kerala. The aim of the present study was to identify the prevalence of various renal diseases in Thrissur district and neighbouring areas of Palghat, Malappuram and Ernakulam districts to which this institution caters.

AIM

The aim of the study was to assess the incidence of various types of renal diseases in Thrissur, on the basis of renal biopsy findings correlated with the clinical data. Government Medical College Thrissur caters to a population of about 3 million from four districts of central Kerala, belonging largely to the lower socioeconomic status.

MATERIALS AND METHOD

The histopathological diagnoses of renal tissue were analysed retrospectively from 663 kidney biopsies performed in adult patients (e" 12 years of age) at the Department of Nephrology and Medicine during an 8 year period. The renal biopsy specimens were stained with Haematoxylin & Eosin, PAS, MT and silver for light microscopy and subjected to immunofluorescence microscopy as well. All the biopsies were originally interpreted by experienced nephropathologists from

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a nearby referral centre (Amritha Institute of Medical Sciences, Kochi). The main indications for renal biopsy were nephrotic syndrome, nephritic syndrome, undiagnosed acute renal failure and selected cases of chronic renal failure. The relevant data were obtained from the request form for renal biopsy which included demographic features (sex, age, residence, date of biopsy & reporting), clinical features (temporal profile, nephritic, nephrotic, renal failure, systemic disease etc.) and laboratory data (Hematology, biochemistry, microbiology, Imageology etc.) There is also a link to record library data where the hospital data sheet each patient can be accessed for detailed analysis.

RESULTS

According to age the patients were divided into three groups. Those aged from 12 years to 44 years were classified as young, those between 45 and 64 years were designated as middle aged, while those above 65 years were grouped as elderly. The majority of the patients who were biopsied belonged to the young age group (406/663 i.e.61.2%), followed by the middle aged (212/663 i.e.32%), while the elderly constituted only 6.78 % (45/663). 55.5% of the patients were males while 44.5% were females with a male: female ratio of 1.25:1.

The histological diagnoses was classified into the following main groups

1. Primary glomerular diseases
2. Secondary glomerular diseases
3. Acute renal failure
4. Chronic renal failure

Glomerular diseases made up 543 out of the total 663 cases (81.9%). Primary glomerular diseases constituted 395 cases (59.6%) among all the biopsies. Among the 395 patients with primary glomerular diseases, nephrotic syndrome was the clinical diagnosis in 207(52.4 %) while nephritic syndrome was the diagnosis in 188(47.6%). In all the age groups put together the most common histological type of nephrotic syndrome was Focal and Segmental Glomerulosclerosis (FSGS) (86/207- 41.5%) followed by Minimal Change Disease (MCD) (48/207 - 23.2%), Membranous Nephropathy (MN) (44/207- 21.3%), and Membranoproliferative Glomerulonephritis (MPGN) (20/207 – 9.7%). Others included 8 cases of IgM nephropathy and one case of C1Q nephropathy. Age group wise analysis also suggested FSGS as the most common histological type of NS in each age group studied. Among the younger age group of 12-44 yrs FSGS was the most common histological subtype (60/137 - 43.8%) followed by MCD (34 /137 - 24.8%), MN (24/137 - 17.5%) and MPGN (16/137 - 11.7%). In the age group of 45-64 years FSGS continued to be in the first place (23/58 – 39.7%), while MN became the second most common type (14/58 – 24.1%) pushing MCD to the third position (12/58 - 20.7%). MPGN was the least common in this age group also (4/58 –6.7%). Of the 12 patients with nephrotic syndrome in the age group of 65-90 years 3 had FSGS (27.2%), 6 had MN (54.5%) ,2 had MCD (18.1%) and one had IgM nephropathy. IgA nephropathy (IgAN) was the single most common histological entity among all the renal diseases put together (92/ 663 biopsies 13.9%) especially among glomerular diseases (92/543 – 16.9%) and also among the primary glomerular disease group (92/395 – 22.3%).Among the nephritic group IgAN accounted for a huge 48.9 % (92/188) followed by post streptococcal Glomerulonephritis (PSGN) having a histological picture of diffuse proliferative GN(DPGN) in 68 cases (36.2%) and Crescentic GN in 24 cases (12.8%). There were 3 cases of mesangioproliferative GN (1.6%) and one case of chronic Glomerulonephritis (0.5%) in this group. The incidence of post streptococcal Glomerulonephritis (PSGN) was 17.21 % (68/395) among all the primary glomerular diseases. Lupus nephritis was the most common cause of secondary glomerular disease (71/148 - 48%). Diabetic nephropathy was the culprit lesion 36.5 % (54/148) of the secondary glomerular diseases. Amyloidosis and Henoch Schonlein purpura were detected in a few cases. Of the total 71 patients with lupus, 14 were males (20%), slightly more than the incidence found in other studies.

Among the 89 patients biopsied for unexplained acute renal failure (ARF) the most common entity was acute interstitial nephritis (AIN) 26 cases (29.2%), followed by crescentic Glomerulonephritis in 24 cases (27%), acute tubular necrosis (ATN) in 22 cases (24.7%) and thrombotic microangiopathy in 7 cases (7.9%). There were 5 cases of cast nephropathy (multiple myeloma), one case each of anti glomerular basement membrane disease, Good Pasteur's syndrome, oxalosis, Castlemann Disease and rhabdomyolysis. Obviously there was some overlap between ARF and glomerular disease due to the presence of Crescentic GN among patients having PSGN and IgAN.

There were 108 cases of chronic renal failure (CRF) most of whom were biopsied to explore reversibility while evaluating acute exacerbation. Some of these patients also belonged to another study for

analysis of non diabetic renal disease among diabetic patients. These biopsies were distributed into diabetic nephropathy in 54 patients (50%), hypertensive nephrosclerosis in 21(19.4%), chronic tubulointerstitial disease in 27(25%), pyelonephritis in 5 cases (4.6%) and one patient reported as papillary necrosis.

12 out of 45 (26.6%) patients who were above the age of 65 years had nephrotic syndrome. Of the 12 cases of nephrotic syndrome in this group 3 had FSGS (27.2%), 6 had MN (54.5%) and 2 had MCD (18.1%) and one was a case of IgM nephropathy. Of the 9 cases of nephritic syndrome 7(77.7%) was due to post infectious Glomerulonephritis.

DISCUSSION

The total number of renal biopsies which were analysed was 663. The largest number of renal biopsies was done in the age group of 12-44 years (406/663;61.2%), while the middle age group of 45- 64 years contributed 31.9%(212/663). Of the total 663 biopsies only 6.78% were done for the elderly aged 65 years and more. The prevalence of renal diseases requiring biopsy was slightly more in males than in females, with a male: female ratio of 1.25:1 (55.5 % versus 44.3% 368 males and 295 females). This observation is similar to studies from other parts of India.

Primary glomerular diseases made up 59.8% of the 663 cases which were biopsied. This is slightly different from a study from Kashmir[1] and another study from Karnataka[2] where the prevalence of primary glomerular disease was 91.73% and 76% respectively.

Of the 543 patients with glomerular diseases 395 had primary glomerular disease, among which nephrotic syndrome was the clinical diagnosis in 207 and nephritic syndrome in 188. This was corroborated by the appropriate histological findings.

In all the age groups put together the most common histological type of nephrotic syndrome was FSGS (41.5%) followed by MCD (23.2%), MN (21.3%) and MPGN (9.7 %). This contrasts with a previous analysis done in 1987 in which MCD was the most common histological variant.[3] In a study from Bangalore in 2006 the most common cause of nephrotic syndrome was MCD (38%) followed by FSGS (22%) and MN (10%). In the study from Kashmir[1] MCD was the most common histopathological diagnosis. In the study from Karnataka[2] among primary glomerular disease minimal change disease was the most common histological lesion, accounting for 46.6% of all biopsies and 60% of primary glomerular disease, followed by FSGS accounting for 13% of all biopsies and 18% of primary glomerular disease. According to the data from Calicut, another state in Kerala, the prevalence of MCD was nearly 70%.[4] Thus compared with other studies from India the incidence of FSGS in our centre is slightly higher. In a recent article which came in JAPI Feb 2011 the incidence of FSGS was 35% while that of MN is 33% and MCD 15% in adults. In another study[5] also the incidence of FSGS was found to be increasing while that of MCD and MPGN was found to be decreasing The prevalence of MCD varies within India, being less than 12% in Vellore[5] (southern part of India) to 33% in Haryana[6] and 44% in Kashmir,[1] 70% in Calicut(Kerala).[4] The reported prevalence of MCD in other countries are less than 14% in Thailand[7] and Pakistan[8] and less than 17% in Iraq.[9] Among the younger age group of 12-44 yrs FSGS was the most common histological subtype (44.7%) followed by MCD (25.37%) MN (17.9%) and MPGN (11.9%). In the age group of 45-64 years FSGS continued in the first place (43.39%), while MN became the second most common type (26.4%) pushing MCD to the third position (22.6%). MPGN was the least common in this age group also (7.5%). Of the 45 patients in the age group of 65-90 years 3 had FSGS (27.2%), 6 had MN (54.5%) and 2 had MCD (18.1%). In a study from Western India[10] the most common cause of nephrotic syndrome in elderly was MN (27.5% of NS).

IgA nephropathy was the single most common disease (13.9% of total biopsies). IgAN is the most common Glomerular disease in Italy and Europe[11] and in the eastern countries like Japan, Taiwan. In the study from Karnataka[2] the incidence of IgAN was only 3.33%. In that study the most common histological diagnosis was MCD (46.6%). In the study from Kashmir the incidence of IgAN was only 1.37%. IgAN was also the most common cause of nephritic syndrome, followed by poststreptococal Glomerulonephritis. According to a study from Thiruvananthapuram, KERALA,[12] (2009) the incidence of IgA nephropathy was 14.26%. The observation made in that study was that the incidence of IgA nephropathy was rising in India starting from an incidence of 4.2% in 1987(Tamil Nadu) to 7.2% in 1992 (Delhi) to 10% in 1995 (Chandigarh) to 14% in 2009 (TVM). The incidence of IgA nephropathy in western countries is 5-10%. IgA nephropathy is more frequent in the Asian area than in Australia, Europe, and North America.[13]

The prevalence of secondary glomerular disease varies within India. Diabetes mellitus was the most

prevalent secondary glomerular disease in New Delhi. Amyloidosis was more prevalent in Chandigarh; lupus nephritis was more prevalent in Vellore. In our study the prevalence of lupus nephritis was 48% (71/148), followed by diabetes 36.5% (54/148) which was comparable to the study from Vellore.[5] However it was different from the study done in New Delhi, where diabetes mellitus was the most common cause of secondary glomerular disease. Lupus nephritis was the most common cause of secondary glomerular disease (48.6%). This is comparable to the study from Vellore where the most common cause of secondary glomerular disease was lupus nephritis, while in the study from Kashmir the incidence of lupus was only 3%. Of the total 71 patients with lupus nephritis, 14 were males (20%) which are slightly more than that found in other studies. Diabetes was the cause in 36.5% of the secondary glomerular diseases. Biopsy is not routinely done in diabetic patients. In general, whenever there is a suspicion of non diabetic renal disease (unexpected deterioration, absence of diabetic retinopathy, short duration with massive proteinuria, nephritic urinary sediment) biopsy is done depending on clinical context and immediate threat to renal function. Amyloidosis accounted for a total of 5 cases only (3.5%).

The most common cause for acute renal failure was AIN 26/89 (29.2%) followed by crescentic GN 24/89 (26.9%) and ATN 2/89 (24.7%). The other causes for ARF were thrombotic microangiopathy, anti glomerular basement membrane disease, Good Pasteur's syndrome, oxalosis, rhabdomyolysis, cast nephropathy (myeloma) and Castlemann disease.

The most common cause for chronic renal failure needing renal biopsy was diabetes mellitus 54/108 (50%) followed by tubulointerstitial diseases 27/108 (25%) and hypertension in 21 cases (19.4%). This may not reflect the ground reality about the aetiology of renal failure because only selected cases undergo renal biopsy particularly to look for a reversible cause. Naturally they will not include inherited diseases, advanced renal failure etc. Actually all these cases represent an unexpected deterioration in renal status i.e. acute on chronic failure.

Of the total 11 elderly patients who had nephrotic syndrome 3 had FSGS (27.3 %) 6 had MN (54.6%) and 2 had MCD (18.1%). There were no cases of MPGN. In the elderly the leading cause of nephritis was post infectious glomerulonephritis (77.7%) The most common cause for ARF in the elderly was ATN followed closely by AIN. The other causes for ARF in the elderly were one case each of oxalosis, cast nephropathy, IgM nephropathy, antiglomerular basement membrane disease and chronic pyelonephritis. The overall spectrum of glomerular disease in the elderly population is similar to that observed from other studies in India.[10] The significant differences from the pattern of disease in the elderly observed from developed countries are (1) post infectious GN was the commonest type of acute GN (2) rarity of paucity-immune crescentic glomerulonephritis.

This centre is not doing renal transplantation, but a handful of cases of renal transplant were also biopsied. There were three cases of allograft nephropathy. These cases represent patients who had come for graft biopsy to our centre due to logistic reasons.

CONCLUSION

Conventionally the most common indication for renal biopsy in any nephrology unit is glomerular disease, especially nephrotic syndrome. In our centre the focus is mostly on general nephrology since the nearby units are stressing on dialysis and transplantation. After the advent of automated biopsy gun (18G; Bard) the procedure has become hassle free, with good tissue yield. There are virtually no serious complications and some units even manage to send the patient home on the same day (we don't). The result is more aggressive renal biopsies in smaller kidneys, especially while seeking reversibility in an otherwise hopeless situation (no scope for any renal replacement therapies). For histopathological analysis of renal tissue we are depending on nephropathologists to get better interpretation. As expected we had more glomerular disease among all renal biopsies, but interestingly the biggest single group was IgA nephropathy most of whom did not present as nephrotic syndrome. One of the nearby centres has recently pointed out the increasing incidence of IgAN, even emerging as the commonest disease causing nephrotic syndrome. An interesting observation among the patients with nephrotic syndrome was the emergence of FSGS as the commonest histological type in all age groups, almost exclusively of the primary type. In ARF renal biopsy is avoided if ATN is the anticipated cause. Still it emerged as the third most abundant type after AIN and Crescents. Some of these cases are biopsied for delayed recovery or unexpected deterioration, explaining the higher than expected ATN cases. Diabetic patients are usually biopsied for indications other than diabetic nephropathy, in our institution mostly for unexplained renal failure. The male share of lupus nephritis burden was almost double than the usual, although there is no easy explanation is

available. The excess number of secondary glomerular disease among our collection may be related to the mandatory (lupus nephritis) and more liberal (renal failure) indications for renal biopsy in these patients. Among the elderly patients PSGN was much more common than crescentic Glomerulonephritis unlike in western hemisphere. The higher incidence of Focal proliferative GN is related to a secondary effect to systemic diseases including malignancy.

END NOTE

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REFERENCES

1. Reshi AR, Bhat MA, Najar MS, Banday KA, Naik MA, Singh DP, et al. Etiological profile of nephrotic syndrome in Kashmir. Indian J Nephrol. 2008 Jan;18(1):9–12.
2. Khanpet M S, Vivekanandam. Cinical, biochemical and histopathological features of adult nephrotic syndrome – a cross sectional study KLE Health Sc. Jr. 2010: 3 (1) : 39-43
3. Date A, Raghavan R, John TJ, Richard J, Kirubakaran MG, Shastry JC. Renal disease in adult Indians: a clinicopathological study of 2,827 patients. Q J Med. 1987 Sep;64(245):729–37.
4. Sreelatha M, Rajaratnam K, Aravindan KP, Ramdas P, Lakshminarayan K. Idiopathic Nephrotic Syndrome in adults- Predictors of histology and therapeutic response. Meerut: ISNCON-2001:2001
5. Narasimhan B, Chacko B, John GT, Korula A, Kirubakaran MG, Jacob CK. Characterization of kidney lesions in Indian adults: towards a renal biopsy registry. J Nephrol. 2006 Apr;19(2):205–10.
6. Aggarwal HK, Yashodara BM, Nand N, Sonia null, Chakrabarti D, Bharti K. Spectrum of renal disorders in a tertiary care hospital in Haryana. J Assoc Physicians India. 2007 Mar;55:198–202.
7. Kanjanabuch T, Kittikovit W, Lewsuwan S, Leelahavanichkul A, Avihingsanon Y, Praditpornsilpa K, et al. Etiologies of glomerular diseases in Thailand: a renal biopsy study of 506 cases. J Med Assoc Thai. 2005 Sep;88 Suppl 4:S305–11.
8. Kazi JI, Mubarak M, Ahmed E, Akhter F, Naqvi SAA, Rizvi SAH. Spectrum of glomerulonephritides in adults with nephrotic syndrome in Pakistan. Clin Exp Nephrol. 2009 Feb;13(1):38–43.
9. Shaker IK, Al-Saedi AJ, Al-Salam S, Saleem MS, Al-Shamma IA. Spectrum of glomerular disease in iraqi patients from a single center. Saudi J Kidney Dis Transpl. 2002 Dec;13(4):515–9.
10. Prakash J, Singh AK, Saxena RK, Usha null. Glomerular diseases in the elderly in India. Int Urol Nephrol. 2003;35(2):283–8.
11. Levy M, Berger . Worldwide perspective of IgA nephropathy. Am J Kidney Dis 1988;12:340-7.
12. Chandrika BK. IgA nephropathy in Kerala, India: a retrospective study. Indian J Pathol Microbiol. 2009 Mar;52(1):14–6.
13. Schena FP. A retrospective analysis of the natural history of primary IgA nephropathy worldwide. Am J Med. 1990 Aug;89(2):209–15.