Original Research Article

A study of clinical profile of renal involvement in diabetic patients in correlation with diabetes complication at tertiary care center, Gujarat, India

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ABSTRACT

Background: The chronic complications of diabetes are broadly divided into microvascular and macrovascular, with the former having much higher prevalence than latter. Microvascular complications include neuropathy, nephropathy and retinopathy. Objectives of the study was to assess the clinical and biochemical profile of renal involvement in diabetic patient and complications due to diabetes mellites.
Methods: This was a hospital based prospective study done in which total of 250 cases attended and admitted at general medicine department, Government Medical College, Sir. T. Hospital, Bhavnagar. Study included Diabetic patient having age - >12 years, Both Gender and Patient who gives consent for study.
Results: Almost 54.8% having age between 41-60 years, Male: female ratio 0.87:1 and 44.0% were to 'obese 2' Body mass index (BMI) category. Around 22.4% participants have retinopathy, 30.0% have anemia, 62.4% have HTN and 26.8% have Ischemic Heart Disease (IHD). Almost 59.6% participants have S. creatinine level was 1.3 to 4 mg/dL and 43.6% have stage 5 of Chronic Kidney Disease (CKD).
Conclusions: Incidence of DM Nephropathy increase with age. With increasing numbers of years of diagnosed DM, the chances of DM Nephropathy are increased and as the duration of DM as well as duration of uncontrolled glycemia increases GFR decreases and DM Nephropathy progresses. HbA1c is a useful marker to account for the glycemic control over the past months, and hence the better indicator to the development as well as progression of DM Nephropathy.

Keywords: Chronic kidney disease, DM, HbA1c, Nephropathy

INTRODUCTION

The number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014. The global prevalence of diabetes among adults over 18 years of age has risen from 4.7% in 1980 to 8.5% in 2014. Diabetes prevalence has been rising more rapidly in middle- and low-income countries. Diabetes is a major cause of blindness, kidney failure, heart attacks, stroke and lower limb amputation. In 2016, an estimated 1.6 million deaths were directly caused by diabetes. Another 2.2 million deaths were attributable to high blood glucose in 2012. Almost half of all deaths attributable to high blood glucose occur before the

age of 70 years. WHO estimates that diabetes was the seventh leading cause of death in 2016.[1]

The chronic complications of diabetes are broadly divided into microvascular and macrovascular, with the former having much higher prevalence than latter. Microvascular complications include neuropathy, nephropathy and retinopathy. Whereas macrovascular complications consist of cardiovascular disease, stroke, peripheral artery disease.[2-4] Diabetes is the most common cause of kidney failure, accounting for nearly 44 percent of new cases. Even when diabetes is controlled, the disease can lead to chronic kidney disease (CKD) and kidney failure. Kidney failure is the final stage of chronic kidney disease.[5]

Assuming that 40 million people in India have Diabetes, this translates to 0.8 million with nephropathy. Thus, the burden due nephropathy is very high in India due to sheer number of people with diabetes. Diabetic nephropathy is a progressive kidney disease caused by angiopathy of capillaries in the kidney glomeruli, characterised by albuminuria which progresses from normoalbuminuria to microalbuminuria to macroalbuminuria ultimately leading to End stage renal disease.[6] In chronic renal failure patients the prevalence of diabetic nephropathy was 30.3% followed by chronic interstitial nephritis (23%) and chronic glomerulonephritis (17.7%).[7,8] So the present study was conducted with the objectives to assess the clinical and biochemical profile of renal involvement in diabetic patient and complications due to diabetes mellites.

METHODS

This was a hospital based prospective study done in which total of 250 cases attended and admitted at general medicine department, Government Medical College, Sir. T. Hospital, Bhavnagar during April 2013 to March 2014 after ethical permission of institutional ethical committee.

Inclusion criteria

- Diabetic patient having age - >12 years
- Both Gender
- Patient who gives consent for study.

Exclusion criteria

- Age <12 years
- Patient who don't give consent.

Outcome measures

- Etiology of renal involvement in diabetic patient.
- Age and Gender Incidence
- Percentage of individual symptoms
- Altered RFT
- Electrolyte profiles
- USG KUB
- Chest X Ray

- ECG
- Hemogram

The data were recorded in an Excel sheet and descriptive analysis was performed by epi. Info. Software. Data were presented in the tables and figures.

RESULTS

Table 1 shows that 8.8% patients having age between 12-20 years, 22.8% having age between 21-40 years, 54.8% having age between 41-60 years and 25.4% having age between 61-80 years. Almost 52.8 % females and 47.2 % males were enrolled in the study. Around 2.8% participants were belonged to BMI classification 'underweight', 14.4% were 'normal' category, 25.6% were to 'obese 1', 44.0% were to 'obese 2' and 13.2% were to 'obese 3' category. Almost 56.8% participants have DM since 0 to 10 years, 36.4% have since 11 to 20 years, 5.6% have 21 to 30 years and 1.2% have since 31 to 40 years. Almost 26.0% participants were admitted at study setting due to heart failure, 5.2% due to hypoglycemia, 2.8% due to uremic encephalopathy, 22.0% due to anemia and 22.0% due to oliguria.

Table 1: Socio-demographic characteristics of study participants (N=250).

Parameter		Number (%)
Age (in year)	12-20	22 (8.8)
	21-40	57 (22.8)
	41-60	137 (54.8)
	>60	34 (13.6)
Gender	Male	117 (46.8)
	Female	133 (53.2)
BMI (wt in kg/ht in mt²)	Underweight	7 (2.8)
	Normal	36 (14.4)
	Obese 1	64 (25.6)
	Obese 2	110 (44.0)
	Obese 3	33 (13.2)
Duration of diabetes (in year)	0-10	142 (56.8)
	11-20	91 (36.4)
	21-30	14 (5.6)
	31-40	3 (1.2)
Causes of admission	Heart Failure	65 (26)
	Hypoglycemia	13 (5.2)
	Uremic encephalopathy	7 (2.8)
	Anemia	55 (22)
	Oliguria	55 (22)

Figure 1 shows that Around 22.4% participants have retinopathy, 30.0% have anemia, 9.2% have neuropathy, 62.4% have HTN, 26.8% have IHD, 2.8% have uremic encephalopathy and 5.2% have hypoglycemia. Table 2 shows that 59.6% participants have S. creatinine level was 1.3 to 4 mg/dL, 34.8% have 5 to 8 mg/dL, 5.2% have 9 to 12 mg/dL and 0.4 have 13 to 16 mg/dL. Almost 0.4%

participants have CKD stage 2, 14.0% have level 2, 14.0% have stage 3, 42.0% have stage 4 and 43.6% have stage 5
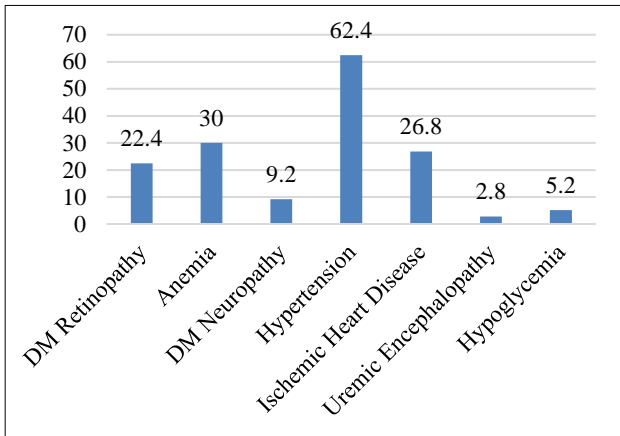

Figure 1: Complication of DM (N=250).

Table 2: Clinical profile of study participants.

Parameter		Number (%)
S. cretinine levels (mg/dL)	1.3-4	149 (59.6)
	5-8	87 (34.8)
	9-12	13 (5.2)
	13-16	1 (0.4)
Stage of CKD	1	0 (0)
	2	1 (0.4)
	3	35 (14)
	4	105 (42)
	5	109 (43.6)

Table 3: Association between duration of DM with HbA1c% level and stage of CKD.

Parameter	Duration of DM (in year)				p value
	0-10	11-20	21-30	31-40	
HbA1c%					
8	72	31	7	2	
10	44	32	6	0	>0.05
12	19	22	3	1	
14	7	4	0	0	
Stage of CKD					
1	0	0	0	0	
2	1	0	0	0	
3	16	17	2	0	>0.05
4	60	39	6	0	
5	65	35	6	3	

Table 3 shows that 72,31,7 and 1 participants with 8.0% HbA1c level have DM since 0-10, 11-20, 21-30 and 31-40 years respectively. Around 44,32,6 and 0 participants with 10.0% HbA1c level have DM since 0-10, 11-20, 21-30 and 31-40 years respectively. Almost 19,22,3 and 1 participants with 12.0% HbA1c level have DM since 0-10, 11-20, 21-30 and 31-40 years respectively. Almost

7,4,0 and 0 participants with 14.0% HbA1c level have DM since 0-10, 11-20, 21-30 and 31-40 years respectively. Almost 16,17,2 and 0 participants with CKD level 3 have DM since 0-10, 11-20, 21-30 and 31-40 years respectively. Almost 60,39,6 and 0 participants with CKD level 4 have DM since 0-10, 11-20, 21-30 and 31-40 years respectively. Around 65,35,6 and 3 participants with CKD level 5 have DM since 0-10, 11-20, 21-30 and 31-40 years respectively.

DISCUSSION

Diabetic nephropathy is the kidney disease that occurs as a result of diabetes. Cardiovascular and renal complications share common risk factors such as blood pressure, blood lipids, and glycemic control. Thus, chronic kidney disease may predict cardiovascular disease in the general population.[8]

Present study was observed that most of the patients in our study were between age group 41-60 years. Youngest patient in study is 12 years and oldest patient is 80 years. Younger patients are almost at the half risk than the older age group patients.

The impact of diabetes on renal impairment changes with increasing age.[8,9] T2DM is a progressive disease whose prevalence also increases with age, thus exposing elderly patients to an increased risk of long-term diabetic complications, including diabetic kidney disease (DKD).[10-12]

In this study females are more affected then males. In our study most of the patients had s. creatinine levels between 1.3-4 mg/dl. Most of the patients in the study are in CKD stage 4 and stage 5 and because of illiteracy, poor compliance and late presentation. Most of the patients with duration of diabetes more then 21 years had HbA1c less than 12% due to decrease insulin requirements.

In this study due to late presentation of the patients coming from the rural areas, illiteracy, and poor compliance most of the patients were in CKD stage 4 and 5, so their insulin requirements decreases. Thereby in my study most of the patients had HbA1c % between 10-12% despite longer duration of DM. Most of the patients had duration of DM more than 10 years so mostly all are in CKD stage 4 and 5. Due to late presentation of the patients coming from the rural areas, illiteracy, and poor compliance most of the patients were in CKD stage 4 and 5.

Chronic kidney disease (CKD) refers to all five stages of kidney damage, from very mild damage in stage 1 to complete kidney failure in stage 5. The stages of kidney disease are based on how well the kidneys can filter waste and extra fluid out of the blood. In the early stages of kidney disease, your kidneys are still able to filter out waste from your blood. In the later stages, your kidneys must work harder to get rid of waste and may stop working altogether.[13]

CONCLUSION

Incidence of DM nephropathy increase with age. With increasing numbers of years of diagnosed DM, the chances of DM nephropathy are increased and as the duration of DM as well as duration of uncontrolled glycemia increases GFR decreases and DM nephropathy progresses. HbA1c is a useful marker to account for the glycemic control over the past months, and hence the better indicator to the development as well as progression of DM nephropathy. Urine examination should always be done at the time of 1st visit in diabetic patients to diagnosed early diabetic nephropathy, as well as preventing further progression of disease. Education and community participation to promote awareness regarding DM nephropathy is also helpful. Blood pressure and glycemia should be adequately controlled and other measures like protein restricted diet, smoking cessation should be strongly advised to patients.

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