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Histological outline of renal disease in type 2 diabetes mellitus patients at our hospital

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Abstract
Renal involvement is a common complication in type-II Diabetes mellitus and it has emerged as the leading cause of end stage renal disease. This study was carried out by taking all patients of T2DM, who underwent renal biopsies at IMS and Sum hospital from January 2016 to February 2017. Seventy-one (Males: 47, Females: 24) subjects with T2DM; who experienced renal biopsy; with a doubt of non-diabetic renal disease were included. The signs for renal biopsy were: acute on chronic renal failure (ACRF) (35.2%), nephrotic syndrome (NS) (31%), acute renal failure (ARF) (14.1%), nephritic syndrome (14.1%), rapidly progressive renal failure (RPRF) (4.2%) and subnephrotic proteinuria (1.4%). The prevalence rates of nondiabetic renal disease (NDRD), diabetic nephropathy (DN) and DN with NDRD were 50.71, 28.16 and 21.13% respectively. The mean durations of T2DM were 12.45, 12.13 and 5.33 years in patients with DN, DN & NDRD and NDRD, respectively. Extensive spectrum of glomerular diseases was detected among those with isolated NDRD; commonest being IgA nephropathy (IgAN) (9.86%), followed by infection related glomerulonephritis (IRGN) (7.04%), membranous nephropathy (MN) (5.63%), focal segmental glomerulus sclerosis (FSGS) (4.22%) & miscellaneous (14.1%) lesions. The acute interstitial nephritis (AIN) was the commonest of the tubule-interstitial diseases (TIDs) in those with isolated NDRD. Among the patients with DN with associated NDRD, acute tubular necrosis (ATN) (7.04%) and IRGN (5.63%) were the shared associated lesions. This study emphasizes the significance of renal biopsy in patients of T2DM with different features.

Keywords: Diabetic glomerulosclerosis, Type-II diabetes, renal biopsy

Introduction
Renal involvement is a common complication in type-II Diabetes mellitus and it has emerged as the leading cause of end stage renal disease. The increased incidence of chronic renal failure is related to a rapidly rising prevalence of diabetes worldwide [1, 2]. Besides diabetic nephropathy, type-II diabetic patients are prone to develop non-diabetic renal disease [3, 4]. Micro albuminuria is the first clinical manifestation of diabetic renal involvement which evolves into asymptomatic overt proteinuria, and later into nephrotic syndrome. Hypertension often accompanies proteinuria that eventually progress within a few years to end stage renal disease in more than 50% of the cases [5]. Renal biopsies from type-II diabetic patients with proteinuria or renal insufficiency showed a hetero-geneous pattern of renal disease. It has been estimated that up to one-third of diabetic patients presented with impaired renal functions are suffering from non-diabetic renal diseases, which reported to have better prognosis than diabetic nephropathy [3, 4]. The end stage renal disease in T2DM is due to NDRD in 40-60% of cases, there by stressing the importance of early diagnosis [6]. The markers indicating the presence of NDRD include short duration of DM, unexplained worsening of renal disease, absence of neuropathy, absence of retinopathy and presence of active urinary sediments, or features of other systemic diseases [6-8]. To our knowledge, there is no such study in the local population where histopathological evaluation of renal biopsy has been performed in type-II diabetic patients. The present study was designed to retrospectively analyze kidney biopsies of patients with DM with the aim to find-out the prevalence of DN, NDRD, and DN plus NDRD.

Materials and Methods
This study is a retrospective study which included all consecutive patients of T2DM who underwent renal biopsies at IMS and Sum hospital, Bhubaneswar from Jan 2016 to Feb 2017,

under guidance of ultrasound using Bard® Max- Core® disposable core biopsy instrument, CR Bard Inc., USA. All the biopsies were analyzed by light microscopy using hematoxylin and eosin (H&E), periodic acid Schiff (PAS), Jone's silver methaneamine and Gomori's trichrome stains (MT) and immunofluorescence studies were performed using anti-human IgG, IgA, IgM, C3, C1q, kappa and lambda light chains. The data was analyzed by SPSS 17 for Windows, by SPSS Inc. IL, USA. Two-sided p value of < 0.05 was considered as statistically significant. The diagnosis of diabetes mellitus was made according to the criteria stated by the American Diabetes Association. Diabetic nephropathy was diagnosed by the presence of mesangial expansion, with or without the nodular Kimmelstiel – Wilson (KW) formation, basement membrane thickening, fibrin caps, or capsular drops. NDRDs were diagnosed and categorized as per standard guidelines.

Results

A total 71 patients (Males: 47, Females: 24, Mean age: 52.93 years) of DM underwent renal biopsy; with a suspicion of non-diabetic renal disease. The demographic data of number of subjects, mean age, gender and duration of T2DM are summarised in table 1. The prevalence rates of non-diabetic renal disease (NDRD), diabetic nephropathy (DN) and DN with NDRD were 50.71, 28.16 and 21.13% respectively (Figure 1). The mean age, gender, duration of T2DM and number of subjects with DN, DN+NDRD and NDRD, are summarised in table 2. The mean durations of T2DM were 12.45, 12.13 and 5.33 years in patients with DN, DN+NDRD and NDRD, respectively. The duration of T2DM in subjects with DN or DN+NDRD was higher than those with NDRD; statistically significant (Pearson Chi-square value: 29.95 & p:0.038). The gender and age of the subjects did not have any statistically effect on renal pathology (p: >0.05).

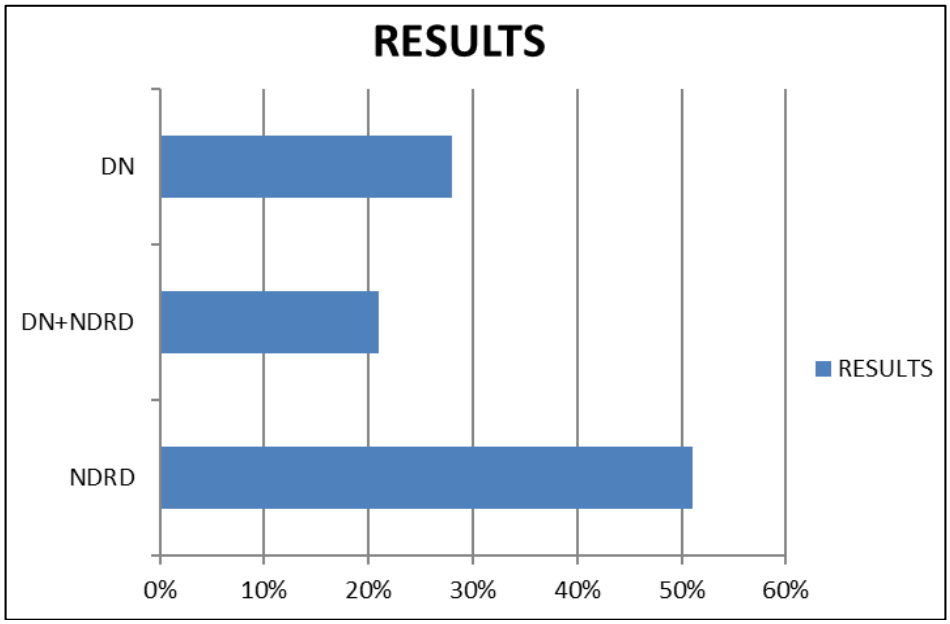

Fig 1: The prevalence rates of nondiabetic renal disease (NDRD), diabetic nephropathy (DN) and DN with NDRD

Table 1: The demographic data of subjects with T2DM

Gender	Number of subjects	Age (years)		Duration of DM (years)	
		Mean	Std. Deviation	Mean	Std. Deviation
Females	24	53.58	14.48	7.78	4.97
Males	47	52.60	11.77	8.92	6.29
Total	71	52.93	12.65	8.53	5.86

Fifty-one percent of subjects had NDRD, of them 36.62% had essential glomerular ailments (PGDs), 5.64% had optional glomerular ailments (SGDs) and 8.45% had tubule-interstitial ailments (TIDs). The Ig A (9.86%) was the most widely recognized of PGDs pursued by IRGN (7.04%), MN (5.63%), FSGS (4.22%), ceaseless glomerulonephritis (CGN) (2.82%), membrano-proliferative glomerulonephritis (MPGN) (2.88%), IgM nephropathy (1.41%), insignificant change infection (MCD) (1.41%) and hostile to glomerular storm cellar film (GBM) immune response ailment (1.41%) (Figure 2). Just 28.16% of subjects had diabetic nephropathy alone, which was analyzed by nearness of mesangial extension (PAS and silver positive), with or without the nodular Kimmelstiel – Wilson (KW) development, storm cellar layer thickening, fibrin tops, or capsular drops, hyaline vascular changes in the intrarenal vessels (Figure.2).

Table 2: Relation of BPRD to duration of T2DM, Age and Gender

Histological diagnosis	Gender		Age (Years)		Duration of T2DM (Years)	
	Males	Females	Mean	Std. Deviation	Mean	Std. Deviation
DN	13	07	52.50	11.10	12.45	6.75
NDRD	21	15	54.47	12.19	5.33	4.07
DN+NDRD	13	02	52.53	13.87	12.13	5.40
All subjects	47	24	52.93	12.65	8.77	6.23

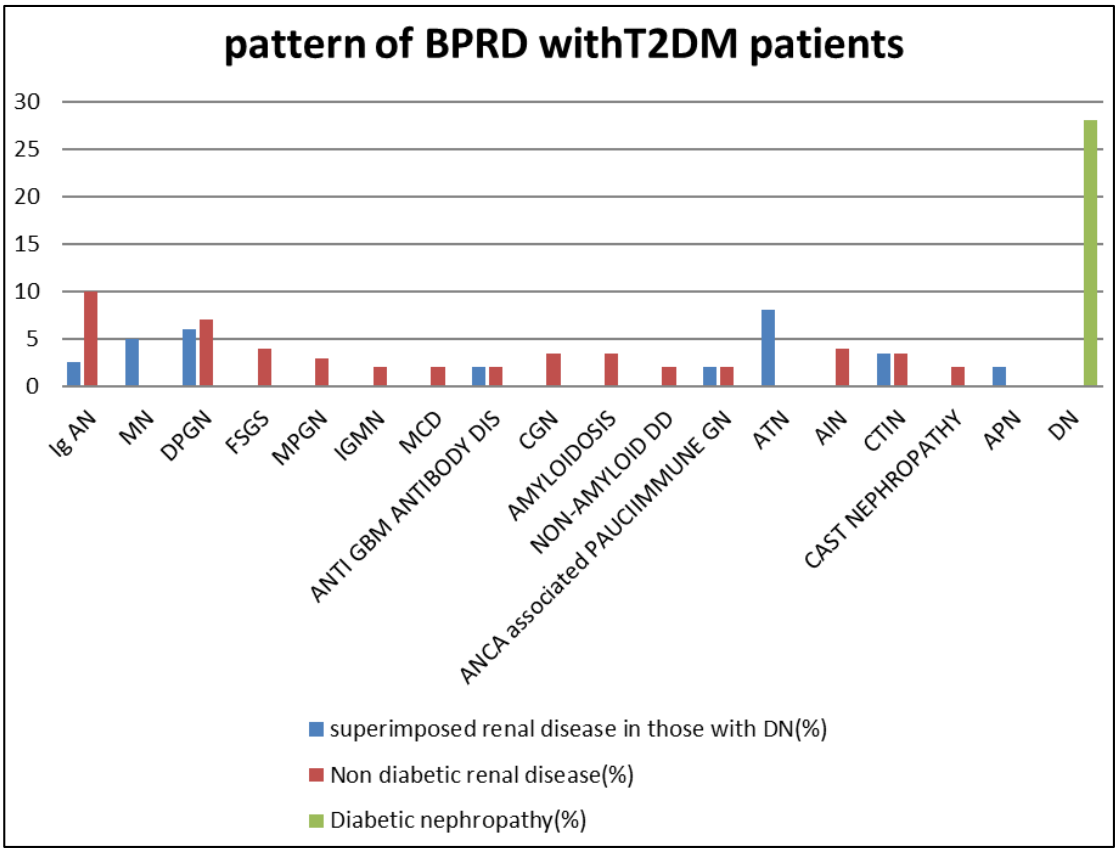

Fig 2: Pattern of BPRD with those patient having T2DM.

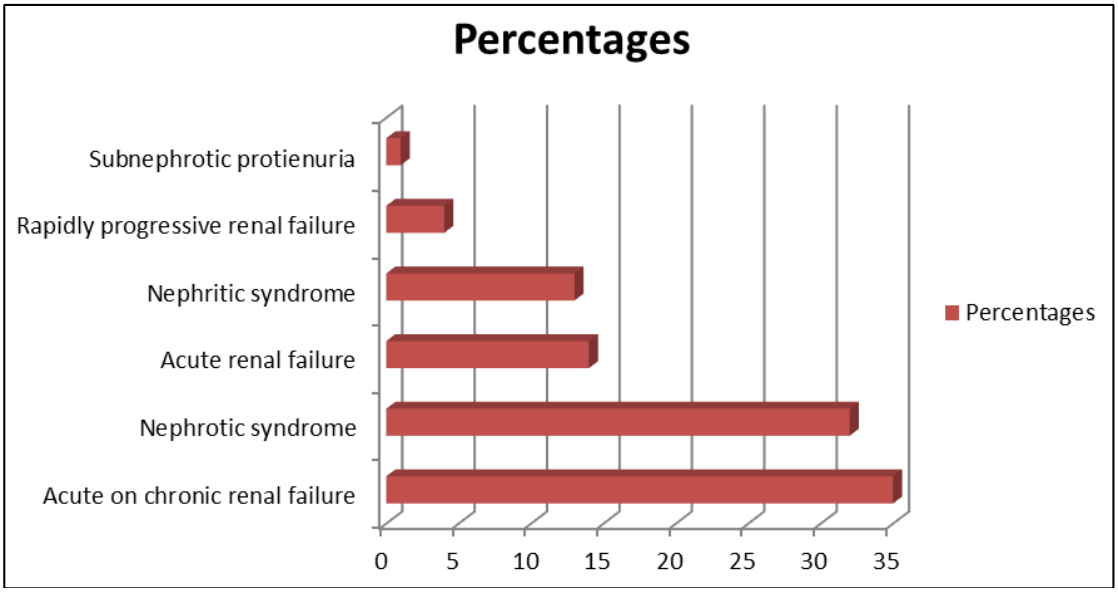

Fig 3: Indication renal biopsy percentage.

The commonest sign for biopsy was acute on chronic renal failure (ACRF) (35%) trailed by nephrotic syndrome (NS) (31%), intense renal disappointment (ARF) (14%), acute nephritic syndrome (ANS) (14%), rapidly progressive glomerulonephritis (RPGN) (4%) and subnephrotic proteinuria (1%) (Figure 3). The clinical disorders and the histological finding are condensed in figure 4. The DPGN was the most widely recognized pathology pursued by CTIN, IgAN, CGN, AIN, ATN and APN in subjects who experienced renal biopsy for ACRF. The DN was the commonest cause for introduction as NS in T2DM pursued by MN, FSGS, amyloidosis, MCD, IgMN, non-amyloid statement malady. The ATN was commonest reason for ARF pursued by AIN, IgAN, MPGN and cast nephropathy. The DPGN and IgAN were the most widely recognized reasons for ANS pursued by MPGN. The ANCA related pauciimmune GN and hostile to GBM immunizer illness were the reasons for RPGN and one subject who experienced biopsy for subnephrotic proteinuria had IgAN. The connection of syndromic conclusion with renal histology was factually critical (Pearson Chi-square worth: 34.27 and p:0.0001).

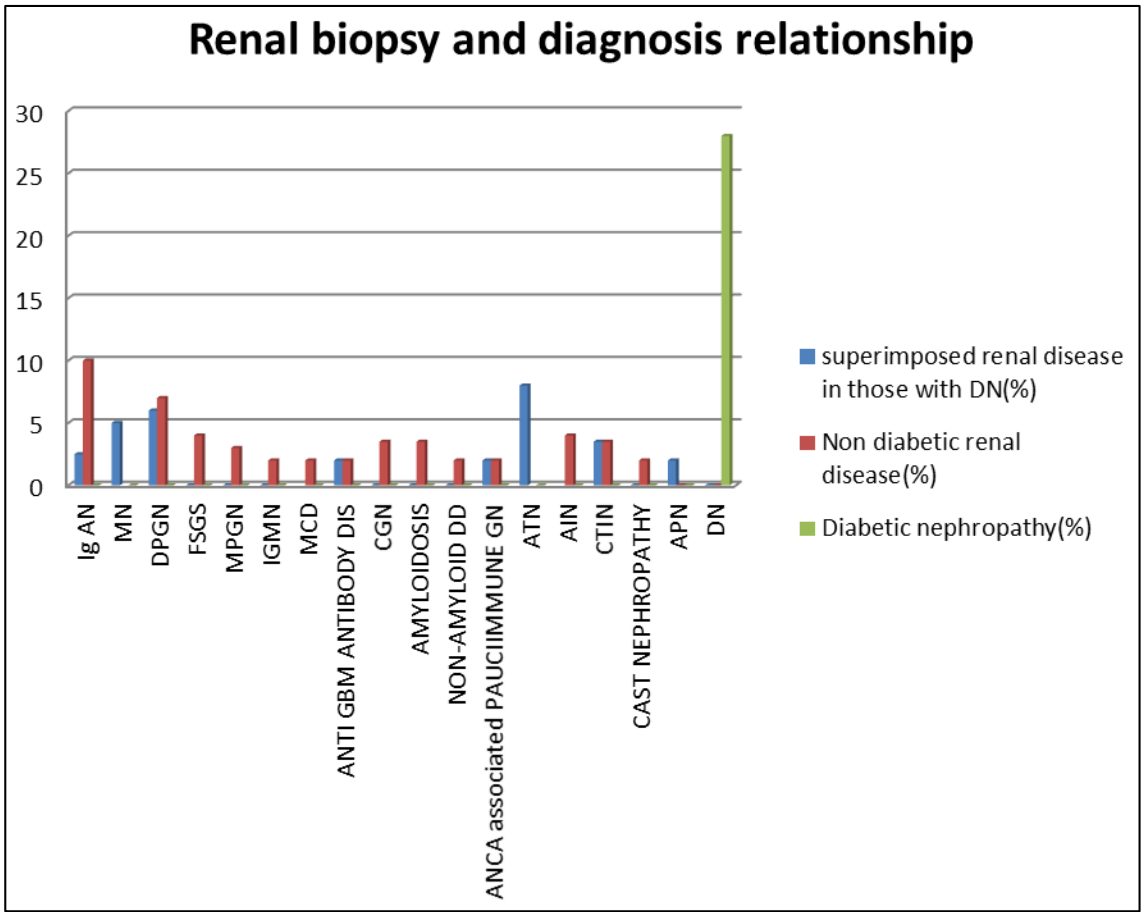

Fig 4: Renal biopsy and diagnosis relationship among our patients

Discussion

The announced recurrence of non-diabetic renal infections in the writing ranges from 9-81% [3]. This wide variation isn't explainable but difficult to clarify. Likewise, it might identify with determination criteria in various foundations and populaces being considered. A portion of the previous studies are not upheld by morphological information and, along these lines, are not ready to explain this inquiry. At the point when morphological information are accessible as in two arrangement from Denmark and Finland, the recurrence of renal illnesses other than diabetic nephropathy alone or superimposed on diabetic glomerulosclerosis ran from 9-18% [3, 10]. In an investigation of patients with type-II diabetes in India, the recurrence was 81% [10]. The majority of patients whose history and clinical findings are compatible with diabetic kidney disease do not benefit from kidney biopsy, because the diagnosis and treatment is usually not altered [11]. However, renal biopsy is helpful in diagnosis and treatment of NDRD in those with T2DM. The clues for NDRD in T2DM are presence of active urinary sediments, low complement levels, sudden deterioration of renal function, nephrotic proteinuria without retinopathy or neuropathy, impaired renal function with normal and/or low grade of proteinuria, absence of retinopathy and short duration of diabetes [12-14].

In the present investigation, predominance paces of NDRD, DN and DN with NDRD were 50.71, 28.16 and 21.13% individually. Perceptions our examinations are comparative with prior reports of renal biopsies in patients with T2DM. The pervasiveness paces of NDRD, DN and NDRD+ND changed from 24.73 to 82.9%, 6.5 to 66% and 4 to 44.08% separately, in prior investigations. The varieties in rates is because of heterogeneity of subjects and signs for biopsies. In one investigation detailed from south India, 50% of the subjects had NDRD and remaining had DN [15]. The commonest NDRDs fluctuated in various investigations, because of varieties in biopsy strategies, geographic and ethnic elements. The TIDs were commonest NDRD in two prior investigations [16, 12], and proliferative GN as the most well-known in one [17] and MN in another examination [15]. Essential glomerular infections (PGD) were commonest cause for NDRD in the present investigation. A wide range of PGDs were seen with four most basic sores being, The IgAN (9.86%), IRGN (7.04%), MN (5.63%) and FSGS (4.22%). Practically a wide range of PGDs have been accounted for in the writing. The FSGS, IgAN, MN, post irresistible glomerulonephritis and MCD were the commonest PGDs separately, in prior investigations [15].

The essential amyloidosis was commonest SGDs pursued by ANCA related pauci-resistant glomerulonephritis and non-amyloid affidavit disease in present investigation. Though, lupus nephritis was the commonest in a previous examination [18] Diabetic nephropathy with superimposed NDRD was found in 21.13% subjects. (glomerular illnesses: 9.86% and TID: 11.27%). he acute tubular injury/necrosis (ATIN) was the most widely recognized related TIDs pursued by CTIN. The IRGN was the most well-known related glomerular illness pursued by IgAN. The pervasiveness of NDRD superimposed on DN was shifted generally (4-41%) in prior investigations [16, 17]. The IgAN and MN were the most pervasive sores found in patients with DN in one of the investigations [12]. The commonest sign for biopsy in the investigation was ACRF trailed by NS, ARF, ANS, RPGN and subnephrotic protienuria. The

DPGN, DN, ATN, ANCA related pauciimmune GN and IgAN were the most well-known pathologies in the individuals who experienced renal biopsies for assessment of ACRF, NS, ARF, RPGN and subnephrotic proteinuria, separately. The DPGN and IgAN were the most widely recognized reasons for ANS.

Conclusions

The commonness of NDRD in T2DM is high in our populace, particularly in subjects who present with typical highlights like an ACRF, ARF, RPGN, ANS, thereby making the renal biopsy technique basic for its conclusion and appropriate treatment. The predominance paces of NDRD, DN and NDRD superimposed on DN were 50.71, 28.16 and 21.13% individually. The NDRDs are the reason NS in upto 48% of cases with staying due to DN and finding of them needs renal histology. The PGDs were commonest cause for NDRD, trailed by TIDs. Among the PGDs the IgAN, IRGN, MN and FSGS were normal. The ATN was the commonest TID pursued by AIN. The ATN pursued by IRGN were the two most NDRD to be related in those with hidden DN. The mean term of T2DM was higher in subjects with DN or DN with superimposed NDRD than those with isolated NDRD.

Reference

1. Cockram CS. The epidemiology of Diabetes mellitus in the Asia-Pacific region. Hong Kong Med J. 2000; 6:43-52.
2. US. Renal Data System. USRDS 2001 Annual Data Report: Atlas of End-Stage Renal Disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases: Bethesda, 2001.
3. Olsen S, Mogensen CE. How often is NIDDM complicated with non-diabetic renal disease? An analysis of renal biopsies and the literature. Diabetologia. 1996; 39:1638-45.
4. Parkash J, Sen D, Usha, Kumar NS. Non-diabetic renal diseasein patients with type-2 Diabetes mellitus. J Assoc Physicians India. 2001; 49:415-20.
5. Remuzzi G, Schieppati A, Ruggenenti P. Clinical practice. Nephropathy in patients with type-2 Diabetes. N Eng. J Med 2002; 346:1145-51. Comment in: N Eng. J Med2002; 347:947-8.
6. Premalatha G, Vidhya K, Deepa R, Ravikumar R, Mohan V. Prevalence of non-diabetic renal disease in type 2 diabetic patients in a diabetes centre in Southern India. J Assoc Physicians India. 2002; 50:1135-1139.
7. Soni SS, Gowrishankar S, Gopalkrisnan, Kishan AG, Raman A. Non-diabetic renal disease in type 2 diabetes mellitus. Nephrology. 2006; 11:533-537.
8. Das U, Dakshinamurty KV, Prayaga V, Uppin MS. Nondiabetic kidney disease in type 2 diabetic patients: A single center experience. Indian J Nephrol. 2012; 22(5):358-362.
9. Devadass CW, Vijaya VM, Raju SV, Mahesh E, Revathi S. Nondiabetic Renal Disease in type 2 Diabetes Mellitus Patients: A Clinicopathological Study. J Lab Physicians. 2013; 5(2):94-99.
10. Wirta O, Helin H, Mustonen J, Kuittinen E, Savela T, Pasternack A. Renal findings and glomerular pathology in diabetic subjects. Nephron. 2000; 84:236-42.
11. Mogensen CE, Christensen CK. Predicting diabetic nephropathy in insulin-dependent patients. N Engl. J Med. 1984; 311:89-93.
12. Devadass CW, Vijaya VM, Raju SV, Mahesh E, Revathi S. Nondiabetic Renal Disease in type 2 Diabetes Mellitus Patients: A Clinicopathological Study. J Lab Physicians. 2013; 5(2):94-99.
13. Prakash J. Non-diabetic renal disease (NDRD) in patients with type 2 diabetes mellitus (Type 2 DM). J Assoc Physicians India. 2013; 61(3):194-199.
14. Tone A, Shikata K, Matsuda M, Usui H, Okada S, Ogawa D *et al*. Clinical features of non-diabetic renal diseases in patients with type 2 diabetes. Diabetes Res Clin Pract. 2005; 69:237-242.
15. Premalatha G, Vidhya K, Deepa R, Ravikumar R, Mohan V. Prevalence of non-diabetic renal disease in type 2 diabetic patients in a diabetes centre in Southern India. J Assoc Physicians India. 2002; 50:1135-1139.
16. Soni SS, Gowrishankar S, Gopalkrisnan, Kishan AG, Raman A. Non-diabetic renal disease in type 2 diabetes mellitus. Nephrology. 2006; 11:533-537.
17. John GT, Date A, Korula A, Jeyaseelan L, Shastry JC, Jacob CK. Nondiabetic renal disease in Noninsulin-dependent diabetics in a South Indian Hospital. Nephron. 1994; 67:441-433.
18. Das U, Dakshinamurty KV, Prayaga V, Uppin MS. Nondiabetic kidney disease in type 2 diabetic patients: A single center experience. Indian J Nephrol. 2012; 22(5):358-362.