A Descriptive Study on "Renal Biopsy" Samples of Patients Admitted to Shahid Labbafinezhad Hospital (2019-2022)

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This epidemiological study aimed to identify the primary categories of kidney pathology diagnosis and their prevalence among patients admitted to Shahid Labbafinezhad Teaching Hospital. We included 1006 kidney biopsy findings from 2019 to 2022. The majority of kidney patients (78%) were between the ages of 20 and 60 years. Nephrotic syndrome made up 62% of the patient population. The findings revealed that primary glomerulonephritis, secondary glomerulonephritis, tubular/interstitial nephritis, end-stage kidney disease, and unclassified cases accounted for 63%, 17%, 12%, 6%, and 2% of kidney disease cases, respectively. The inclusion of a large number of patients from various regions across the country, combined with the expertise of the laboratory staff, underscores the reliability and significance of the results obtained in this study.

INTRODUCTION

Epidemiological studies, particularly the descriptive method, offer a comprehensive approach for understanding and controlling the risk of disease. Given the importance of understanding the prevalence of kidney diseases in guiding treatment and regional public health map,[1-4] This study aims to conduct a descriptive epidemiological investigation of pathological diagnosis of referred patients to Shahid Labbafinezhad Hospital by using kidney biopsy samples and analysis of clinical and laboratory findings.

MATERIALS AND METHODS

This cross-sectional study is based on the 1006 kidney biopsy reports at Shahid Labbafinezhad Teaching Hospital, Shahid Beheshti University in Tehran, Iran, from 2019 to 2021. The pathology diagnosis were categorized into five main groups[4]: Primary glomerulonephritis, Secondary glomerulonephritis, Tubular/interstitial nephritis, End-Stage Kidney Disease (ESKD), and Unclassified cases (non-diagnosed biopsis). Each of the main groups—Primary Glomerulonephritis, Secondary Glomerulonephritis, and Tubular/Interstitial Nephritis-comprises several subtypes, which are detailed in Table 1.[5]

Clinical and laboratory information was recorded in Microsoft Office Excel 2010, and the data were analyzed using SPSS Version 15. Comparisons were made based on age groups and gender using One Way ANOVA and Independent-Sample T-Test,[6] respectively.

RESULTS

Table 1 shows the descriptive results of the study. In this study, The patients' ages ranged from 7 days to 84 years. Based on the data in Table 1, the highest prevalence of kidney diseases was observed among individuals aged 20 to 60. Nephrotic syndrome was recorded in 62% of the patients Membranous glomerulonephritis had the highest frequency, followed by MCD and FSGS. Microscopic hematuria. was most commonly observed in IgA

Table 1. Frequency and prevalence percentage of pathological diagnoses in different age groups and their clinical evidence (Microscopic hematuria, hypertension) and Laboratory results (protein in urine and serum creatinine) in the Labbafinezhad Hospital (2019-2022)

	Total Numbers (percentage)	Men frequency (percentage)	Women frequency (percentage)	Age (year) (Mean ± SE)	Age group, n (%)					Prevalence percentage of clinical evidence		Mean ± SE	
					<20 years	20-40	41-60	61-80	>80	HTN	Microscopic hematuria	Proteinuria (gr/day)	Cr (mg/dl), blood
Total patients	1006 (100%)	546 (54)	460 (46)	44.3 ± 0.5	48 (4.7)	396 (39.4)	388 (38.6)	165 (16.4)	9 (0.9)	16	16	2.9 ± 0.1	2.9 ± 0.1
Primary Glomerulonephritis	672 (63)	364 (54)	308 (46)	42.9 ± 0.6	38 (5.7)	284 (42.3)	258 (38.4)	87 (12.9)	5 (0.71)	17	18	2.9 ± 0.1	2.1 ± 0.1
MCD (Minimal Change Disease)	142 (12.9)	68 (48)	74 (52)	39.3 ± 1.2	17 (12.0)	59 (41.5)	55 (38.7)	10 (7.0)	1 (0.71)	16	14	3.3 ± 0.4	1.4 ± 0.1
FSGS (Focal Segmental Glomerulosclerosis)	119 (10.8)	77 (65)	42 (35)	41.6 ± 1.4	10 (8.4)	50 (42.0)	44 (37.0)	14 (11.7)	1 (0.8)	23	17	2.8 ± 0.4	2.1 ± 0.2
MPGN (Membranoproliferative Glomerulonephritis)	12 (1.1)	6 (50)	6 (50)	43.8 ± 4.7	1 (8.3)	3 (25.0)	5 (41.7)	3 (25.0)	0	25	16	1.9 ± 0.8	3.0 ± 0.8
Pauci-immune glomerulonephritis	29 (2.6)	14 (48)	15 (52)	50.9 ± 2.2	0	7 (24.1)	16 (55.2)	6 (20.7)	0	17	41	2.04 ± 0.9	3.7 ± 0.6
Mesangioproliferative glomerulonephritis	11 (1.0)	6 (55)	5 (45)	33.3 ± 4.5	1 (9.1)	8 (72.7)	1 (9.1)	1 (9.1)	0	9	64	1.5 ± 0.7	1.7 ± 0.6
IgA nephropathy	85 (7.7)	65 (76)	20 (24)	38.9 ± 1.2	1 (1.2)	50 (58.8)	31 (36.5)	3 (3.5)	0	16	47	1.4 ± 0.3	2.5 ± 0.3
MGN (Membranous Glomerulonephritis)	276 (25.2)	131 (47)	145 (53)	45.7 ± 0.9	7 (2.5)	111 (40.2)	105 (38.0)	50 (18.1)	3 (1.1)	15	9	3.6 ± 0.3	2.1 ± 0.2
Secondary Glomerulonephritis	185 (17.2)	93 (50)	92 (50)	45.6 ± 1.1	6 (3.2)	67 (36.2)	72 (38.9)	38 (20.5)	2 (1.1)	36	17	2.6 ± 0.3	4.1 ± 0.6
AM (Amyloidosis)	21 (1.9)	11 (52)	10 (48)	56.3 ± 2.6	0	1 (4.8)	12 (57.1)	7 (33.3)	1 (4.8)	24	0	5.0 ± 0.8	2.1 ± 0.4
Secondary MGN	4 (0.4)	3 (75)	1 (25)	43.7 ± 3.9	0	2 (50.0)	2 (50.0)	0	0	0	50	2.4 ± 1.3	1.5
LN (Lupus Nephritis)	68 (6.2)	19 (28)	49 (72)	36.4 ± 1.6	5 (7.4)	43 (63.2)	14 (20.6)	6 (8.8)	0	9	29	2.1 ± 0.3	2.3 ± 0.4
Alport's syndrome	5 (0.5)	4 (80)	1 (20)	23.0 ± 1.9	1 (20.0)	4 (80.0)	0	0	0	0	20	1.4 ± 0.7	1.5 ± 0.2
DN (Diabetic Nephropathy)	44 (4.0)	28 (64)	16 (36)	51.5 ± 1.7	0	6 (13.6)	25 (56.8)	13 (29.5)	0	36	14	3.1 ± 0.7	3.4 ± 0.4
MM (Multiple Myeloma)	8 (0.7)	4 (50)	4 (50)	66.1 ± 3	0	0	2 (25.0)	5 (62.5)	1 (12.5)	38	0	1.6 ± 1.1	11.2 ± 2.3
TMA (Thrombotic MicroAngiopathy)	1 (0.1)	1 (100)	0	38	0	1 (100)	0	0	0	100	0	0.4	5.7
hypertensive induced nephropathy	40 (3.6)	26 (65)	14 (35)	48.9 ± 2.2	0	12 (30)	19 (47.5)	9 (22.5)	0	100	5	1.3 ± 0.2	6.0 ± 1.8
Tubular/Interstitial Nephritis	127 (11.9)	75 (59)	52 (41)	50.7 ± 1.4	5 (3.9)	32 (25)	51 (39.8)	39 (30.5)	1 (0.8)	26	13	1.4 ± 0.3	4.2 ± 0.3
Chronic TIN	41 (3.7)	24 (59)	17 (41)	48.0 ± 2.7	3 (7.1)	12 (28.6)	15 (35.7)	11 (26.2)	1 (2.4)	37	10	1.0 ± 0.2	3.4 ± 0.4
Acute TIN	24 (2.2)	13 (54)	11 (46)	48.0 ± 3.3	1 (4.2)	7 (29.2)	11 (45.8)	5 (20.8)	0	17	8	1.9 ± 0.3	5.3 ± 0.7
Acute on Chronic TIN	13 (1.2)	6 (46)	7 (54)	54.0 ± 5.5	1 (7.7)	1 (7.9)	6 (46.1)	5 (38.5)	0	31	8	2.9 ± 1.0	3.5 ± 0.8
ATN (Acute Tubular Necrosis)	70 (6.4)	45 (64)	26 (36)	53.0 ± 1.7	0	17 (24.3)	28 (40)	25 (35.7)	0	17	14	1.5 ± 0.5	4.5 ± 0.5
ESKD (End-Stage Kidney Disease)	61 (5.7)	42 (69)	19 (31)	44.4 ± 1.8	1 (1.6)	22 (36.1)	29 (47.5)	8 (13.1)	1 (1.6)	46	13	2.2 ± 0.4	4.6 ± 0.5
Unclssified	22 (2.1)	14 (64)	8 (36)	45.9 ± 3.2	0	9 (40.1)	8 (36.4)	5 (22.7)	0	9	18	4.9 ± 0.7	2.7 ± 0.7

nephropathy (47%), mesangioproliferative GN (64%), and secondary MGN (50%). The statistical results (T-test) for serum creatinine values in patients with Primary glomerulonephritis(Primary GN) indicated a significant difference between men and women ($P < .05$). Additionally, the statistical test (ANOVA) for proteinuria in Secondary glomerulonephritis(Secondary GN) patients showed a significant difference among different age groups ($P < .05$).

DISCUSSION

According to this study, the prevalence of primary glomerulonephritis, tubular/interstitial nephritis, secondary glomerulonephritis, ESKD and unclassified cases were 63%, 17%, 12%, 6% and 2% in our biopsy samples, respectively. The average age in different groups of kidney diseases was 33 to 66 years. Additionally, in our study the majority of patients with kidney disease (78%) were between the ages of 20 and 60. The prevalence of hypertension in primary glomerulonephritis, secondary glomerulonephritis, and tubular/interstitial nephritis were found to be 17, 36, and 26 %, respectively. It was found that secondary glomerulonephritis was associated with high incidence of hypertension (36%). Microscopic hematuria was observed in 18% of patients with primary glomerulonephritis, 17% of patients with secondary glomerulonephritis and 13% of patients with tubular/interstitial nephritis.

Primary Glomerulonephritis

In the patients with primary glomerulonephritis, the most common pathologic findings were MGN, MCD, and FSGS. MGN was found to be the most common pathological finding in all age groups. Based on the previous study in Shahid Labbafinezhad hospital during 2013-2016, MGN was also reported as the most common pathological finding in all age groups. The results of the present study were similar to those of the mentioned study, except that in patients under the age of 20, the most frequent diagnosis in our study was minimal change disease (MCD).[7]

Our study showed a higher prevalence of IgA nephropathy in men, especially in the age group of 20 to 40 years, with a high prevalence of Microscopic hematuria (17%). According to Schena's study, IgA nephropathy is more common in Asia than it is in other regions of the world.[8]

The average serum creatinine level was the highest in patients with pauci-immune glomerulonephritis (3.7 ± 0.6 mg/dL) and the lowest in patients with MCD (1.4 ± 0.1 mg/dL).

Secondary Glomerulonephritis

In patients with secondary glomerulonephritis, lupus nephritis and diabetic nephropathy had the highest prevalence among other types of glomerulonephritis.

Saadati *et al.* stated that about one-third of SLE(Systemic lupus erythematosus) patients develop LN, with rates varying from 29% to 54% in different studies.[9-11] In this study, 52% of individuals with SLE exhibited lupus nephritis in their kidney biopsy. According to Saadati *et al.*, 90% of SLE patients were women at reproductive age of 16-52 years.[9] In the present study, women at reproductive age accounted for about 44% of SLE cases. According to Pakfetrat *et al.*, the prevalence of lupus nephritis among individuals under the age of 30 is around 62%, with women accounting for the vast majority (88.3%).[12]

The average serum creatinine was 4.1 ± 0.6 mg/dL in patients with secondary glomerulonephritis, with the highest belonging to MM (11.2 mg/dl). The average amount of proteinuria was (2.6 ± 0.3 g/day), with a maximum value of (5.0 ± 0.8 g/day) observed in patients with amyloidosis.The highest prevalence of Microscopic hematuria was observed in secondary MGN (50%), Lupus nephritis (29%), and Alport syndrome (20%).

Tubular/interstitial nephritis (TIN)

The frequency of acute tubular necrosis (ATN) was higher (70 cases) than other pathologic findings among the tubular/interstitial nephritis cases. Chronic TIN and acute on chronic TIN exhibited the highest prevalence among individuals with hypertension, at 37% and 31%, respectively. The highest prevalence of Microscopic hematuria (14%) was observed in ATN. The mean levels of proteinuria and serum creatinine were (1.0-2.9 g\day) and (3.4-5.3 mg/dl).

ESKD

The number of patients with ESKD in Iran grew over 130% from 1996 to 2006, partly due to late diagnosis.[13] In the current study, individuals over

40 years of age constituted more than 63% of the ESKD population. The average serum creatinine was 4.6 mg/dL. Considering the high prevalence of hypertension (46%) in ESKD (in this study) and the chronic and long-term nature of factors such as diabetes mellitus and hypertension in the development of ESKD, it is recommended to improve the screening methods and especially early referral of patients at risk.[14]

Unclassified

Unclassified pathologic findings (non-diagnosised biopsis) comprised about 2% of biopsy findings. Improving kidney biopsy techniques and improving the knowledge of those involved in the biopsy process and pathological diagnosis are considered to be essential factors in reducing "non-diagnostic" cases.[15]

In summary, variations in the distribution and prevalence of kidney diseases emphasize the need for epidemiological studies to guide the planning of education, public health initiatives, and hygiene infrastructure. These studies are essential for understanding the etiology of diseases and enabling the development of more effective preventive and therapeutic strategies. Therefore, it is crucial to prioritize the design of epidemiological studies in medical science.

CONCLUSION

The present study is performed based on the pathological findings obtained over a three-year period from Shahid Labbafinezhad Teaching Hospital, Shahid Beheshti University in Tehran, Iran with advanced human resources, as well as diagnostic and therapeutic equipments. Since Shahid Labbafinezhad Teaching Hospital is a national referral center, the study findings indicate the importance of the study and application of the findings in diagnosis and treatment of the involved patients. It is recommended that all active centers in the field of kidney biopsy collaborate to establish a national database through a serious, dynamic, comprehensive, and regularly updated effort. This will allow for valuable conclusions to be drawn regarding the prevention and identification of common or invisible diseases, health planning, policy-making, decision-making, and providing facilities and training for specialists to treat these conditions effectively.

CONFLICT OF INTEREST

The authors report no conflict of interest.

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