ORIGINAL ARTICLE

COMPLICATION RATES IN DIABETES MELLITUS IN RELATION TO DURATION OF DIABETES

Azmat Ali, Faryal Naeem

Department of Medicine, KRL Hospital, Islamabad - Pakistan

ABSTRACT

Objectives: To find out rate of complications in terms of nephropathy, neuropathy and retinopathy with progression of diabetes mellitus.

Material and methods: This cross sectional study was conducted among 190 patients with type 2 diabetes mellitus. Study period was from August 2017 to July 2018. This study was carried out at KRL Hospital Islamabad, Pakistan. Prior permission from ethical review board was taken. Patient's personal history, family history, laboratory data was recorded and complications of diabetes were noted on a specified proforma. Data was analyzed using statistical package for social sciences version 17.

Results: This study included 190 patients. 104 (54.7%) were females and 86 (45.3%) were males. 22.6% patients had coexisting hypertension. 41.5% patients were having either of parents diabetic. 43% patients in this study had nephropathy, 24% neuropathy and 12% retinopathy. Majority of patients (89%) had HbA1c >7. Patients with diabetes duration of more than 10 years had high complication rates with regard to retinopathy 52.6% and neuropathy 52.3% while nephropathy was 36.9%.

Conclusion: Diabetic neuropathy and retinopathy rise with duration of disease. Majority of patients (89%) had poor glycemic control (HbA1c > 7).

Key words: Diabetes mellitus, siblings, nephropathy, hypertension, retinopathy.

This article may be cited as: Ali A, Naeem F. Complication rates in diabetes mellitus in relation to duration of diabetes. J Med Sci 2019; 27: (3) 165-168.

INTRODUCTION

The prevalence of type 2 diabetes mellitus has increased significantly worldwide over the past few decades. About 1 in 11 adults worldwide have diabetes and 90% of whom have type 2 diabetes mellitus[1].

Around 422 million people were living with diabetes in 2014, compared to 108 million in 1980, prevalence rising from 4.7 to 8.5 % in adult population[2]. A study shows overall prevalence of Diabetes mellitus (DM) and prediabetics 8.3% and 6.3 % respectively and only 18% of these were already known diabetics or were on treatment[3]. This suggests screening of general population for diabetes, as complications are usually present at the time of diagnosis.

Around 415 million people are diabetic with the International Diabetes Federation (IDF) estimating an increase to 642 million by 2040 [4]. In 2007, 246 million people world-wide suffered from diabetes making the disease one of the most common non-communicable diseases[5].

The prevalence of type 2 diabetes mellitus in Pakistan is estimated to be 11.7%. The prevalence in urban areas is 14.8% and that in rural areas as 10.3%[6]. Family study of diabetes have revealed that first degree relatives of individuals with type 2 diabetes are at 3 times risk of diabetes than individuals without a family history of the disease. There is 1 in 7 chance of having the disease if any of your parent is diabetic before 50 year, 1 in 13 chance of having the disease if one of the parent is diabetic after 50 years, 1 in 2 chance of having the disease if your both parents are diabetic[7]. The

Dr. Azmat Ali (Corresponding Author)
HOD
Department of Medicine, KRL Hospital, Islamabad - Pakistan
E-mail: ali99azmat@gmail.com
Contact: +92 - 321-5380811
Date Received: 14 May, 2019
Date Revised: 23th June, 2019
Date Accepted: 20th August, 2019

elderly twins have higher incidence and prevalence of type 2 Diabetes[8] and first-degree relatives of diabetic individuals have lifetime rates of diabetes up to four times the background population prevalence[9].

Diabetic retinopathy, neuropathy and nephropathy are common microvascular complications of diabetes . The risk of complications is related to duration of diabetes and hyperglycemia. Of estimated 285 million people with diabetes worldwide almost one third have signs of diabetic retinopathy (DR) and of these one third have vision threatening DR including diabetic macular edema (DME)[10]. Diabetic neuropathic pain is common complication of diabetes and most common cause of neuropathic pain. Diabetic nephropathy is the leading cause of renal failure in United states. Without intervention diabetic patients with microalbuminuria typically progress to proteinurea and overt nephropathy. In a survey conducted in august 2017 in different Islamabad localities 1000 indiviuals were included in the survey. Out of 500 males 82 (16.6%) were diabetic and out of 500 females 116 were diabetic (23.2%). Female predominance for diabetes was noticed in this survey. (unofficial communication)

MATERIAL AND METHODS

This cross sectional study was carried amongst 190 patients with type 2 diabetes mellitus. Study period was from August 2017 to July 2018. This study was conducted at KRL Hospital Islamabad. Prior permission from ethical review board was taken. Patient's personal history, family history, laboratory data was recorded and complications of diabetes were noted on a specified proforma. Patients having pain, paresthesias and pins and needle sensations were taken as having neuropathy. Patients having proteinuria of more than 30mg/L were included as having nephropathy. Complications rates were tailored according to the number of patients followed for that particular complication and percentages taken accordingly. Data was analyzed using statistical package for social sciences version17. Patients with type 1 Diabetes mellitus were excluded from this study. Patients with other causes of nephropathy were also excluded from this study.

RESULTS

This study included 190 patients. 104 (54.7%) were females and 86 (45.3%) were males. 52.1 % were taking oral medications, 21.6% insulin and 26% both. 22.6% patients were having coexisting hypertension. 41.5% patients have either of their parents as diabetic. Majority of patients (89%) had HbA1c level > 7. 62% of patients in our study had diabetes duration more than 5 years. Table 1 and 2 shows complications of diabetes. Table 3 shows disease duration with complications. Patients with diabetes duration of more than 10 years had complication rates of retinopathy (52.6%), neuropathy (52.3%) while nephropathy was 36.9%.

Table 1: COMPLICATIONS OF DIABETES.

	No of Patients	Available Patients	Percentage
Nephropathy >30 mg/L (microalb minuria	46	106	43.3%
Neuropathy	46	190	24.2%
Retinopathy	19	158	12%

Table 2: RETINOPATHY GRADES.

Retinopathy Grades	No of patients & % ages
Grade-I	11(57.8%)
Grade-II	5(26.3%)
Grade-III	3(15.7%)

Table 3: DIABETES DURATION WITH COMPLICATIONS .

Complications	Diabetic Since	No of patients
Retinopathy	<5 years	2 (10.5%)
	5-10 Years	7 (36.8%)
	>10 years	10 (52.6%)
Neuropathy	<5 years	10 (23.8%)
	5-10 Years	10 (23.8%)
	>10 years	22 (52.3%)
Nephropathy	<5 years	16 (34.7%)
	5-10 Years	13 (28.2%)
	>10 years	17 (36.9%)

DISCUSSION

Diabetes and its complications are rising despite accessibility to tertiary care physicians and new treatment modalities. Diabetic retinopathy (DR), neuropathy and nephropathy are common complications of diabetes mellitus. In this study retinopathy was observed in 12% of patients, 57.8% of whom were having grade 1 retinopathy. In a study the annual incidence of diabetic retinopathy was 2.2%- 12.7%[11]. In another study the prevalence of diabetic retinopathy was 28.7%[12].

According to a study diabetic retinopathy is the most frequent microvascular complication of diabetes mellitus resulting in blindness[13].

Microalbuminuria is iceberg to diabetic complications. Without any intervention in type 2 diabetic patients 20 - 40% with microalbuminuria progress to manifested nephropathy after 20 years from on set of diabetes and approximately 20% develop end stage renal disease. In this study 43.3% had microalbuminuria. In one study prevalence of diabetic nephropathy was 45.6%[14]. In another study the prevalence of microalbuminuria was found to be 31.6% in diabetics[15].

Diabetic neuropathy is another complication of long standing diabetes. In this study the prevalence of neuropathy was 24 % and increased to 52.3% in those with more than 10 years of disease. A study shows 22% prevalence of neuropathy in Type 2 DM[16]. Another study revealed prevalence of diabetic neuropathy to be 60% in patients with long standing diabetes[17]. According to a study peripheral neuropathy is the earliest and most frequently observed long term complication of diabetes that causes increased risk of foot ulceration, limb pain with numbness[18].

Duration of diabetes is directly related to the development of microvascular complications. In this study 52.6 % of the patients with retinopathy, 52.3% patients with neuropathy and 36.9% with nephropathy have duration of diabetes more than 10 years. In another study it was revealed that 40% patients with retinopathy, 37% patients with neuropathy had duration of diabetes between 10 and 15 years and 54 % of patients with nephropathy had disease duration more than 15 years[19]. Another study suggests that age at onset and duration of diabetes are positively associated with macrovascular complications and death whereas only duration of disease is independently associated with microvascular complications[20].

Limitations

Patients included in this study did not have long term follow up.

CONCLUSION

Diabetic neuropathy and retinopathy rise with duration of disease. Majority of patients had poor glycemic control (> 7).

REFERENCES

1. Zheng Y, Ley SH, Hu FB. Global aetiology and epidemiology of type 2 diabetes mellitus and its complications. Nat Rev Endocrinol. 2018;14(2):88-98.
2. World Health Organization. Global report on diabetes. Geneva, Switzerland; 2016.
3. Tripathy JP, Thakur JS, Jeet G, Chawla S, Jain S, Pal A, et al. Prevelence and risk factors of diabetes in a large community based study in North India : results from a STEPS survey in punjab, India . Diabetology and Metabolic syndrome, 2017 9:8.
4. International Diabetes Federation. IDF Diabetes atlas. 7th ed. Brussels, Belgium: International Diabetes Federation; 2015.
5. Tabish SA. Is Diabetes Becoming the Biggest Epidemic of the Twenty-first Century?. International Journa of Health Sciences. 2007 Jul; 1(2): V–VIII.
6. Meo SA, Zia I, Bukhari IA, Arain SA. Type 2 Diabetes mellitus in Pakistan: Current prevalence and future forecast. Journal of Pakistan Medical Association, December 2016, Vol.66, No.12.
7. Hieronymus LB, Peddicord CB. Reducing Diabetes Risk for the Whole Family. Diabetes Self –management, April 2014.
8. Poulsen P, Grunnet LG, Pilgaard K, Storgaard H, Alibegovic A, Sonne MP, et al. Increased Risk of type 2 Diabetes in Elderly Twins, American Diabetes Association, Diabetes. 2009 Jun; 58(6): 1350-1355.
9. Köbberling J, Tillil H. Empirical risk figures for first degree relatives of non-insulin dependent diabetics. The genetics of diabetes mellitus. London: Academic Press; 1982. p. 201–209.
10. Lee R, Wong TY, Sabanayagam C. Epidemiology of diabetic retinopathy, diabetic macular edema and related vision loss. Eye and Vision (London) 2015; 2:17.
11. Sabanayagam C, Banu R, Chee ML, Lee R, Wang YX, Tan G, et al. Incidence and progression of diabetic Retinopathy: a systemic review. The Lancet Diabetes and Endocrinology, July 2018.
12. Mumtaz SN , Faheem MF, Arsalan M, Shaikh SA, Kazi U, Memon MS. Prevalence of diabetic retinopathy in Pakistan: A Systemic Review, Pakistan Journal of Medical Sciences. 2018 Mar- Apr;34 (2):493-500.
13. Khan F, Usman R, Wadud S, Zafar S, Abideen ZU, Association of vitamin D with retinopathy in patients with type 2 Diabetes mellitus. J Med Sci 2015; 26 (2) 58061

14. Aldukhayel AR. Prevalence of diabetic nephropathy among type 2 diabetic patients in some of the Arabs countries.International Journal of Health Sciences (Qassim), 2017 Jan-Mar; 11(1): 1-4

15. Hussain KSA. Prevalence and biochemical correlates of microalbuminuria in type 2 diabetes mellitus at pudcherry, India. Int J Adv Med. 2018 Aug;5(4):865-868.

16. Jaiswal M, Divers J, Dabelea D, Isom S, Bell RA, Martin CL et al. Prevalence of and Risk Factors for Diabetic Peripheral Neuropathy in Youth With Type 1 and type 2 Diabetes: Search for Diabetes in Youth study ,Diabetes Care, American Diabetes Association. Diabetes Care 2017 Sep; 40(9): 1226-1232.

17. Jawad F.Diabetic neuropathy, Situational analysis in Pakistan. Journal of Pakistan Medical Association. Volume 68, No 1, Jan 2018.

18. Khan Z, Khan I, Khan WM. Peripheral neuropathy in newly diagnosed type 2 diabetes mellitus patients: audit of a single center. J Med Sci 2018; 26 (4) 331-335.

19. Ramanathan RS. Correlation of duration, hypertension and glycemic control with microvascular complications of diabetes mellitus at a tertiary care hospital. Integrative Molecular Medicine. 21 Feb 2017, Vol 4(1) : 1-4.

20. Zoungas S, Woodward M, Li Q, Cooper ME, Hamet P, Harrap S, et al. Impact of age, age at diagnosis and duration of diabetes on the risk of macrovascular and microvascular complications and death in type 2 diabetes. Diabetologia (2014) 57:2465–2474.

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE NIL

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Ali Z: Concept, Design, Analysis & interpretation of data.

Naeem F: Data Collection, literature, review, Bibliography.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.