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Abstract

AIM: To study spectrum of biopsy proven renal disease (BPRD) and to look for any changing trends in renal disease in comparison to a previous study from this centre and other studies.

MATERIALS AND METHODS: Retrospective analysis of the histopathological reports of all native kidney biopsies performed from 1990 – 2001 at this centre is presented (n=5258). Incomplete records (n=92) and inadequate biopsies (n=150) were excluded. Reports of the remaining biopsies 928 from children (<15 years) and 4035 from adults (15 and above) were analyzed and categorized into major histological patterns as proliferative glomerulonephritis (PGN), minimal Change Disease (MCD), focal and segmental glomerulosclerosis (FSGS), membranous nephropathy (MN), IgA nephropathy (IgAN), diabetic glomerulosclerosis (DG) and benign arteriolar nephrosclerosis (BANS).

RESULTS: Most BPRD showed male preponderance except in systemic lupus erythematosus (17.5%) and cortical necrosis (40%). BPRD in children showed MCD (47.2%), FSGS (12.5%), mesangial PGN (11.3%), endocapillary proliferative GN (8.8%) and lupus nephritis (3.5%). The incidence of MPGN has declined to 2.6% in this study when compared to 7.2% between 1970 and 1985. Non-diabetic renal disease (NDRD) was seen in 72% diabetics who underwent a biopsy. PGN was seen in 40.7%, MCD 8.7%, FSGS 22%, MN 11%, BANS 6.8% and interstitial nephritis 6.8% respectively. Comparison of primary glomerulonephritis from the Italian registry of renal biopsies with the present study showed an increased incidence of IgAN, MN and MPGN in Italy, whereas MCD, FSGS, mesangial PGN and post infectious GN were significantly more common in the present study.

CONCLUSION: This study provides descriptive epidemiological biopsy data and highlights some important trends in changing prevalence of renal disease.

Key words: Biopsy proven renal disease, Tropics, Change in spectrum

Introduction

A review of renal biopsy data can give some insight into the spectrum of clinically significant renal disease and basic epidemiological data on renal disease in the community. This can provide a basis for further studies aimed at identifying risk factors in the development and progression of renal disease through case control and cohort study designs. This study reports the spectrum of BPRD in both children and adults from a tertiary care hospital in southern India, between 1990 and 2001 and compares them with a similar study from the same institution and some other studies to see any changing trends in renal disease.

Subjects and methods

A retrospective analysis of all renal biopsies performed on native kidneys from 1990 to 2001 at this institution was done. All biopsies were evaluated by light microscopy, immunofluorescence and special stains were used when warranted. Provisional diagnosis in relation to associated clinical findings and laboratory investigations were regrouped into major clinical
syndromes. A total of 5258 native kidney biopsies were performed during this period. Incomplete records (n=92) and inadequate biopsies (n=52) were excluded. Reports of the remaining biopsies 928 from children (<15 years of age) and 4035 from adults (15 years and above) were analyzed and categorized into major histological patterns. Histological categories included endocapillary proliferative GN, crescentic GN, mesangial PGN, MCD, MN, MPGN, FSGS, IgAN, focal proliferative GN, end stage renal disease, amyloidosis, lupus nephritis, benign arteriolar nephrosclerosis, diabetic glomerulosclerosis, interstitial nephritis, cortical necrosis, myeloma kidney, thrombotic microangiopathy and vasculitis.

Comparison of types of BPRD in this study was made with an earlier study (1971-1985) from the same institution and the Italian Registry of Renal Biopsies (IRRB).

Results

Nephrotic syndrome was the commonest indication for renal biopsy among various clinical syndromes during both periods of study (1971-1985 and 1990-2001 Table 1).

Sex Distribution of Various BPRD: Males outnumbered females in all disease categories except for cortical necrosis and SLE in which there was a marked female preponderance. (Fig.1A and 1B)

Age Distribution and Percentage of BPRD in Children: Out of the 928 children who had renal biopsy for various indications MCD constituted 47.2%, FSGS 12.5%, Mesangial proliferative GN 11.3% and PIGN 8.8%. The rest was constituted by other histological categories. (Fig.2)

Age Distribution and Percentage of BPRD in Adults: Among 4035 adults who underwent renal biopsy, FSGS was the commonest histological diagnosis (16.8%) in all age groups, second being PIGN. Table 2 highlights the percentage of various BPRD in adults in different age groups.

Renal Biopsy in Diabetics: Two hundred and fifteen diabetic patients had renal biopsy for either nephrotic range proteinuria without diabetic retinopathy or haematuria or unusual decline in renal function. Seventy two percent of these patients had non-diabetic renal disease (NDRD). (Fig.3)

Changing Trends in BPRD at CMCH Vellore: Comparison of data of this study from the previous study from the same institution showed change in trends in BPRD.

Comparison of Primary GN from IRRB with the present data showed an increased incidence of IgAN, MN and MPGN in Italy, whereas MCD, FSGS, mesangial PGN and PIGN were significantly more common in the present study. (Fig 6)

Discussion

Males outnumbered females in all BPRD categories except for SLE and cortical necrosis. Increased incidence of SLE in females is well known. Cortical necrosis was more in females in this study especially in their reproductive age group and is likely to be due to obstetric complications.

Table 1: Percentage of various clinical syndromes

<table>
<thead>
<tr>
<th>CLINICAL SYNDROME</th>
<th>1990-2001 (n=5258)</th>
<th>1971-1985 (n=2827)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Nephritis</td>
<td>15.70%</td>
<td>14.80%</td>
</tr>
<tr>
<td>Nephrotic syndrome</td>
<td>65.40%</td>
<td>54.20%</td>
</tr>
<tr>
<td>Acute Renal Failure</td>
<td>1.80%</td>
<td>9.30%</td>
</tr>
<tr>
<td>Chronic Renal Failure</td>
<td>10.20%</td>
<td>8.10%</td>
</tr>
<tr>
<td>AUA*</td>
<td>1.70%</td>
<td>8.20%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1.70%</td>
<td>4.10%</td>
</tr>
<tr>
<td>RPRF**</td>
<td>3.40%</td>
<td>0</td>
</tr>
<tr>
<td>Nephrolithiasis</td>
<td>0.10%</td>
<td>0</td>
</tr>
</tbody>
</table>

*AUA: Asymptomatic urinary abnormalities

**RPRF: Rapidly progressive renal failure
Analysis of BPRD in children showed MCD to be the commonest histological category (47.2%) followed by FSGS (12.5%). It is widely accepted that MCD is the most common cause of nephrotic syndrome in children. Recent studies show increasing incidence of FSGS in adults and children. The present study shows that the incidence of FSGS in adults has increased compared to the previous study. The same could not be shown in children, as we do not have data of FSGS in the previous study.

Among BPRD in adults, FSGS is the commonest histological category in all age groups (16.8%) follow by PIGN, MCD, MN, IgAN. There is a worldwide increase in the incidence of FSGS, which was reported to be the commonest cause of nephrotic syndrome in African-American patients. Despite variations in racial incidence, FSGS is found to be increasing in white population also. The incidence of diabetic nephropathy, amyloidosis, benign nephrosclerosis and myeloma kidney were more common in the age group of 55 years and above as expected. Higher incidence of lupus nephritis, IgA nephropathy and MPGN were seen in the age group of 15 – 34 years.

Diabetic patients were subjected for renal biopsy if they had haematuria, significant proteinuria without diabetic retinopathy or unusual decline in renal function. Out of the 215 diabetic patients, 74% had non-diabetic renal disease. Proliferative GN and FSGS were found to be the commonest histological diagnosis. The diabetic patients studied here showed a different distribution of NDRD from that reported in the western world. Higher prevalence of proliferative GN in this population could be because of increased skin infection with compromised blood supply and peripheral neuropathy.

Comparison of the present data with a previous study from the same institution showed some interesting changes. FSGS, PIGN, mesangial PGN and MN showed an increasing trend. The use of automated thin needles with ultrasound guidance has led to an increase in the number of renal biopsies. This could be a reason for the increase in the incidence of PIGN.

MPGN, crescentic GN, amyloidosis, BANS, DN, ATN and cortical necrosis showed a decreasing trend. Decreasing incidence of MPGN has been reported in other studies also. Decreasing trend in the other categories mentioned could be due to overall better
Figure IA: Sex distribution of BPRD

![Graph showing sex distribution of BPRD categories: FSGS, PIGN, MCD, Mes.PGN, MN, IgAN, LN, ESH, Cres.GN, DN.]

FSGS: Focal segmental Glomerulosclerosis; PIGN: Postinfectious GN; MCD: Minimal change disease; Mes.PGN: Mesangial proliferative GN; MN: Membranous nephropathy; IgAN: IgA Nephropathy; LN: Lupus Nephritis; ESH: End stage histology; Cres.GN: Crescentic GN; DN: Diabetic Nephropathy

Figure IB: Sex distribution of BPRD

![Graph showing sex distribution of BPRD categories: BANS, MPGN, FPGN, ATN, Amyl, Myeloma, Cor.Nec, Others.]

BANS: Benign arteriolar Nephrosclerosis; MPGN: Membrano proliferative GN; FPGN: Focal proliferative GN; ATN: Acute tubular necrosis; Amyl: Amyloidosis; Cor.Nec: Cortical Necrosis
Figure 2: BPRD in children

Histological Categories

MCD: Minimal change disease; FSGS: Focal segmental Glomerulosclerosis; Mes.PGN: Mesangial proliferative GN; PIGN: Postinfectious GN; LN: Lupus Nephritis; IgAN: IgA Nephropathy; MN: Membranous nephropathy; ESH: End stage histology; Cres.GN: Crescentic GN; IN: Interstitial Nephritis; MPGN: Membrano proliferative GN; HSP: Henoch-Schnelein purpura

Figure 3: Renal Biopsy in Diabetics (n=215)

Indications - No diabetic retinopathy, Unusual course, significant haematuria

104 (48%)  51 (24%)  60 (28%)
Figure 4 : Increasing trends

![Bar chart showing increasing trends in histological categories including FSGS, PIGN, MCD, Mes Pro.GN, MN, and Interstitial nephritis.]

Figure 5 : Decreasing trends

![Bar chart showing decreasing trends in histological categories including Lupus Nephritis, Crescentic GN, Diabetic nephropathy, SANS, MPGN, Focal PGN, ATN, Amyloidosis, and Cortical necrosis.]
medical care especially blood pressure control, early treatment of infective and diarrhoeal illnesses and better obstetric care. The decreased incidence of diabetic nephropathy in this study may not be true representative of the overall diabetic renal disease as only diabetic patients with unusual presentations were biopsied. IgAN constituted 14% of primary GN when compared to 9.6% of primary GN in the 1991 report. Increasing incidence of IgAN worldwide is well known.

Comparison of primary GN from IRRB with our data showed higher percentage of IgAN, MN and MPGN in IRRB, whereas MCD, FSGS, mesangial PGN and PIGN were significantly more common in this study. The higher incidence of proliferative GN could be due to increased incidence of infections in our country.

Conclusions

The increasing incidence of worldwide FSGS is confirmed in this study. MPGN, ATN, BANS and cortical necrosis showed a declining trend. This study also provides descriptive epidemiological biopsy data and highlights the changing trends.

References