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Original Research Article

Spectrum of renal diseases- A clinicopathological study

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Abstract

Aim: To study the spectrum and frequency of various renal diseases; profile of various renal disease in different age groups was also studied.
Material and method: Ultrasound assisted percutaneous renal biopsy with routine H&E staining was done. Periodic acid Schiff, Masson Trichome, Silver Methinamine and Congo red done where needed.
Result: Renal biopsies from total of 100 patients suspected with renal disease were evaluated. Maximum incidence of renal disease was seen in the age group 41-50 years which comprised 24% of total cases. 56 patients (56%) were male and 44 (44%) patients were female. Most of the benign diseases were seen in age group 41-50 Yrs and malignant diseases were seen in 61-70 yrs of age. Minimal change disease was commonest cause of nephrotic syndrome. The commonest cause of chronic kidney disease/chronic renal failure was chronic glomerulonephritis and for acute renal failure were toxins. Acute tubular necrosis was commonest histopathological finding seen in acute renal failure Minimal change disease was commonest cause of nephrotic syndrome. Commonest histopathological feature in nephritic syndrome was tubulointerstitial nephritis
Conclusion: Early diagnosis of kidney diseases with renal biopsy lead to appropriate treatment and prevented the end stage renal disease.
Keywords: Renal biopsies, glomerulonephritis, kidney diseases.

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1. Introduction

Renal diseases are emerging as a global threat to human health in general and for developing countries in particular. Spectrum of renal diseases varies significantly in different parts of the world as it is influenced by geographical, environmental and socio economic factors in that region.

Kidneys can be involved by non neoplastic and neoplastic diseases. Non neoplastic conditions are categorized according to the involvement of different structures like glomeruli, tubules, interstitium and blood vessels [1]. Glomerular diseases can be primary, secondary to systemic diseases or hereditary.

Incidence of acute renal diseases in India is 20 cases per 1000 paediatric admission [2] and 6.4 per adult admission [3]. In developing countries the most common causes of acute renal disorder are frequently associated with volume responsive prerenal [4], obstetric [5], infectious [6] and toxic mechanism [7]. Acute renal diseases affect predominantly young [8] and children in developing countries [9]; where as in developed region elderly patient's predominats [10]. Due to lack of awareness and paucity of investigatory facilities in developing countries like India the renal disorders get diagnosed in later stages when irreversible damage has already taken place in kidney.

Chronic renal diseases form major burden in spectrum of renal diseases in our country. The approximate prevalence of CKD in India is 800 per million population.[11] Renal cell carcinoma represent about 1% to 3% of all visceral cancers and account for 85% of renal cancers. There are 30,000 new cases per year and 12,000 deaths from the disease [12].

Renal biopsy is key diagnostic tool used in the evaluation of patient with the renal diseases by this

procedure it is possible to established an accurate diagnosis, obtain critical information on evaluation and prognosis of disease process and develop a rational approach to the treatment of renal disease.

Various special stains can be used for the evaluation of renal biopsies like PAS, Masson trichome, silver methinamine and congo red. These stains are useful to detect basement membrane thickening, glomerulosclerosis, mesangial proliferation, membrano proliferative disorders and renal amyloidosis etc.

Aims and objectives:

Prospective observational Study was conducted in the Department of pathology, Indira Gandhi Medical College Shimla (H.P.) during the period extending from May 2008 to November 2009 to study the spectrum and frequency of various renal diseases. Profile of various renal diseases in different age groups was also studied.

2. Material and methods

The study was conducted for duration of one year. Ultrasound assisted percutaneous renal biopsy for histopathological examination was collected from patients admitted in the department of nephrology and surgery, IGMC, Shimla in whom clinical history, urine analysis, biochemical and radiological investigations suggested the possibility of renal diseases. Complete clinical data was recorded and Performa was filled out after taking a written informed consent from the patient. However patients who were unable to provide written informed consent were excluded. Gross examination of biopsy specimen was done. Biopsy specimens were fixed in 10% buffer formalin for fixation, kept for one day and routine H&E staining was done.

Periodic acid schiff, Masson Trichome, Silver Methinamine and Congo red were done according to the procedure given in hand book of histopathological and histochemical techniques (CFA Culling) [13]. Non neoplastic diseases were classified, according to WHO classification into nephrotic syndrome, nephritic syndrome, acute renal failure, chronic kidney disease and lupus nephritis caused by primary or secondary glomerulonephritis. SLE/DLE with lupus nephritis cases were classified according to who classification into class-I LN to class –VI LN [14]. Malignant tumors of kidney were classified according to new classification of renal cell neoplasm [15].

3. Observations

Renal biopsies from total of 100 patients suspected with renal disease were evaluated. Maximum incidence of renal disease was seen in the age group 41-50 years which comprised 24% of total cases. In the present study out of 100 patients, 56 patients (56%) were male and 44 (44%) patients were female.

Table 1: Syndrome wise distribution of diseases:

Type of diseases	Total No of cases
Nephrotic syndrome	45
CKD/CRF	28
ARF	12
SLE/DLE with lupus nephritis	10
Nephritic syndrome	05

Out of 100 cases of renal biopsy 45% cases presented with nephrotic syndrome, while chronic kidney diseases accounted 28% of cases, ARF was seen in 12 % of cases and other presentation were SLE/DLE with lupus nephritis 10% of cases nephritic syndrome 5% of cases.

Nephrotic syndrome was the commonest in age group 21-30 yrs comprising 27 % of total cases, followed by age group 11-20 yrs and 31-40 yrs who comprised 20% each. Out of total 45 cases of nephrotic syndrome male comprised 60% of total cases, while female comprised 40% of total cases.

Table 2: Distribution of cases of Nephrotic syndrome according to histopathology

Histopathological findings	No of cases
Minimal change disease	19 (42.22%)
Membranous GN	09 (20%)
Focal glomerulosclerosis	08 (17.77%)
Proliferative GN	04(08.88%}
Membranoproliferative GN	01 (02.22%)
FSGS	01(02.22%)
Amyloidosis	01(02.22%)
Fibrillary Nephropathy	01(02.22%)
TIN	01(02.22%)

It is evident from the above table that commonest cause of nephrotic syndrome was minimal change disease seen in 19 cases (42.22%) followed by membranous glomerulonephritis 9 cases (20%.

Chronic kidney disease/chronic renal failure were commonest in age group of 41-50 yrs. male (17 cases) outnumbered the female (11cases) patients. Out of twenty eight patients nine patients had acute or chronic renal failure.

Table 3: Distribution of cases of CKD/CRF according to histopathology

Histopathological findings	No of cases
Chronic GN	10
TIN	04
RPGN	02
Benign Nephrosclerosis	02
Mesangioproliferative GN	01
Proliferative GN	02
unclassified	07

As it is evident from the above table commonest cause of chronic kidney disease/chronic renal failure was chronic glomerulonephritis which was seen in 10 out of 29 cases, followed by tubulointerstitial nephritis 4 cases and Rapidly progressive glomerulonephritis 2 cases and benign nephrosclerosis 2 cases each. Males (17 cases) outnumbered the female (11cases) patients.

In the present study acute renal failure was commonest in age group of 41-50 years. Commonest cause

of acute renal failure was toxins seen in 9 cases (75 %) followed by drugs 2 cases (16.66%) cases and acute gastroentritis 1 case (8.33%). Acute tubular necrosis was commonest histopathological findings seen in 5 cases of acute renal failure followed by tubulointerstitial nephritis in 3 cases.

Nephritic syndrome was commonest in age group 11-20yrs followed by 51-60yrs and >60yrs. Nephritic syndrome was commonest in males (4 cases) than female (1 case).

Table 4: Histopathological diagnosis in nephritic syndrome

Histopathological findings	No of cases
Proliferative GN	01
RPGN	01
TIN	02
unclassified	01

In the present study commonest histopathological features were tubulointerstitial nephritis 2 cases, followed by proliferative glomerulonephritis 1 case, and rapidly progressive glomerulonephritis 1 case. SLE/DLE was commonest in age group 21-30 yrs 5 cases followed by 31-40yrs 2cases. The present study all 10 patients with SLE/DLE were females.

Table 5: Distribution of cases of SLE /DLE according to WHO classification

WHO class of LN	No of cases
Class-I LN	03
Class –II LN	05
Class –III LN	00
Class –IV LN	02

In present study out of total 10 cases of SLE/DLE most of cases were of class –II LN (5 cases), followed by class- I LN (3 cases) (30%) and class –IV 2 (cases) 20%.

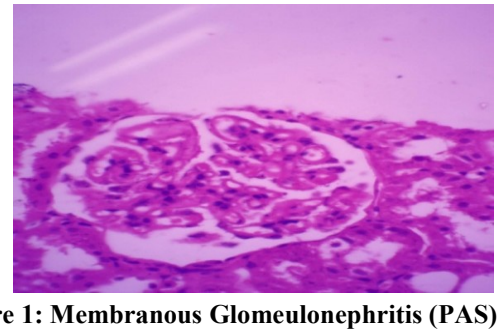

Figure 1: Membranous Glomeulonephritis (PAS) 400X

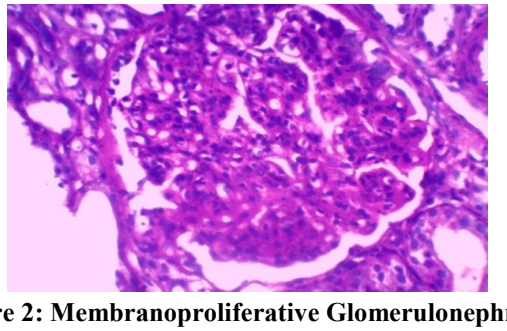

Figure 2: Membranoproliferative Glomerulonephritis (H&E, 400x)

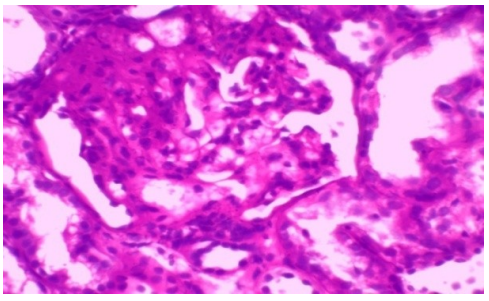

Figure 3: Focal Segmental Glomerulosclerosis (PAS), 400x

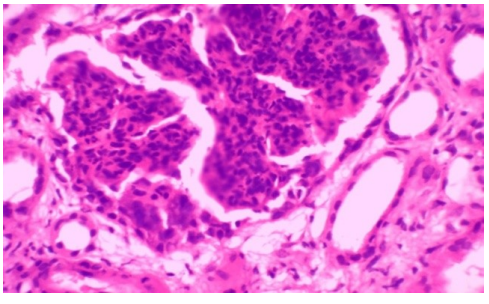

Figure 4: Proliferative Glomerulonephritis (H&E, 400x)

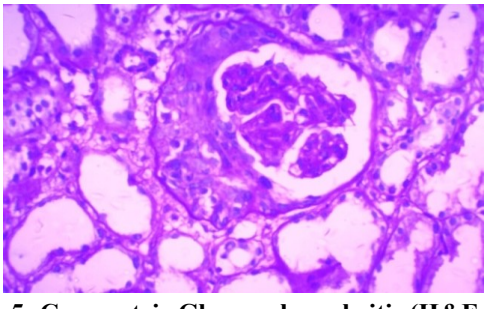

Figure 5: Crescentric Glomerulonephritis (H&E, 400x)

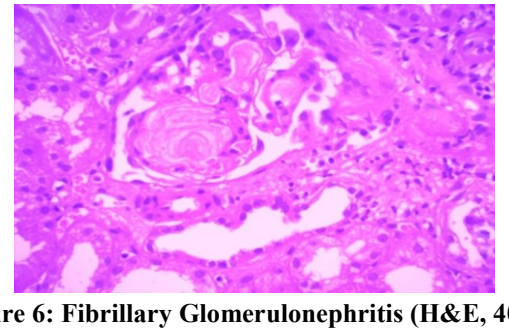

Figure 6: Fibrillary Glomerulonephritis (H&E, 400x)

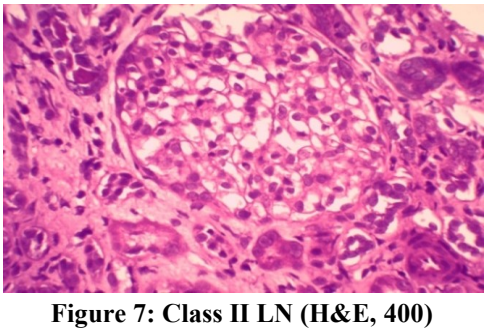

Figure 7: Class II LN (H&E, 400)

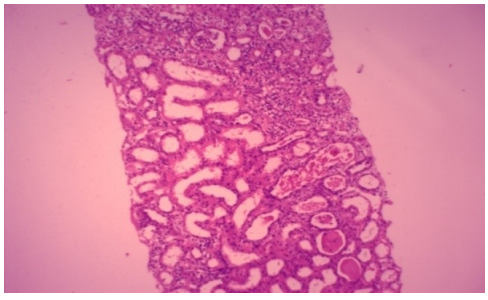

Figure 8: Snake bite induced acute tubular necrosis with tubulointerstitial nephritis (H&E, 400x)

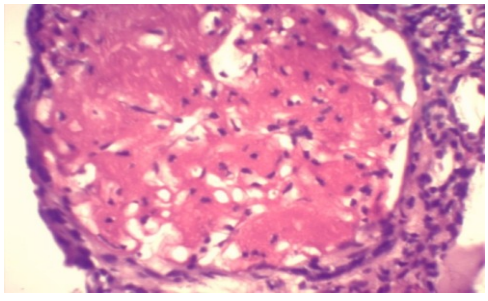

Figure 9: Renal Amyloidosis (Congo red, 400x)

4. Discussion

Since the spectrum of renal diseases has variable behaviour therefore its magnitude is different in different regions. Diagnosis of renal diseases is based on the careful observation and clinicopathological correlation.

In the present study 45% of renal biopsy cases presented with nephrotic syndrome which is comparable with the study conducted by Prakash (61.5%) [16] and Razukeviniene (29.1%) [17].

Commonest cause of nephrotic syndrome was minimal change disease 42%, followed by membranous glomerulonephritis 20%. Chugh (1998) [18] reported minimal change disease has been commonest cause of nephrotic syndrome seen in 23-37 % of cases, followed by proliferative GN 19%, membranoproliferative18%, membranous GN 10%

In present study Membranous glomerulonephritis was seen in 20 %. Present study was comparable to study by Aggarwal [19] which showed 20% cases of membranous glomerulonephritis causing nephrotic syndrome. Present study is close to study by Aggarwal [20] which showed 16% cases of membranous glomerulonephritis

Primary glomrulonephritis was seen in 71% while secondary glomerular. Diseases was seen in 29%, similar data has been reported from PGI Chandigarh[18] where primary glomerulonephritis was seen in 69% of cases and secondary glomerular diseases was seen in 31%. In a study from AIMS [19] all of the cases of nephrotic syndrome primary glomerular disease were seen in 58%and secondary glomerular disease was seen in 41%. In another study from PGIMS Rohtak [20] showed similar data where primary glomerulonephritis was seen in 78% and secondary glomerular disease was seen in 21%.

After nephrotic syndrome second commonest presentation in the present study was chronic kidney disease/ chronic renal failure seen in 28 % of cases. Chronic glomerulonephritis was commonest cause of chronic renal failure seen in 44.4%. Similar findings were observed by Aggarwal [19] and Aggarwal [20].

In the present study TIN was found in 14.2 % cases of chronic renal failure compared with 16.5% and 14.3% cases reported by Mittal [21] and Sakhuja [22] respectively.

In the present study hypertension was found in 50% cases of chronic kidney disease/ chronic renal failure. Out of which 7.14 % showed feature of hyaline arteriosclerosis.

Diabetic nephropathy was cause of chronic renal failure in 4% of cases.

Acute renal failure constituted 12 % of clinical syndrome and was comparable with study by HK Aggarwal [20], Chitala *et al* [23] and Utar *et al* [24].

In the present study commonest cause of acute renal failure was toxins 75 % followed by drugs16.66% and acute gastroentritis 8.33%. Most common toxins were snake venom and wasp venom. Acute renal failure due to snake venom toxicity was 66.66 % and due to wasp venom was 33.33%.

In the present study 5 % of patients presented as nephritic syndrome which is comparable to study by HK Aggarwal who reported 6.7 % cases of nephritic syndrome. Post infectious glomerulonephritis was commonest cause for it. In majority of patients the diagnosis was clinically on the basis of recent infection and clinical presentation. Proliferative glomerulonephritis was seen in 20 % of cases, rapidly progressive glomerulonephritis 20 % cases and TIN 40 % cases. RPGN was seen in 19.67% of cases.

In the present study SLE/DLE constituted 10% of cases, 08% cases of SLE and 02% cases of DLE. Commonest age group involved was 21-30 yrs (50%). All the patients were females. Present study was comparable to other studies reported by Aggarwal [19] and Agarwal [20].

5. Conclusion

In the present study most of the cases were of nephrotic syndrome followed by chronic kidney disease/chronic renal failure, acute renal failure, nephritic syndrome and SLE/DLE. Minimal change disease was commonest cause of nephrotic syndrome, Post infectious glomerulonephritis was commonest cause of nephritic syndrome, and chronic glomerulonephritis was commonest cause of chronic Kidney disease. Most of the benign diseases were seen in age group 41-50 Yrs and malignant diseases were seen in 61-70 yrs of age. Early diagnosis of kidney diseases with renal biopsy lead to appropriate treatment and prevented the end stage renal disease.

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