

## HISTOLOGICAL PATTERN OF NEPHROTIC SYNDROME IN ELDERLY PATIENTS

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**Background:** Renal biopsy is a safe and informative technique that has played a key role in the evolution of nephrology as a specialty. This cross-sectional descriptive study was aimed to study the histological pattern of nephrotic syndrome in elderly patients. **Methods:** This study was conducted from January 1998 to December 2005 (8 Years) in the Department of Nephrology, Govt. Lady Reading Hospital, Peshawar, Pakistan. We performed renal biopsy in 153 patients aged 60 years and above, admitted with nephrotic syndrome—proteinuria with protein >3 gm/24 hours with or without oedema, hypoalbuminemia, hyperlipidemia, acute nephritic syndrome—red blood cell casts or dysmorphic red cells on urine microscopy, temporally associated with acute renal failure with or without new onset hypertension, acute renal failure—sudden decline in renal functions developing in days to weeks causing retention of nitrogenous wastes and rapidly progressive renal failure—sub acute decline in renal functions developing over weeks to months. **Results:** Significant differences in the histological pattern are noticed when compared with the studies of the other centres. Minimal Change Disease (MCD) was the commonest histological pattern (40%), followed by Membranous Nephropathy (21%), Crescentic Nephritis (19.6%), Focal Segmental Glomerulosclerosis (FSGS) (6.5%), Hypertensive Nephropathy (5.8%), Mesangiocapillary Glomerulonephritis (MCGN) (3.9%) and Diffuse Proliferative Glomerulonephritis (DPGN) (3.2%).

**Keywords:** Renal Biopsy, Glomerulonephritis, Minimal Change Disease, Membranous Nephropathy, Crescentic Nephritis, Focal Segmental Glomerulosclerosis, Hypertensive Nephropathy, Mesangiocapillary Glomerulonephritis, Diffuse Proliferative Glomerulonephritis

### INTRODUCTION

The introduction of renal biopsy transformed the study of renal diseases, particularly glomerular diseases, by providing the histological information that helps in the classification of renal diseases and insight into pathogenesis. Renal biopsy is a safe and informative technique that has played a key role in the evolution of nephrology as a specialty.

Iversen and Brun, in Copenhagen, adapted the liver biopsy technique to attempt renal biopsies. They used intravenous urography to target the right kidney and biopsy was obtained by suction in the sitting position.<sup>1</sup> Kark and Muehrcke improved on the Danes' technique by using a modified Vim Silverman needle and introduced for the first time that renal biopsy could be obtained with more ease in the lying position.<sup>2</sup> In the recent years, two major modifications are made in the technique. First, the use of real time ultrasound to localize the kidneys and second, improvements in the design of the biopsy needle with the introduction of the Trucut needle and subsequently the gun mounted semi-automatic biopsy needle.<sup>3</sup>

Alterations in renal functions or abnormalities in urinalysis results may be attributed to aging, hypertensive changes or renal diseases. Renal diseases found in the elderly population are treatable in as many as 80% of patients.<sup>4</sup> The reluctance to subject the elderly patients to such interventional procedures as renal biopsy has limited the examination of renal disease in this age group.

A marked increase in renal biopsies is noted in the elderly population. This may be due to increase in the longevity, as well as the increase in the general health of this group. It may also be related to the overall expectations of continuing an active and healthy lifestyle.<sup>5</sup>

Objective of study was to study the histological pattern of nephrotic syndrome in elderly patients.

### PATIENTS & METHODS

It was a cross-sectional descriptive study and was carried out on patients aged 60 years and older with usual renal symptoms, from January 1998 to December 2005 (08 years), 153 biopsies from 153 patients were carried out. Clinical presentations were grouped as:

- (i) Nephrotic syndrome—proteinuria (>3 gm/24 hours) with or without oedema, hypoalbuminemia, hyperlipidemia
- (ii) Acute nephritic syndrome—red blood cell casts or dysmorphic red cells on urine microscopy, temporally associated with acute renal failure with or without new onset hypertension,
- (iii) Acute renal failure—sudden decline in renal functions developing in days to weeks, causing retention of nitrogenous wastes
- (iv) Rapidly progressive renal failure—subacute decline in renal functions, developing over weeks to months

The clinical information was recorded, including clinical presentation, history, baseline

investigations, serum creatinine, urinalysis results, ASO titre, ANF, anti-DNA, serum complement levels (C3 and C4), 24 hours urinary protein excretion, creatinine clearance, urine and serum protein electrophoresis, presence of antineutrophil cytoplasmic antibody and presence of antiglomerular basement membrane antibodies.

In our study, renal biopsy was performed under real-time ultrasound guidance to localize the kidney, using a needle biopsy gun. The patient should lie face down, with a support in the under upper abdomen to splint the kidney, the lower pole of the kidney was localized with the help of ultrasound and the skin over the target was marked. The skin was then washed with antiseptic-pyodine solution; local anaesthetic agent lignocain 2% was infiltrated down to the capsule of the kidney, a small stab incision was made through the skin. Biopsy needle was then mounted on the biopsy gun and the gun cocked. Needle was advanced under ultrasound control (the ultrasound probe was placed in the sterile sleeve) to just short of renal capsule, and the patient at this stage was told to hold the breath so that the kidney was in the correct position to biopsy the lower pole. The gun was then fired to get a biopsy sample.

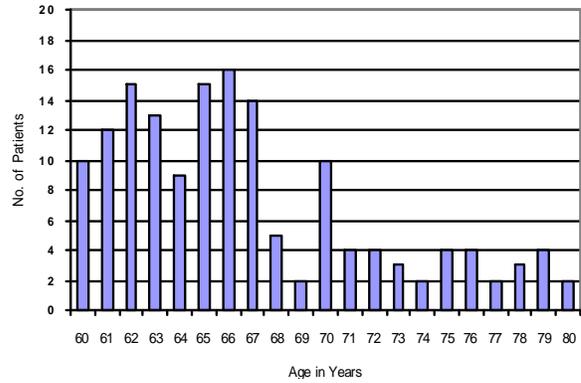
The biopsy sample was sent in the formalin for light microscopy and a sample was fixed in the liquid nitrogen for immunofluorescence study. The patients were there after shifted to ward to lie flat in bed, maintaining a high fluid intake for 24 hours, keeping a record of time pulse, blood pressure and urine out put.

All the biopsies (153) were reported and processed by a single histopathologist to avoid bias in reports.

**RESULTS**

Average age of elderly patients was 70 years with a range of 60–80 years including 103 men and 50 women (man to woman ratio: 2:1) (Figure-1). The indications for renal biopsy in these patients are shown in Table-1, Nephrotic syndrome 106 (69.2%) was the commonest indication for renal biopsy followed by acute nephritic syndrome 21 patients (13.7%), rapidly progressive renal failure 15 (9.8%) and acute renal failure 11 (7.2%).

The histological pattern of nephrotic syndrome in the studied population were: minimal change disease 61 patients (40%), membranous nephropathy 32 patients (20.9%), crescentic nephritis 30 patients (19.6%), focal segmental glomerulosclerosis 10 (6.5%), hypertensive nephropathy 9 (5.8%), Messangiocapillary Glomerulone-phritis 6 (3.9%) and diffuse Proliferative Glomerulone-phritis 5 cases (3.2%). (Table-2).



**Figure-1: Number of Patients Age 60-80 Years**

**Table-1: Indications for renal biopsy**

Clinical Presentation	Patients	%
Nephrotic Syndrome	106	69.3
Acute Nephritic Syndrome	21	13.7
Rapidly Progressive Renal Failure	15	9.8
Acute Renal Failure	11	7.2
<b>TOTAL</b>	<b>153</b>	<b>100</b>

**Table- 2: Histological pattern**

Diagnosis on Renal Biopsy	Patients	%
Minimal Change Disease	61	40.0
Membranous Nephropathy	32	20.9
Crescentic Nephritis	30	19.6
Focal Segmental Glomerulosclerosis	10	6.5
Hypertensive Nephropathy	09	5.8
Messangiocapillary Glomerulonephritis	06	3.9
Diffuse Proliferative Glomerulonephritis	05	3.2
<b>TOTAL</b>	<b>153</b>	<b>100</b>

**DISCUSSION**

Renal biopsy is a very useful investigation to understand the histological nature of the renal diseases. It helps in establishing the accurate tissue diagnosis, identifying the exact pathology and devising the appropriate management plane for patients suffering from different types of nephritides at any age group.<sup>6</sup>

As most of the patients in the study group were never investigated for baseline renal functions, hence it led to additional difficulties to segregate the elderly patient group having underlying existent renal disease. This is supported by a small group of 9 patients (5.8%) in the study who had mild to moderate renal impairment with normal sized kidneys and on renal biopsy had hypertensive nephropathy. These cases represent a slow and undetected decline in renal functions that on acute discovery of poor renal functions lead to a renal biopsy. Overall, more than 90% of our elderly patients had histological diagnosis that would benefit from therapeutic interventions. For example, MCD, membranous nephropathy, crescentic nephritis, MCGN and diffuse Proliferative GN. The remaining 20% of 153 biopsies provided at least prognostic information or ruled out conditions in which one can at least delay the progression and preventing harmful empirical therapies.

Significant differences in the histological pattern were noticed in this study, when compared with other studies conducted in Pakistan and in more established centres of the west.<sup>7-9</sup> Minimal change disease was the commonest histological pattern—61 patients (40%) in our study. Compared to earlier studies<sup>10,11</sup> where membranous nephropathy was the commonest cause of idiopathic nephrotic syndrome (38%), only 32 patients (20.9%) in our study had membranous nephropathy. Rest of our finding are almost identical to the observation of other studies.<sup>11-14</sup> Although the incidence of diffuse proliferative glomerulonephritis is falling in the developed countries due to better control of infection<sup>14</sup> but in the developing countries like ours, it is still a significant finding.<sup>15</sup> Five patients (3.2%) in our study group had diffuse proliferative glomerulonephritis.

Other studies<sup>16-23</sup> in adult population aged more than 40 years, revealed mesangio proliferative glomerulonephritis as the most frequently occurring glomerulopathy, followed by membranous nephropathy and tubulointerstitial nephritis. However, an audit report of renal biopsies from Jinnah Post Graduate Medical Institute, Karachi has shown FSGS is the leading cause of glomerulopathy followed by membranous and MCD while a study from Kuwait has reported FSGS as the commonest followed by MCD and IGA nephropathy (Table-3).

**Table-3: Comparison of earlier studies with the present study**

Country/Area	Commonest histological pattern	
USA <sup>16-8</sup>	Membranous Nephropathy	
UK <sup>19</sup>	IgA Nephropathy	
Middle East (Kuwait) <sup>23</sup>	FSGS	
Pakistan	Sindh <sup>22</sup>	FSGS
	NWFP <sup>20</sup>	Mesengio-proliferative GN
	Punjab <sup>21</sup>	MCD
<b>Present Study</b>	<b>MCD</b>	

We have noticed quite a variable histological pattern from different centres but one thing common to all studies is that the use of renal biopsy for correct diagnosis leads to a more directed therapeutic approach.

## CONCLUSION

It is concluded from the above study that more than 90% of the patients aged 60 years and above are suffering from nephritides having curable cause. It also provides prognostic information and rules out conditions in which one can delay the progression of the renal disease.

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