

Assessment of Clinico-Pathological Characteristics of Renal Biopsy: Tertiary Care Centre Based Study

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Abstract

Introduction: Nephrology's most essential diagnostic tool is the kidney biopsy. The purpose this study is to investigate the clinico-pathological characteristics of individuals having renal biopsies at a tertiary care facility in Mumbai, analyse the renal biopsy histopathological pattern and investigate the incidence and kinds of complications in these individuals.

Objective: This single center cross-sectional observational study was conducted from October 2020 to September 2022 in tertiary level.

Methods: The conventional indication for kidney biopsies was based on clinical presentation and studies. The patient's demographic profile, the reason for the kidney biopsy, and histological patterns were investigated and analysed with the use of relevant statistical methods.

Results: The majority of patients (72%) were less than 60 years old, whereas the greatest number of patients (45%) were between the ages of 20 and 39. The results reflected that men outnumbered women and 76% of the participants had primary renal disease, 21% had secondary renal disease and 3% had normal renal biopsy results. The most prevalent reason for doing a kidney biopsy was incidentally found, unexplained renal failure, followed by oliguria and edoema.

Conclusions: This study demonstrates that glomerular illnesses, accounting for 88% of cases, are significantly more prevalent than disorders of the tubulo-interstitial (7%) and vascular (2%) compartments, 3% of the biopsies had a normal histological pattern. Owing to the small sample size and the research population consisting mostly of serving people, the results of this study cannot be generalised to the general population.

Keywords: Clinico-pathological profile, Kidney biopsy, Renal Failure, Renal disease

1. Introduction

Renal diseases have been one of the leading causes of morbidity and mortality in recent years. Accurate disease diagnosis can facilitate quick and appropriate treatment, ultimately lowering morbidity and mortality associated with renal illness. Renal biopsy is an essential method for identifying renal disease in patients. Globally, the prevalence of chronic kidney disease (CKD) is increasing[1]. Existing health policies in developing nations such as India are severely stretched by a lack of infrastructure and financial resources due to the increasing prevalence of chronic kidney disease[2]. During a renal biopsy, a section of renal tissue is routinely extracted using a needle or other surgical instrument. Percutaneous and laparoscopic/open biopsy are the two most testing arises from graft dysfunction in transplanted kidneys, a renal biopsy is advised. Despite the fact that a kidney biopsy is regarded as

common techniques for obtaining renal biopsies. Percutaneous renal biopsy guided by USG is often the preferred technique[3]. Biopsy is used to identify several renal diseases, including glomerular and interstitial abnormalities, in native kidneys. In yet another study, researchers analysed data from native kidney biopsies performed at a single facility in Bihar, India[4]. They conducted a retrospective review of all native kidney biopsies performed at their institution. Relevant clinical and laboratory information was documented. A research study revealed that the risks and consequences of percutaneous kidney biopsy[5]. They observed that renal biopsies on native or transplanted kidneys are commonly regarded as a safe operation. When aberrant renal function

a safe surgery, problems may nonetheless emerge. To comprehend the regional epidemiology of glomerular disease in a particular location, it is

essential to examine the prevalence of biopsy-proven renal disease and its variation and distribution according to geographic areas, socioeconomic situations, race, age, and a renal biopsy indication[6]. In addition, it increases our understanding of the use of renal biopsies and provides a foundation for future research into renal parenchymal diseases. Large-scale investigations of the prevalence and pattern of renal illnesses offer the opportunity to learn more about the epidemiology of glomerulonephritis [7]. The epidemiology of renal illness gives vital information that may be implemented in clinical practice. This paper aims to investigate the clinico-pathological characteristics of individuals having renal biopsies at a tertiary care facility in Mumbai, analyse the renal biopsy histopathological pattern and investigate the incidence and kinds of complications in these individuals. This study was done in an effort to address this hole and to determine the trend of biopsied-proven renal illness from 2020 to 2022.

Materials and Methods

This cross-sectional, single-center observational study was undertaken at the Department of Medicine and Nephrology of a tertiary medical college in Mumbai. 100 patients undergoing renal biopsy at this tertiary care centre, irrespective of indication, between Oct 2020 and Sep 2022 were included in the study. Taking inclusion and exclusion criteria into account, 100 patients aged 18 and older who had renal biopsy were included in the study over the research period. The consent based on knowledge was requested from all patient, was taken as inclusion criteria and unwilling patients for renal biopsy was taken as exclusion criteria. The final result of the patients was recorded, and they were categorised as either primary or secondary renal biopsies. Many patient-related variables were evaluated to determine their relationship to the result. Patient information, renal functions, baseline tests, and the reason for the biopsy were documented. All patients received USG(Ultrasonogram) so, CBC(Complete blood count), and blood pressure optimization prior to biopsies. Under USG direction, a biopsy was performed using a 16 G x 16 cm automated biopsy cannon. All patients got a

repeat USG 24 hours after a biopsy to detect any hematoma or other problems.

Results

A population's demography, lifestyle, and incidence of concomitant disorders influence the profile of kidney diseases. These variables(aged population and comorbid illnesses such as diabetes, hypertension, and dyslipidemia)have significantly contributed to the increase in the prevalence of renal disease. Renal biopsies are crucial for determining the pattern of renal disorders. Not only does it give a diagnosis, but it also provides vital prognostic information for deciding treatment modalities. There has been few research on the profile of renal biopsies and the pattern of glomerular disorders on biopsies. In this study, a total of 100 individuals received renal biopsies, patients satisfied the inclusion/exclusion criteria. This study was done to examine the trend of biopsy-proven renal illness at the Department of Medicine and Nephrology ,tertiary care hospital, Mumbai from 2020 to 2022 in an effort to close this gap.

From this study, the observational results are mentioned below:

Distribution of Age

The majority of patients (45%) are between the ages of 20 and 39, while just 28% are beyond the age of 60.

Distribution of Sex

In the present study, 70% of the patients who received a kidney biopsy were male, whereas 30% were female.

3.3 Co-morbidities

When collecting the patient's medical history, we inquired about the occurrence of co-morbidities. Observations revealed that 45% of patients had hypertension and 39% had type 2 diabetes mellitus.

3.4 Reasons for renal biopsy

59% of renal biopsies were performed in response to incidentally found, unexplained renal impairment. This was followed by 35% edoema. 6% of patients exhibited oliguria. There were no

6% of patients exhibited oliguria. There were no patients with gross hematuria or anuria.

3.5 Pathological profile of renal biopsy

76% of the 100 individuals who underwent [55 males and 21females]renal biopsy were found to have primary renal disease, 21%[12 male and 9 female] had secondary renal disease, and 3% had a normal renal histology pattern. The most

prevalent form of primary renal illness was Non-Proliferative Glomerulonephritis (NPGN; 27%), followed by Focal Segments Glomerulosclerosis (FSGS; 18%) and Membranous Nephropathy (MN; 10%). [Table 1].

Table1: Distribution of patients with primary renal disease

Primary Renal Disease	Number of Male Patients	Number of Female Patients	Total
Membranous Nephropathy(MN)	7	3	10
Non-proliferative Glomerulonephritis (NPGN)	19	8	27
Immunoglobulin A Nephropathy	6	2	8
Focal segmental Glomerulosclerosis (FSGS)	14	4	18
Minimal Change Disease(MCD)	4	2	6
Acute Tubular Injury	5	2	7

Diabetic Nephropathy (13%)[10 males and 3 females] was shown to be the most prevalent (6%)[Table 2].

cause of biopsy-proven secondary renal illness, followed by Lupus Nephritis

Secondary renal disease	Number of Male Patients	Number of Female Patients	Total
Diabetic Nephropathy	10	3	13
Hypertensive Nephropathy	2	0	2
Lupus nephritis	0	6	6

Table2:Distribution of patients with secondary renal disease

3.6 Complications

7 % of individuals who received a kidney biopsy experienced problems related to the operation. The most common consequence was local site discomfort (5%), whereas 2% experienced self-limiting gross hematuria after the treatment(Figure 1).After renal biopsy, none of the

patients suffered serious complications, such as extensive hematuria or perinephric hematoma causing a >10% drop in hematocrits or necessitating PRBC(Packed Red Blood Cells) transfusion, angiography, nephrectomy, hypotension, or death.

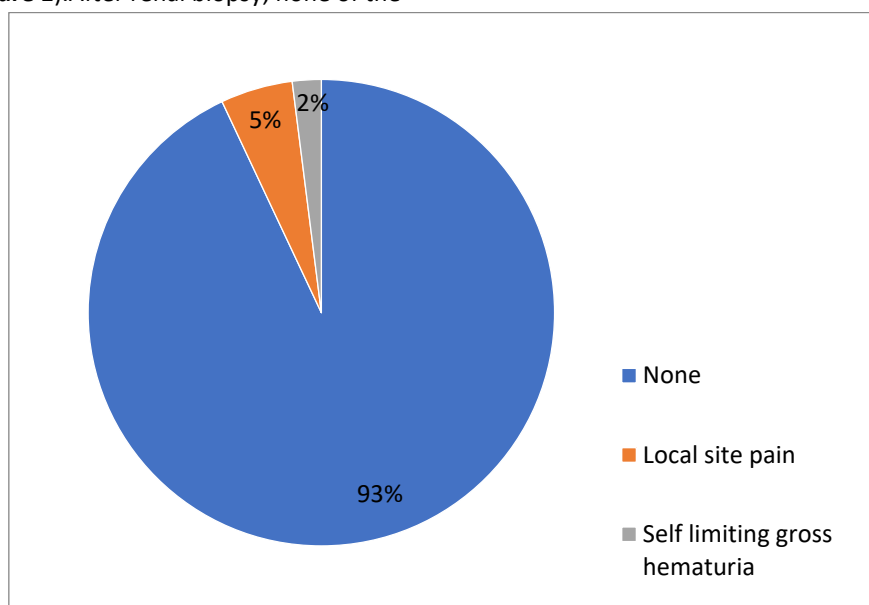


Figure 1:Pie Chart of Occurrence of problems in percentage following renal biopsy

2. Discussion

Globally, kidney disorders have emerged as a leading source of morbidity and mortality. There are 2 types of renal failure. Firstly, An acute kidney

injury/rapidly progressive glomerulonephritis (AKI/RPGN): AKI was considered (a) if serum creatinine doubled in a patient with a known baseline or (b) if serum creatinine rose rapidly over

a few days to weeks, with or without oliguria, in the absence of a specific reason in the medical records. Secondly, Chronic kidney/renal disease (CKD/CRD):Incidentally observed renal dysfunction or worsening in renal function. that was less severe with or without proteinuria and/or hematuria, when the underlying cause is unknown. Renal disease often progresses when the glomerular filtration rate falls to 25% of normal[8]. Early detection is essential for preventing additional damage and gradual renal function loss. Based on the underlying disease process and stage of renal illness, individuals at high risk should be evaluated for kidney damage indicators (albuminuria, anomalous urine sediment, and higher serum creatinine) and renal function (estimation of glomerular filtration rate from serum creatinine).If a sudden decline in renal function is observed, potential reversible causes should be investigated and treated accordingly[9]. During a renal biopsy, a section of renal tissue is often extracted using a needle or a surgical tool. The results of a kidney biopsy, whether observed under light microscopy, immunofluorescence, or electron microscopy, make it possible to establish an accurate diagnosis of the condition and give the patient improved treatment and care. In order to make an accurate diagnosis in the early stages of renal dysfunction, the value of renal biopsy is on the rise due to the increasing frequency of illnesses such as diabetes, hypertension, dyslipidaemia, etc[10]. There have been few research undertaken on the profile of renal biopsies and the pattern of glomerular disorders on biopsies, particularly in India[11-12].Primary (73%) and secondary (15.5%) glomerular diseases were the most prevalent histological diagnoses in our investigation, which was likewise observed in other nations. The frequency of diabetic glomerulosclerosis on kidney biopsy varies between 1.3% and 18.5% in the elderly. This study was undertaken to analyse the trend of biopsied renal illness at our institute between 2020 and 2022. In this study, 28% of patients who underwent kidney biopsies were older than 60 years The majority of patients (72%) were less than 60 years old, whereas the greatest number of patients (45%) were between the ages of 20 and 39. 30% of patients who had a kidney biopsy were

female, whereas 70% of patients were men. In our study, we discovered that incidentally discovered unexplained renal failure (59%) was the most frequent reason to do a kidney biopsy, followed by edoema (35%), and oliguria (6%). 76 % of the individuals in the current research had primary renal disease, 21 % had secondary renal disease, and 3 % had normal renal biopsy results.With a frequency of 28%, Non-Proliferative Glomerulonephritis (NPGN), which is indicative of MCD, was the most prevalent biopsy-proven primary renal disease, followed by Focal Segmental Glomerulosclerosis (18%) and Membranous Nephropathy (11%).Among the secondary causes of renal pathology, it was found that Diabetic Nephropathy, which accounted for 13% of biopsy-confirmed renal pathology, was the most common cause, followed by Lupus Nephritis (6%).In this investigation, the histopathological pattern indicated that glomerular illnesses, which accounted for 88% of cases, were much more prevalent than tubulo-interstitial (7%) and vascular (2%) disorders, respectively. The research revealed that kidney biopsy is a generally safe technique. 7 %of the 100 individuals included in this research suffered problems because of renal biopsy. Local site discomfort was the most prevalent consequence, accounting for 5%; 2% developed self-limiting, non-intervention-required gross hematuria. None of the patients experienced major problems such as extensive hematuria or perinephric hematoma resulting in a >10% decrease in hematocrits or necessitating PRBC transfusion, angiography, or nephrectomy, hypotension, or death following renal biopsy. These results are consistent with research undertaken in many locations of the world.

3. Conclusions

In conclusion, renal biopsy remains the gold standard for renal illness diagnosis and histopathological pattern analysis. The analysis of the clinico-pathological characteristics of renal biopsies indicated that primary renal disease is far more prevalent than secondary renal illness, with glomerular disorders greatly outnumbering tubule interstitial and vascular diseases. No patient who got a kidney biopsy experienced serious problems necessitating aggressive active intervention. This

study has several limitations, with sample size and study population being the most significant. Owing to the small sample size and the research population consisting mostly of serving people, the results of this study cannot be generalised to the general population. This study was further limited by the fact that it was done at a single location. To better comprehend the clinico-pathological characteristics of renal biopsies in patients, more research with larger sample sizes and multi-center participation is necessary. This study suggests doing similar multi-centric investigations and maintaining a renal registry to shed more light on the clinico pathological pattern of biopsied renal disorders.

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