ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

The Contemporary Analytical Observations Of Renal Biopsy Findings In Type 2 Diabetic Patients.

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ABSTRACT

One of the most common causes of end-stage kidney disease is diabetic kidney disease (DKD). People with diabetes have a lower rate of kidney biopsies; nonetheless, these patients can have glomerular disorders other than diabetic nephropathy. The quantity and complexity of renal biopsies done on diabetes individuals is growing. The purpose of this study was to evaluate into the utility of renal biopsy in diabetic patients as well as the accuracy of distinguishing diabetic nephropathy (DN) versus non diabetic renal disease (NDRD) using clinical and laboratory data. This was a single-center, cross-sectional, retrospective study on 100 patients to determine clinical and laboratory characteristics in all diabetic patients who underwent biopsy at KIMS Hospital, Bangalore. This study consisted of 57 males and 43 females with the mean age of 45.57 ± 14.34 years. On biopsy, we observed 40 patients with DN alone, 40 patients with NDRD alone and around 20 patients has DN over-imposed with NDRD. The DN group had a higher mean serum creatinine level of 3.10 mg/dl, followed by the DN over-imposed with NDRD and the NDRD alone group. The high Emerging prevalence of NDRD in our population emphasizes the importance of clinicians considering renal biopsy in diabetic patients with an atypical clinical history, as extra disease-specific therapy may be beneficial for this subset of the population.

Keywords: Renal Biopsy, Type 2 Diabetes Mellitus, Non diabetic kidney disease

https://doi.org/10.33887/rjpbcs/2022.13.5.1

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INTRODUCTION

Diabetic kidney disease (DKD) is the most prevalent complication of diabetes mellitus (DM) and is associated with the high incidence of end-stage kidney disease (ESKD) in adults [1]. DKD occurs in 30 percent of persons with type 1 DM and 40 percent with type 2 DM [2].

The number of renal biopsies conducted in diabetic patients is increasing as the prevalence of diabetes mellitus (DM) has reached epidemic proportions. However, less is known about the epidemiology of renal problems in diabetes individuals, which by itself is associated with an elevated risk of death and morbidity. Several elements account for this information gap, including discrepancies in diagnosing kidney disease(s) among diabetes patients, differences in screening programs, and competitive mortality [3].

Patients with diabetes can develop non-diabetic kidney disease (NDKD). In a small percentage of patients, NDKD and DKD can appear concurrently. As per prior biopsy data and literature research, the prevalence of NDKD in diabetic patients varies between 23% and 73% [4-6].

Patients with diabetes who undergo renal biopsy but are misdiagnosed as having DKD can demonstrate diabetic nephropathy (DN) alone, DN with superimposed non-diabetic renal disease (NDRD), or NDRD alone [7]. The distinction between these diagnostic groups can have an impact on patient care and prognosis. When NDRD is diagnosed, it is essential because it necessitates a change in treatment [7].

Based on the aforementioned, the purpose of this article was to evaluate the clinical-pathological correlations, as well as the usefulness and modern spectrum of renal disease that has been confirmed by biopsy in diabetic patients from KIMS hospital over a 10-year period, so that clinicians are aware of the vast number of NDRDs in diabetic patients and can effectively manage them.

MATERIAL AND METHODS

Study Design

After obtaining approval from the ethical committee and informed consent from the patients, the study was conducted over a period of 10 years from 2011 to November 2021. This cross-sectional research was performed in the Department of Nephrology, KIMS, Bangalore, in 100 patients with type 2 diabetes who underwent renal biopsy and were retrospectively evaluated.

Study population

The participants in the study were separated into three groups: Diabetic nephropathy alone (DN), Non Diabetic Renal disease (NDRD) alone and DN plus NDRD. The inclusion criteria were patients who have had diabetes for more than 5 years.

Data Collection

Clinical data, pathologic diagnoses, and histologic findings were manually retrieved and entered into the Ms excel sheet. Demographics (age, sex, and race), diabetes duration, presenting renal abnormalities, and laboratory and serologic findings were also examined in the patients' medical records.

Statistical Analysis

The data was analysed by SPSS for Windows, version 16.0 (SPSS Inc., Chicago, Ill., USA). Categorical variable was analyzed using Chi square test whereas continuous variables was analyzed using ANOVA test. The level of statistical significance was set at P-value of <0.05.

RESULTS

This study consisted of 57 males and 43 females with the mean age of 45.57 ± 14.34 years. On biopsy, we observed 40 patients with DN alone, 40 patients with NDRD alone around 20 patients has DN

over-imposed with NDRD. The DN over-imposed with NDRD group had a higher mean serum creatinine level of 3.0 mg/dl, followed by the DN group and the NDRD alone group (Table 1). Our study showed that Lupus Nephritis were the predominant form of NDRD followed by acute glomerulonephritis and Chronic Pyelonephritis in the NDRD alone group.

Table 1: Demographic and clinical data at time of kidney biopsy

Characteristics	DN (n=40)	NDRD Alone (n=40)	DN + NDRD (n=20)	P value
Participants	40	40	20	
Age in Years (Mean ± SD)	43.65 ± 14.53	46.63 ± 16.07	47.30 ± 9.75	0.547
Sex n (%)				
Male	24	21	12	0.342
Female	16	19	8	
Duration of DM in years (Mean ± SD)	10.06 ± 2.67	5.48 ± 1.37	10.05 ± 2.84	0.000
Serum Creatinine (mg/dl) (Mean ± SD)	3.10 ± 0.87	1.99 ± 0.83	2.99 ± 1.70	0.000
eGFR (ml/min per 1.73 m2) (Mean ± SD)	27.32 ± 9.34	32.88 ± 11.68	26.63 ± 12.53	0.039
Proteinuria (g/d) (Mean ± SD)	3.65 ± 1.30	1.77 ± 0.77	4.66 ± 1.08	0.000

Table 2: Types of NDRD

Types	NDRD	DN + NDRD
IgA Nephropathy (IgAN)	3 (7.5%)	0 (0%)
Chronic Glomerulosclerosis	3 (7.5%)	1 (5%)
Acute Glomerulonephritis (AGN)	6 (15%)	4 (20%)
Chronic Glomerulonephritis (CGN)	4 (10%)	0 (0%)
Minimal Change disease	2 (5%)	0 (0%)
Transplant Glomerulopathy	4 (10%)	1 (5%)
Lupus Nephritis (LN)	12 (30%)	10 (50%)
Chronic Pyelonephritis (CPN)	6 (15%)	4 (20%)

DISCUSSION

It was observed that the length of diabetes was the strongest predictor of DN or DN superimposed NDRD was identified on biopsy. Patients with NDRD alone had a mean DM duration of 5.48 ± 1.37 years, which was substantially less than those with DN alone (10.06 ± 2.67 years) or DN plus NDRD (10.05 ± 2.84 years). Short-term diabetes (less than 5 years) had a high sensitivity (75%) and specificity (70%) for predicting NDRD, according to Tone et al. [8]. In a similar study, Chang et al. [9] found that patients with NDRD had a mean DM duration of 5.9 years compared to 10.6 years in patients with DN alone. According to Sharma et al largest cohort study, patients with NDRD alone had a median duration of DM of 5 years, which was considerably less than those with DN alone (13 years) or DN plus NDRD (10 years). They also stated that patient with DM over 12 years or more had shown to be the best predictor of DN alone. [7].

In the present study NDRD was found in 60 % of biopsies, Out of which 40 patients with NDRD alone and 20 patients with NDRD with concurrent DN. This was in consistent with prior research, which revealed that the frequency of NDRD ranged from 45 to 57 % [8, 10-13], but differed with other studies, which reported that the incidence of NDRD was about 7-10 % [14, 15]. This disparity could be attributed to the fact that the research populations are different. There was no significant difference in age or gender between the NDRD and DN groups. Patients with NDRD associated with DN were older than those with isolated DN, according to Soni et al. [16].

In patients with NDRD alone, the most common histopathological findings were LN (30%), AGN and CPN (15%) each, IgAN (7.5%), and CGN (10%) whereas patients with NDRD superimposed with DN, the most common histopathological findings were LN (50%) followed by AGN and CPN (20%) each.

Lupus nephritis was the most common cause of NDRD in both groups: NDRD alone (12 cases) and DN+NDRD (10 cases). Similar findings were reported by Arunagiri R et al,[17] who noted that it was the most common cause of secondary GN and the most common lesion among female adults and middle-aged groups. Several studies from Egypt, [18, 19], Sudan, [20], Iran, and Bahrain have found an increased prevalence of LN, one of the secondary causes of GN [17].

IgA nephropathy was found in only three cases, which is extremely rare. In nearby countries such as Saudi Arabia, Bahrain, and Iran, lower rates of IgA nephropathy have been recorded. In Europe, North America and the Far East, on the other hand, there is a high prevalence of IgAN [17].

In the present study, Serum Creatinine level and duration of diabetes were found to be correlated with NDKD. But our findings were in contrary with Artan AS et al [21]. According to them, microscopic hematuria found to be highest incidence in NDRD patients. Similar findings were reported by Akimoto et al. In the literature, we encountered that patients with DN and microscopic hematuria had significant interstitial inflammation and hematuria linked with a greater risk of progression to ESKD, according to the research [22].

According to Ghani AA et al study, non-NDRD was seen in 45.2 percent of the diabetic population investigated, with crescentic glomerulonephritis being the most prevalent NDRD among diabetes patients. Proteinuria was shown to be more common in people who had NDRD on top of DN [13].

The mechanism responsible for the establishment of NDRD in diabetic patients is unknown. The increased exposure of antigenic cellular components that elicit immunological responses has been linked to DN tendency to superimposed nephritis. Pre-existing glomerular abnormalities may also stimulate an immune reaction in the subepithelial region [16]. However, Lai et al [23] reported no correlation in the prevalence of NDRD between diabetic and non-diabetic patients, and speculated that the appearance of an unique glomerulonephritis in the diabetic kidney could be coincidental.

CONCLUSION

The present study revealed that incidence of NDRD was seen 60% of the study population. Although atypical clinical symptoms may signal NDKD, none of them are particularly specific or sensitive. We propose that kidney biopsies be conducted more often in diabetic patients with unusual clinical findings, and that specific emphasis be made to individuals with atypical clinical findings, based on the high NDKD rates in these patients.

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