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Pattern of Renal Disease in the Elderly Biopsy Based Data from a Single Center in Kurdistan Region-Iraq: A 7-Year Retrospective Study

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ABSTRACT

Background: Data on biopsy-proven renal disease in the elderly is extremely rare in Kurdistan-Iraq, since there are no studies being conducted. This will be the first attempt to analyze patients ≥ 60 years) in the region.
Objective: To evaluate the histo-pathological spectrum of renal disease in elderly patients.
Materials and Methods: Records of all elderly patients ≥ 60 years) who had undergone renal biopsy in the (Shorsh General Hospital) during 7 year period, between January 2010 and December 2016 were collected and retrospectively analysed.
Results: In total, 1914 patients underwent renal biopsy during this period of which 135 cases were elderly. Their mean age was (67.2 ± 6.3 years), they were predominantly males 68.1% and 31.9% were females. The most frequent clinical presentations prior to renal biopsy or indications were; proteinuria, renal impairment and hypertension. Majority of the biopsies showed some form of Glomerular diseases (82.3%) either Primary glomerular disease (51.9%) or Secondary glomerular disease (30.4%) followed by Miscellaneous (9.6%) and Tubulo-intersitial nephropathies (6.7%). The most common primary glomerular disease was Focal-segmental glomerulosclerosis (40.0%) followed by Membranous nephropathy (25.7%), Crescentic glomerulonephritis (12.9%). Among the Secondary glomerular disease, Hypertensive nephrosclerosis formed the commonest diagnosis (68.3%), followed by Amyloidosis (24.4%) and Diabetic nephropathy (4.9%).
Conclusion: In conclusion, this study demonstrates that Primary glomerular disease is the most prevalent with Focal-segmental glomerulosclerosis, Membranous nephropathy and Crescentic glomerulonephritis being the most frequent diagnosis. Among the Secondary glomerular disease Hypertensive nephrosclerosis was the commonest followed by Amyloidosis and Diabetic nephropathy? Renal biopsy in very elderly cases is a valuable diagnostic way that could be offered in clinical settings with maximal potential benefit.

Key words: Kidney diseases, Elderly, Renal biopsy, Glomerulonephritis

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INTRODUCTION

Aging and old age are among the most significant challenges facing medicine this century. Modern medicine and healthier lifestyles have increased the likelihood that younger adults will now achieve old age [1]. This increase in life expectancy is associated with more chronic and acute disease in the elderly. As there is physiologic decline in the kidney function with aging, the elderly are more vulnerable to chronic progressive kidney disease as well as any superimposed acute injury to the kidneys [2]. Previously renal biopsies of the elderly were not performed routinely. However in recent studies renal biopsy is considered to be a safe procedure even in the elderly and yields valuable information which can help decide the patient management and prognosis [3]. Renal biopsy remains a valuable clinical tool and generally required to establish the type of glomerular disease, reflect the level of disease activity and to guide treatment decision. It is able to provide a tissue diagnosis in more than 95% of patients, with a life-threatening complication rate of less than 0.1% [4]. It is mandatory to recognize the spectrum of renal disease in the elderly in order to understand the etiology as well as factors of disease progression to end stage renal disease [5].

Studies about the patterns and prevalence of renal diseases in Kurdistan region-Iraq are extremely rare and exact incidence of renal disease in the elderly is not known, because of very limited information available on that age group and overall spectrum of clinical renal disease in the elderly from our country. Therefore, this study is conducted to analyse the relative frequencies of kidney diseases in the aged population, and to better understand the natural history of renal diseases in this

region. The study was performed based on renal biopsies obtained from the histopathology center in Sulaimani Governorate-Iraq. The results are compared with similar reports from other countries.

MATERIALS AND METHODS

This is a retrospective study with approve of Shorsh hospital research committee of renal biopsies performed over a period of 7 years from January 2010 to December 2016, at Shorsh hospital in Sulaimani Governorate which provides the renal histopathological service for the entire population of North-Iraq (Kurdistan Region) in a single center. Collectively a total number of 2779 renal biopsies were performed of which 191 cases were excluded from the study because of either having insufficient samples or not having proper clinical data, and another 674 cases were excluded since they were taken from transplanted subjects.

In total, 1914 renal biopsies remained of which 135 cases were obtained from elderly patients. A retrospective analysis was conducted with the (≥ 60 years) age group. Individuals aged 60 years or above (≥ 60 years) were arbitrarily considered elderly. There were 92 males and 43 females with age ranging from 60 years to 83 years. The indications for renal biopsy included (proteinuria, unexplained microscopic or macroscopic hematuria, systemic disease with evidence of renal involvement and unexplained renal impairment).

The following data were recorded for each patient: name, age, sex, source of referral, indication for renal biopsy, histopathological diagnosis and laboratory investigations such as serum creatinine, 24-hour urinary protein, urine microscopy, virology (HBs-Ag, anti-HCV, HIV) and serology (anti-dsDNA antibody, antinuclear antibody ANA, C3, C4). All samples were obtained by percutaneous method using a true-cut needle under ultrasound guidance and a (16 G × 16 cm) size instrument was used. Specimens obtained were prepared as per the standard protocol and examined by the same group of pathologists and technicians of our hospital. Analysis included Light microscopy (LM) and immunofluorescence (IF). For LM, Sections were made from formalin fixed paraffin embedded tissue and three sections were stained with Hematoxylin and Eosin, one with periodic acid Schiff, and one with Masson's trichrome. Special stains were used when warranted.

IF (Immunofluorescence microscopy) panel included staining for IgG, IgM, IgA, C3, C1q, and kappa and lambda light chains. During 2010 IF analysis was not available, but afterwards it was performed in majority of the biopsies.

Histological categories were classified as follows:

Primary glomerulonephritis (PGN): Focal segmental glomerulosclerosis (FSGS), Membranous nephropathy (MN), Minimal change disease (MCD), Membrano-proliferative glomerulonephritis (MPGN), Post-infectious glomerulonephritis (PIGN), Immunoglobulin A nephropathy (IgAN), Crescentic glomerulonephritis (CresGN) and Mesangioproliferative glomerulonephritis (MesPGN).

Secondary glomerulonephritis (SGN): Lupus nephritis (LN), Diabetic nephropathy (DN), Hypertensive nephrosclerosis (Hypertensive NS), and Amyloidosis (AM).

Tubulo-interstitial nephropathies (TIN): Tubulo-interstitial nephritis either acute TIN or chronic TIN and Acute tubular necrosis (ATN).

Miscellaneous: (Nephrocalcinosis, Thrombotic microangiopathy, Cast nephropathy, Burkitt lymphoma, Pyelonephritis and Cystic kidney).

Normal kidney biopsy.

Data analysis

Collected data were treated statistically using Statistical Package for the Social Sciences (SPSS) version 21 for the data analysis and Microsoft Excel 2010 was used for data entry as well as for designing of the graphs. Data are expressed as means ± standard deviations. Descriptive statistics were generated on all variable, chi square tests were used to investigate the associations present. p-value less than 0.05 was considered significant.

RESULTS

One hundred and thirty five renal biopsies of patients aged 60 years or above were retrospectively analysed after exclusion of the renal biopsies from younger age groups, renal graft and those with insufficient records. Their mean age was 67.2 ± 6.3 years, ranged from sixty years to eighty three years. The male sex prevailed 92 cases (68.1%) with females comprising 43 cases (31.9%) of the study.

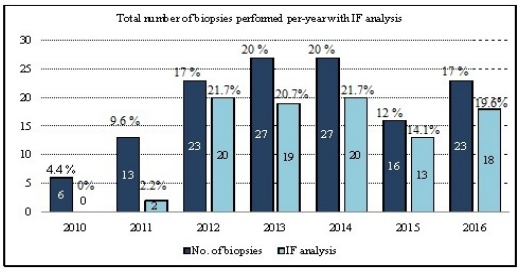


Figure 1: The total number of biopsies performed per-year with IF analysis performance rate

Higher number of biopsies was taken during the last four years and variation was observed in each type of renal disease according to time periods. Immuno-fluorescence test was not available in 2010 then afterwards it was performed for most of the biopsies. The total number of biopsies performed per-year together with IF analysis performance rate is shown in Figure 1. Also the

distribution of various types of renal disease in each year is shown in Table 1.

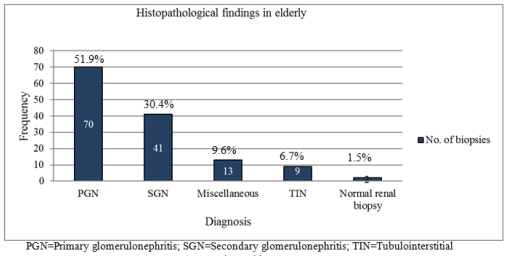
Table 1: The distribution of different types of renal disease in each year

Major categories	Year							Total
	2010	2011	2012	2013	2014	2015	2016	
FSGS	2	2	3	3	10	1	7	28
MN	0	2	3	3	5	2	3	18
MCD	0	1	0	3	1	0	1	6
MPGN	0	1	1	1	1	1	0	5
DN	0	1	0	0	0	1	0	2
Hypertensive NS	0	3	3	9	7	2	4	28
LN	0	0	1	0	0	0	0	1
PIGN	0	0	1	0	0	0	0	1
IgA N	0	0	0	1	1	1	0	3
TIN	1	0	1	1	1	0	3	7
ATN	0	0	1	0	0	0	1	2
Cres GN	0	2	3	1	0	1	2	9
AM	0	1	2	2	1	4	0	10
Miscellaneous	2	0	3	3	0	3	2	13
Normal renal biopsy	1	0	1	0	0	0	0	2
Total	6	13	23	27	27	16	23	135

FSGS=Focal-Segmental Glomerulosclerosis; MN=Membranous Nephropathy; MCD=Minimal Change Disease; MPGN=Membranoproliferative Glomerulonephritis; PIGN=Post-Infectious Glomerulonephritis; IgAN=Immunoglobulin A Nephropathy; CresGN=Crescentic Glomerulonephritis; MesPGN=Mesangioproliferative Glomerulonephritis; LN=Lupus Nephritis; DN=Diabetic Nephropathy; HNS=Hypertensive Nephrosclerosis; AM=Amyloidosis; TIN=Tubulointerstitial Nephropathies; ATN=Acute Tubular Necrosis; Miscellaneous Includes (Nephrocalcinosis, Thrombotic Microangiopathy, Cast Nephropathy, Burkitt Lymphoma, Pyelonephritis and Cystic Kidney Disease).

The most frequent clinical presentations prior to renal biopsy or indications were; proteinuria (69.6%), renal impairment (55.6%), hypertension (34.8%), hematuria (21.5%), and Diabetes (10.4%). As demonstrated in Table 2. The most common histopathological findings in elderly are shown in Figure 2. Glomerular disease was the most frequent diagnosis (82.3%) either PGN (51.9%) or SGD (30.4%) followed by Miscellaneous (9.6%) including (Nephrocalcinosis, Thrombotic microangiopathy, Cast nephropathy, Burkitt lymphoma, Pyelonephritis and Cystic kidney) and TIN (6.7%).

There were 70 cases of PGN comprising (51.9%) of renal diseases. FSGS was the most common type of PGN observed in 28 cases (40.0%), followed by MN 18 cases (25.7%) and Cres GN 9 cases (12.9%). MCD was found in 6 cases (8.6%), MPGN in 5 cases (7.1%), IgA N in 3 cases (4.3%) and PIGN in 1 case (1.4%). There were 41 cases of SGN constituting (30.4%) of the total biopsies, Hypertensive NS was the most frequently diagnosed disease 28 cases (68.3%) of SGN, followed by the second most common diagnosis AM 10 cases (24.4%). DN was found in 2 cases (4.9%) and LN was encountered in minority of patients 1 case (2.4%).



PGN=Primary glomerulonephritis; SGN=Secondary glomerulonephritis; TIN=Tubulointerstitial nephropathies

Figure 2: The overall frequencies of different renal diseases in native renal biopsies in the elderly

Table 2: Clinical presentation of patients prior to renal biopsy

Clinical Presentation (N=135)	No. of biopsies	(%)
Proteinuria	94	69.6
Renal impairment	75	55.6

Hypertension	47	34.8
Hematuria	29	21.5
Diabetes	14	10.4

DISCUSSION

The current study provides the latest comprehensive information about the demographics, clinical presentations and pattern of kidney diseases in elderly patients from a 7-year period in a single center in Kurdistan region-Iraq. To the best of our knowledge, this is the largest renal biopsy series and the first to analyze patients aged ≥ 60 years in Iraq. Clinico-pathological data of 1914 patients who underwent renal biopsy between the years (2010-2016) were analyzed, in which 135 cases were elderly.

In our study population the male sex prevailed 92 cases (68.1%) and 43 cases (31.9%) were female, this's similar to other studies assessing the same age group in the United Kingdom and Italy [6,7]. This finding suggests that males are more susceptible to kidney diseases and another notable outcome identified was the male sex predominance for all histopathological categories of biopsy proven glomerulonephritis with the exception of Lupus nephritis, in which females were more frequently affected.

The recent study identified proteinuria as the most frequent clinical manifestation indicating renal biopsy in (69.6%) of all cases, followed by renal impairment (55.6%), hypertension (34.8%), hematuria (21.5%), and Diabetes (10.4%). This is consistent with other reports published in Poland, Spain and the United States [8-10]. On the other hand studies from Spain and the United States reported acute kidney injury as the commonest presentation [11,12].

Among the biopsy proven renal disease in the elderly, glomerular disease was the most frequent finding being diagnosed in (82.3%) of all cases. Primary glomerulonephritis was the most common diagnosis (51.9%) followed by Secondary glomerulonephritis (30.4%), Miscellaneous (9.6%) including (Nephrocalcinosis, Thrombotic microangiopathy, Cast nephropathy, Burkitt lymphoma, Pyelonephritis and Cystic kidney) and Tubulointerstitial nephropathies (6.7%). which is similar to studies performed in China and India [13,14].

In elderly patients, Membranous nephropathy is known to be the most common histological pattern according to studies conducted in India, Korea, Ireland, Japan, India, Brazil and Saudi Arabia [15-21]. In our study, Focal-segmental glomerulosclerosis (40.0%) and Membranous nephropathy (25.7%) were first and second most common type of primary glomerulonephritis; this is concordant with the outcome in a study from Japan [22]. There are some discrepancies in the frequencies and spectrums of glomerular diseases in different countries and regions. In this regards, the primacy of Focal-segmental glomerulosclerosis is noteworthy since Focal-segmental glomerulosclerosis is a heterogeneous lesion and its incidence is on the rise throughout the world, both in adults and children.

Hypertensive nephrosclerosis was the most common histological pattern among the Secondary glomerulonephritis, a finding justified by the high prevalence of arterial hypertension in that age group, which can reach up to (68.3%) of the Secondary glomerular nephropathies, which's compatible with a report in Brazil [23]. Whereas a study from China reported Diabetes nephritis as the most common secondary glomerulonephritis [24]. Other studies from Turkey and India have shown Amyloidosis to be the commonest [25,26]. A research examined Records of all elderly patients (≥ 60 years) who had undergone kidney biopsy in the nephrology department. Their clinical details and laboratory investigations at the time of biopsy were noted. Details of kidney biopsy were recorded from their biopsy reports. Like our paper, they showed spectrum of biopsy-proven kidney disease in the elderly Indians seen in tertiary care hospital varies from the younger population. Kidney biopsy provides useful information with therapeutic and prognostic implications in these patients. The percentage of elderly patients among the total biopsied population is low in India, and these patients present late with renal dysfunction. Prospective studies are needed to assess the outcome of the commonly seen kidney diseases in elderly patients [27].

CONCLUSION

In conclusion, renal biopsy is a useful modality to diagnose kidney disease in the elderly population, providing us with important diagnostic information that can guide treatment and planning appropriate management. In our study, Primary glomerular disease constituted majority of the biopsies followed by Secondary glomerular disease. Among the Primary glomerulonephritis Focal-segmental glomerulosclerosis and Membranous nephropathy were the most common findings, and regarding the Secondary Glomerular diseases Hypertensive nephrosclerosis was the commonest followed by Amyloidosis.

LIMITATIONS

We were unable to analyze the data for the period before 2010 due to unavailability of a Histopathological center for renal biopsy in Kurdistan Region.

After establishment of the center in Sulaimani Governorate, immunofluorescence test was not present for the first year (2010).

Another shortcoming of our study was unavailability of Electron microscopy, which would have helped in better and more precise diagnosis.

Inadequate clinical data was another factor.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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