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Letter to the Editor

A Clinicopathological Study of Renal Biopsies in Glomerular Diseases

To the Editor,

The present knowledge of the pathology of renal diseases has been derived to a large extent after the introduction of percutaneous needle biopsy of the kidney and the systematic study of these small samples of renal tissue by light microscopy, electron microscopy and immunofluorescence microscopy. The technique of percutaneous renal biopsy was introduced in to clinical usage in the early 1950's and till today, it is one of the most common and widely accepted invasive procedures for the diagnosis of renal diseases.[1] Although the role of immunofluorescence and electron microscopy in the study of renal pathology cannot be overemphasized, the review of the literature reveals that most of the glomerulonephritides can still be diagnosed by light microscopy with reproducibility.[2]

This study was performed with the purpose to interpret the renal biopsies by light microscopy and classify them according to the disease process and to correlate the pathological findings of glomerular diseases with clinical and laboratory parameters. The records of all the patients on whom renal biopsies were performed over a three year period from August 1, 2005 to July 31, 2008 by percutaneous route for suspected glomerular diseases in the department of Medicine (Nephrology Unit), Shri. B. M. Patil Medical College, Hospital and Research Center, Bijapur, were included in the study. Majority of the biopsies were studied only by light microscopy, but 35 biopsies were also subjected to immunofluorescence microscopy.

Clinical history, examination findings and laboratory findings of the patients were recorded. The biopsies were performed by using an 18 gauge Bard's bioptic gun under real-time ultrasound guidance and a renal tissues ranging from 1-2 cm were obtained. The specimens obtained were immediately fixed in 10% formalin for histopathological examination and in isopentane, snap frozen in liquid nitrogen for immunofluorescence study. Non-glomerular and neoplastic diseases were excluded.

A total of 75 renal biopsies were reviewed for suspected glomerular diseases and were classified as glomerular diseases, other diseases and inadequate tissue sample. There were 71 cases of glomerular diseases which accounted for 94.6% of the biopsies and showed a preponderance of males, 46 males and 25 females. Other diseases like tubulointerstitial nephritis and inadequate biopsies accounted for to 2.7% each (Table 1).

Among the 71 cases with glomerular diseases, 59 (83%) cases were due to primary causes, which accounted for 78.7% of the total biopsies done (Table 2).

Among the 59 cases with primary glomerular diseases, the majority of the cases (25%) were

Table 1. Distribution of renal biopsies of suspected glomerular diseases.

Diseases	No. of cases (%)
Glomerular diseases	71 (94.6)
Other diseases	2 (2.7)
Inadequate tissue sample	2 (2.7)
Total	**75 (100.0)**

of focal segmental glomerulosclerosis (FSGS), while 22% of the cases were of mesangioproliferative glomerulonephritis (MesPGN) which was the next largest group (Table 3). Among the twelve cases of glomerular diseases that occurred secondary to systemic causes the highest was due to amyloidosis (58.3%) followed by systemic lupus erythematosus (SLE) (41.7%) (Table 4).

The 71 cases of glomerular diseases showed a preponderance of males, 46 males and 25 females. Male predominance was also noted in FSGS, MesPGN, membranoproliferative glomerulonephritis (MPGN), membranous nephropathy (MN), minimal change disease (MCD) and amyloidosis of kidney. Lupus nephritis (LN) and cortical necrosis showed female predominance (Table 5).

Evaluation of the clinical features showed that, out of the 59 cases with primary glomerular diseases, 42 presented with facial puffiness, 17 with pedal edema, three with hematuria and two with hypertension, whereas among the 12 cases with secondary glomerular diseases 11 presented with facial puffiness, eight with pedal edema and three with hypertension. Rashes and joint pains were seen in five cases of LN (Table 6).

Laboratory findings showed that among the 59 cases with primary glomerular diseases, 39 cases presented with proteinuria, 23 with raised serum creatinine levels, 15 with raised blood urea and six with raised C3 levels. Out of 12 cases with secondary glomerular diseases, ten presented with proteinuria, 11 with raised se-

Table 2. Classification of glomerular diseases.

Diseases	No. of cases (%)
Primary glomerular diseases	59 (83)
Secondary glomerular diseases	12 (17)
Total	**71 (100)**

Table 3. Distribution of primary glomerular diseases.

Glomerular diseases	No. of cases (%)
FSGS	15 (25.0)
MesPGN	13 (22.0)
MPGN	9 (15.4)
MN	9 (15.4)
MCD	4 (6.7)
DPGN	3 (5.0)
CGN	2 (3.5)
Chr. GN	2 (3.5)
Cortical necrosis	2 (3.5)
Total	**59 (100.0)**

FSGS: Focal segmental glomerulosclerosis, MesPGN: Mesangioproliferative glomerulonephritis, MPGN: Membranoproliferative glomerulonephritis, MN: Membranous nephropathy, MCD: Minimal change disease, DPGN: Diffuse proliferative glomerulonephritis, CGN: crescentic glomerulonephritis, Chr. GN: Chronic glomerulonephritis

Table 4. Distribution of secondary glomerular diseases.

Secondary glomerular diseases	No. of cases (%)
Amyloidosis of kidney	7 (58.3)
Lupus nephritis	5 (41.7)
Total	**12 (100.00)**

Table 5. Sex distribution of various glomerular diseases.

Glomerular diseases (n = 71)	Male (46)	Female (25)
Focal segmental glomerulosclerosis (15)	9	6
Mesangioproliferative glomerulonephritis (13)	7	6
Membranoproliferative glomerulonephritis (9)	8	1
Membranous nephropathy (9)	7	2
Minimal change disease (4)	3	1
Diffuse proliferative glomerulonephritis (3)	2	1
Crescentic glomerulnephritis (2)	1	1
*Chronic glomerulonephritis (2)	2	0
Amyloidosis (7)	6	1
Lupus nephritis (5)	1	4
Cortical necrosis (2)	0	2

*Unclassifiable on histology

Table 6. Clinical features of various glomerular diseases.

Glomerular disease	Facial Puffiness	Pedal edema	Hematuria	Hypertension
FSGS	13	7	-	-
MesPGN	10	4	-	-
MPGN	7	3	-	-
MN	6	3	-	-
MCD	4	-	-	-
CGN	-	-	2	-
Chr. GN	-	-	1	1
DPGN	2	-	-	1
Amyloidosis	7	7	-	2
Lupus nephritis	4	1	-	1

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rum creatinine levels and ten with raised blood urea levels. Antinuclear antibody ANA)/anti-double stranded deoxyribonucleic acid (anti-dsDNA) positivity was seen in three cases of LN (Table 7).

Immunofluorescence studies were performed for 35 cases where there was difficulty in making a conclusive diagnosis by light microscopy alone. IgG, IgA, IgM and C3 were used and the pattern of deposition was studied. SLE class IV showed full house positivity (Table 8).

Among 59 cases of primary glomerular diseases, 25% were of FSGS, followed by MesPGN which contributed to 22%. These cases were predominantly seen in males and they presented with nephrotic range proteinuria and some patients with elevated urea and creatinine levels. This is consistent with the study of Daskalakis and Winn who also found that FSGS is the most common cause of nephrotic syndrome (NS) in adults accounting for 35% of the cases (Table 9).[3] Hass have reviewed the reports from all non-transplant adult renal biopsies from the year 1974 to 1993 which comprised of 7,420 cases. The authors were of the opinion that among all biopsies there was an increase in the incidence of FSGS over the 20 years between 1974 to 1993, which comprised 10-15% of idiopathic NS cases in adults.[4]

Abrantes MM et al[5] studied 110 patients with biopsy-proven FSGS and compared their results with clinical and laboratory data. Rana K

Table 7. Laboratory findings in various glomerular diseases.

Glomerular disease	Proteinuria	Raised serum creatinine	Raised blood urea	Raised C3	ANA positivity
FSGS	15	8	5	6	-
MesPGN	6	2	-	-	-
MPGN	9	7	3	-	-
MN	9	6	4	-	-
MCD	4	-	-	-	-
DPGN	3	1	2	-	-
CGN	2	1	-	-	-
Chr. GN	1	2	1	-	-
Amyloidosis	7	7	7	-	-
Lupus nephritis	3	4	3	-	3

FSGS: Focal segmental glomerulosclerosis, MesPGN: Mesangioproliferative glomerulonephritis, MPGN: Membranoproliferative glomerulonephritis, MN: Membranous nephropathy, MCD: Minimal change disease, DPGN: Diffuse proliferative glomerulonephritis, CGN: Crescentic glomerulonephritis, Chr. GN: Chronic glomerulonephritis

Table 8. Immunofluorescence studies of glomerular diseases.

Serial No.	Diseases	IgG+ve	IgG–ve	IgA+ve	IgA-ve	C3+ve	C3-ve	IgM+ve	IgM-ve
1.	FSGS	1	4	1	4	3	2	3	2
2.	MesPGN	0	9	0	9	0	9	4	5
3.	MPGN	2	3	0	5	5	0	0	5
4.	MN	4	0	0	4	1	3	0	4
5.	MCD	0	2	0	2	0	2	2	0
6.	LN IV	3	0	3	0	3	0	3	0
7	AMY	0	1	0	1	0	1	1	0
8.	CGN	1	1	0	2	1	1	0	2

FSGS: Focal segmental glomerulosclerosis, MesPGN: Mesangioproliferative glomerulonephritis, MPGN: Membranoproliferative glomerulonephritis, MN: Membranous nephropathy, MCD: Minimal change disease, LN: Lupus nephritis, Amy: Amyloidosis of kidney, CGN: Crescentic glomerulonephritis

Table 9. Incidence of FSGS in various studies.

Serial No.	Studies	FSGS %
1	Daskalakis and Winn[3]	35%
2	Haas et al[4]	35%
3	Abrantes MM et al[5]	32%
4	Rana K et al[6]	20%
5	Rennke and Klein et al[7]	20%
6	Chandrika KB[8]	18.84%
7	Present study	25%

et al revealed FSGS is the most common cause of NS in adults.[6] Rennke et al[7]and Chandrika KB[8] revealed that FSGS was the most common occurrence in their studies. Overall FSGS seems to be the most common cause of NS in adults.

MCD is more common in boys than in girls. It is most common in young children aged less than six years. The incidence of MCD is reported as 2-16 per million population per year in children younger than 16 years.[9] However, MCD can occur at any age and is still a common cause of NS in adults. In the present study, MCD was seen commonly below ten years of age with male predominance.

Overall, there were five cases of LN that showed class IV and class V changes. Four cases showed diffuse proliferative glomerulonephritis (class IV) and one case showed MN (class V). All the cases were seen in adult females with features of NS. Laboratory data of these patients showed ANA and antidsDNA positivity.

In the present study out of 12 secondary glomerular disease cases, seven cases (58.3%) were of renal amyloidosis and these cases were in the age group of 40–60 years. There was male preponderance with high creatinine and urea levels with nephrotic range proteinuria >3.5 g/kg and clinical features of NS. All the cases were associated with chronic inflammatory states in which tuberculosis, bronchiectasis and rheumatoid arthritis were common. This has been reported earlier by other authors as well.[10]

Dikman and Thomas[11] compared the clinical and morphological course of amyloid renal disease. They showed that the renal amyloidosis was common in adults and these patients presented with NS symptoms with massive nephrotic range proteinuria with elevated blood urea nitrogen and creatinine levels. Progression to azotemia and renal failure was common in all forms of renal amyloidosis.[11] Primary amyloidosis is common in developed countries and secondary amyloidosis common in developing countries. AA amyloidosis affects patients of various ages with median age of 50 years. However in younger patients affected by AA amyloid a hereditary component must be considered. The conditions associated with secondary amyloidosis are inflammatory arthritis, chronic inflammatory states, chronic infections and malignancies. The overall incidence of renal amyloidosis is reported as 3% and NS was the most common presentation.[12,13]

In conclusion, our study shows that the majority of the biopsies were of primary glomerular diseases and that FSGS was the most common

followed by MesPGN. Among the secondary glomerular diseases, renal amyloidosis was found to be most common in the patients who presented with NS, and majority of the cases were of secondary amyloidosis in whom tuberculosis and chronic respiratory infections were common. NS was the most common presentation for both primary and secondary glomerular diseases. Out of 75 cases that included both primary and secondary glomerular diseases, 64 cases showed correlation of pathological findings with clinical and laboratory parameters.

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Dr. Abdul Hakeem Attar,
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Dr. Begum Zeenath,
Dr. Ravindra Madraki,
Dr. Balasaheb Ramling Yelikar
Department of Pathology, Shri B.M. Patil Medical College, Bijapur and & KBNIMS, Gulbarga, India
E-mail: attar.hakeem@gmail.com

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