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Clinical Profile and Spectrum of Complications of Diabetes at the Onset of Younger Age

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ABSTRACT
Introduction: *The incidence with younger patients is continuously growing in the regular clinical care setting. Unhealthy lifestyle, sedentary habits are responsible for the changing dynamics of diabetes in young*
Objectives: *To evaluate the incidence, clinical profile and spectrum of complications of different types of diabetes mellitus among young patients (age between 15 to 25 years).*
Materials and Methods: *Cross-sectional study of every consecutive diabetic patient of age of onset between 15 to 25 years attending Department of Medicine and department of Endocrinology*
Results: *We studies 60 patients of which Type 1 DM accounted for the highest no. of cases (61%). In Type 1 DM males (85%) were more affected and in Type 2 DM males and females were equally affected. Osmotic symptoms were present predominantly in Type 1 DM (67%). Positive family history was highest in Type 2 DM (81.2%) cases. Retinopathy was present in 28% of the total cases of young diabetes, predominantly in Type 2 DM (43.7%). Nephropathy is present in 16.6% of the cases of diabetes, in general predominating in Type 1 DM(22%). Both autonomic and peripheral neuropathy were found to be highest in Type 2 DM .*
Conclusions: *This group represents an extreme phenotype with high prevalence of risk factors. Hence, a study on diabetes in young is very much relevant in the present scenario.*
Keywords: *Diabetes mellitus, Fasting plasma glucose,Type1 diabetes mellitus, Type 2 diabetes mellitus, Fibrocalculus pancreatic diabetes, Maturity Onset Diabetes of Young,neuropathy ,nephropathy,retinopathy.*

INTRODUCTION

Diabetes Mellitus is considered one of the largest emerging threats to health in 21st century. World Health Organization statistics show that, worldwide, almost three million deaths per year are attributed to diabetes, equivalent to 5.2% of all deaths.[1]

India leads the world with second largest number of diabetic subjects. India is the second most populous country in the world with the second largest number of cases of Diabetes Mellitus[2,3,4]. (IDF Diabetes Atlas Sixth edition 2013) Acco-rding to WHO, 346 million people worldwide have diabetes.

DM is a chronic disorder with multiorgan involvement having many microvascular complications (Diabetic nephropathy, Neuropathy & Retinopathy) and Macro Vascular

complications (Coronary artery disease, Peripheral artery disease, stroke[5.6.] If glycaemic control is not attained in early stages of the disease, the complications could be many.

In India, apart from T1DM and T2DM, there are other forms of diabetes in the young including maturity-onset diabetes of the young (MODY), Fibro Calculous Pancreatic Diabetes (FCPD), Gestational Diabetes Mellitus (GDM), Endocrine diabetes and the rare genetic forms of diabetes.

T2DM, earlier considered a disorder of middle age or elderly, is increasingly being reported among young adults and now also in adolescence and childhood, probably due to the burgeoning epidemic of childhood obesity. Indeed, the epidemic of T2DM is now spreading so rapidly, that already in some countries, like Japan; T2DM is already more common than T1DM, in children.[7,8]

Population-based estimates of T2DM are lacking in children and adolescents. Clinic-based data suggest that T2DM is increasing in the young

Available data suggests that the prevalence of type 2 diabetes mellitus (T2DM) is not only increasing, but there is also a shift of age at onset of T2DM toward younger age groups .T2DM in the young is mostly associated with overweight and obesity which are currently more common among the more affluent classes of society. Therefore, it is important to analyse in depth the epidemiological burden of disease in reference to the study on diabetes in young.

MATERIALS AND METHODS

Sample frame for the study consists of every consecutive patient of age between 15 to 25 years attending department of Medicine. The inclusion criteria was Age - 15 to 25 years and the diagnosis was based in meeting the ADA (American Diabetes Association) criteria of DM

The following patients were excluded, patients with Chronic Kidney Disease, Chronic Liver Disease, Sepsis, Primary Hyperparathyroidism.

The design of the study was cross -sectional with purposive sampling. The study group included the diabetic patients in the age group 15 – 25 years from a period of January 2014 to December 2015.

The statistical tools used included, proportion analysis, bivariate analysis, association tests, Chi-Square Tests, Ratio Tests, Diagrams, Percentage Analysis.

EPI INFO 7 was used for the analysis.

Algorithm for differential diagnosis of diabetes in youth in India:

Using a simple questionaire, which involves family history of diabetes, response to therapy, presence of ketosis and abdominal X-ray, an algorithm is made by which the majority of cases of youth-onset diabetes in India can be classified into different groups. In addition, C-peptide, and ultrasonography of the abdomen have been used to help refinethe process.

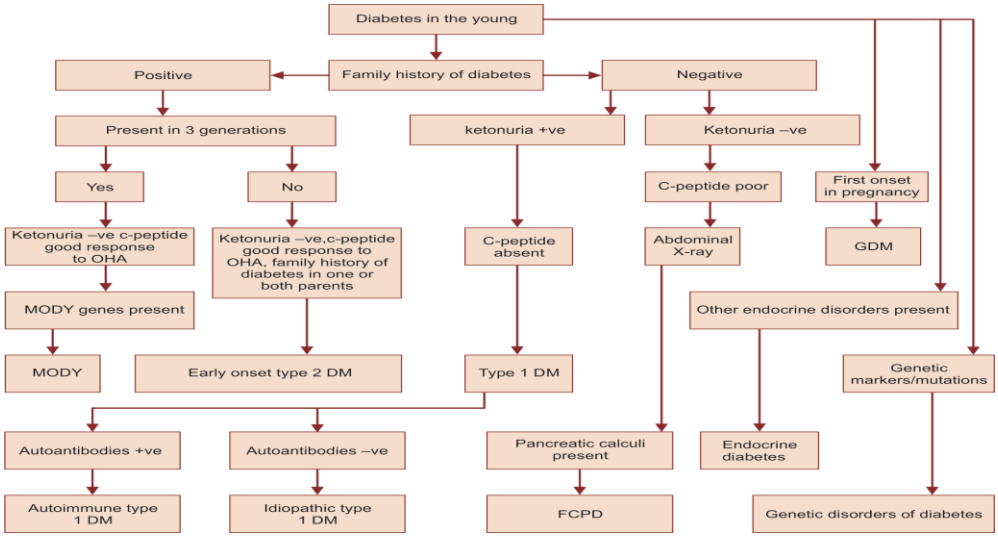

Figure 1: Management of Diabetes in Young (ADA:2011)

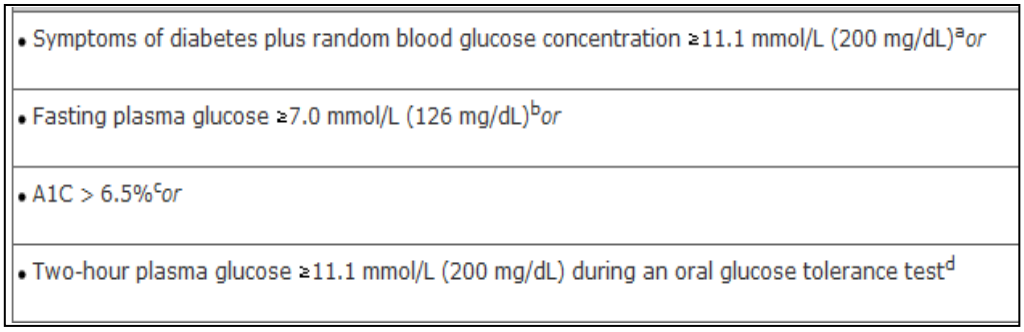

Figure 2: ADA Criteria for Diagnosis of T2DM

Table 1: Findings and Key Observations

S. No.	Characteristics under study	FCPD	Type-I DM	Type-2 DM	Comments
1.	Occurrence % in study group	11	61	28	Type I DM cases were observed maximum and FCPD least.
2.	Male % in the group	85	62	50	In both Type 1 DM and Type 2 DM categories; number of males with disease was more compared to females
3.	Dependance between sex and disease	Yes	Yes	Yes	There existed dependency between gender and types of Diabetics.
4.	Retinopathy present %	21	22	44	Presence of retinopathy was found highest in type 2 DM cases
5.	Nephropathy present %	0	22	13	Type 1 DM had the highest incidence of nephropathy
6.	Dependance of Nephropathy on diseases	No	Yes	Yes	The presence or absence of Nephropathy is not depending on kinds of diseases
7.	Dependance of Retinopathy on diseases	Yes	Yes	Yes	Retinopathy was the most common diabetes complication .But there was no dependency of retinopathy and the types of diabetes
8.	Peripheral Neuropathy present %	22	2.7	56.2	Presence of Pheripheral Neuropathy was found highest in Type 2 DM cases
9	Autonomic Neuropathy present %	0	2.7	44	Presence of autonomic neuropathy is higher in Type 2 DM cases
10	BMI Level association less than 18.5	NIL	NIL	NIL	Type1 DM was more associated with lean body weight
	BMI Level association greater than 25.5	NIL	NIL	Positive	Type 2 DM was more associated with obesity
11	2-h PG greater than 200	Positive	Postive	Positive	positive association existed in all the three types with FPG >150 and 2-h PG >200
12	Cholestrol>150 level TGA >100	10.8	78.3	21.6	Type 2 DM was more associated with dislipidemia
13	Mode of presentation(osmotic symptoms)	14.29	67.5	31.25	The most common mode of presentation among patients with Type 1 DM
14	Family history	0	18.9	81.2	Type 2 DM showed high association with family history, cases than Type I DM

DISCUSSION

The present study "Clinical profile and spectrum of complications of diabetes of younger age" was undertaken between January 2014 to December 2015 in the Postgraduate department of Medicine, and department of Endocrinology, S.C.B Medical College, Cuttack, Odisha.

60 cases of young Diabetics were taken and categorized in to Type 1 Diabetes Mellitus, Type 2 Diabetes Mellitus and Fibro Calculus Pancreatic Diabetes(FCPD).

General Distribution

In the present Study, Group Type I DM cases were observed maximum (61%) and FCPD least (11%).Type 2 Dm accounted for 28% of the cases. In a previous study by Registry of people with diabetes in India with young age at the onset (2006-2011), the relative proportion of patients

with Type 1 and Type 2 DM varied between centers. In centers like MDRF, Chennai and AMC, Dibrugarh, 40 % of the total patients were from the Type 2 DM category. In all the other collaborating centers, Type 1 DM contributed a significant majority (71.5 % to 94.4%), while the proportion of patients with youth onset type 2 diabetes was below 25%.

Gender

It was seen that the Study Group consisted of 62% young males and 38% females.

In a previous study by Registry of people with diabetes in India with young age at the onset (2006-2011) 49.53% were males and 50.47% were females.

In both Type 1 DM and Type 2 DM categories; number of males with disease was more compared to females.[9-11]

Out of 7 cases of FCPD 85% are males. Out of 37 cases of Type 2 DM 62% were males. In Type I DM, both males and females were equal. A chi square test carried out revealed that there existed dependency between gender and types of Diabetics. This pattern of gender distribution is different from SEARCH and EURODIAB studies where Type 1 DM prevalence was slightly more among males and Type 2 DM prevalence was more among females[12]

Mode of Presentation

Out of the 60 patient's osmotic symptoms were present in 67.6% of TYPE1 DM and 31.3 % of TYPE2 DM patients

Complications

Retinopathy is present in 29% of the study group. Retinopathy is present in 21% of FCPD, 22% cases in Type I DM and 44% in Type II DM. Nephropathy was present in 17% of the cases. Presence of Nephropathy was found highest in TYPE1 DM cases (29.5%) followed by TYPE 2 DM (12.5%).

In the case of Peripheral Neuropathy the occurrence was only in 20% of the study group. Presence of Peripheral Neuropathy was found highest in Type 2 DM cases (56.2%) Autonomic Neuropathy was present only in 13% in the study group. It indicated that this characteristic was having little influence in the study group .The presence of autonomic neuropathy is higher in Type II DM cases.

Previous data analysis by "The Registry of people with diabetes in India with young age at the onset (2006-2011) in all the diabetes categories, retinopathy was reported as the most common diabetes complication[13-14]. This was followed by nephropathy in Type 1 DM and neuropathy in Type 2 DM.

In both Type 1 DM and Type 2 DM, prevalence of complications increased with increase in duration of diabetes (years since diagnosis/onset of diabetes). For similar disease duration, the prevalence of complications was higher among Type 2DM compared to Type 1 DM. Retinopathy and neuropathy appeared to manifest at a relatively short span of disease among Type 2 DM patients compared to Type 1 DM.[15-17]

Family History

Relationship between family history and occurrence of Diabetics was analysed. Detailed analysis revealed that 81% cases in Type II DM showed high association with family history, 19% cases in Type I DM and no relationship between family history in FCPD cases.

Family history is considered as one of the important risk factors of young onset diabetes. In a previous study by "The Registry of people with diabetes in India with young age at the onset (2006-2011) ",family history of diabetes was most prevalent among people with youth onset Type 2 DM, in whom paternal and maternal diabetes was reported diagnosed with diabetes.

Body Mass Index (BMI)

Analysis on distribution of BMI in different levels was done and positive association was found for the level 18.5 to 25 in all the cases. However, a non significant association was found for the level less than 18.5 for FCPD, but positive association in the level less than 18.5 for Type DM I and DM II cases. There existed positive association for the level greater than 25 in Type II Dm and no association for Type I DM in this level. The mean BMI were 21.09 ± 3.2 and 21.9 ± 3.4 kg/m^2 for Type 1 and Type 2 DM respectively

In another study by" Registry of people with diabetes in India with young age at the onset (2006-2011) "at each age, mean BMI values of adolescents with Type 2 DM was more than that of Type 1 DM . The mean BMI values of Type 1 DM and Type 2 DM were 19.4±4.0 and 25.4± 4.9 kg/m2 respectively.

Lipid Profile

Triglyceride level in 3 kinds of Diabetics were analysed. It was found that TGA level 100 to 150 was high in Type I DM (78.3%), Type II DM (21.6%) and low 10.8% in FCPD.

Conclusion and Summary

The study in young Diabetes (15-25 yrs of age) revealed that, Type 1 DM cases were observed maximum and FCPD least. In both Type 1 DM and Type 2 DM categories; number of males with disease was more compared to females. There existed dependency between gender and types of Diabetics. Osmotic symptoms were the most common mode of presentation among patients with Type 1 DM. Type 2 DM showed high association with family history, cases than Type I DM. Type 2 DM was more associated with dyslipidemia, obesity, higher chances of retinopathy, autonomic neuropathy and peripheral neuropathy Type 1 had the highest incidence of nephropathy. Importantly, the presence or absence of Nephropathy is independent of the type of DM. Retinopathy was the most common diabetes complication, but there was no association of retinopathy with the type of diabetes.

Bibliography

1. Kitagawa T, Owada M, Urakami T, et al. Increased incidence of non-insulin dependent diabetes mellitus among Japanese school children correlates with an increased intake of animal protein and fat, ClinPediatr. 1998;37(2):111-5.
2. Kida K. Obesity and type II diabetes in childhood. In Proceedings of Diabetes in Asia, 2002. Colombo, Sri Lanka. Diabetes Association of Sri Lanka; 2002.p.44.
3. The burden of mortality attributable to diabetes: realistic estimates for the year 2000. Roglic G, Unwin N, Bennett PH, Mathers C, Tuomilehto J, Nag S, Connolly V, King ;Diabetes Care. 2005 Sep; 28(9):2130-5.
4. IDF Diabetes Atlas 6th edition 2013 pg. 34. & King H, Aubert RE, Herman WH. Global burden of diabetes, 1995-2025- Prevalence, numerical estimates and projections. Diabetes Care 1998; 21: 1414-31
5. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. Diabetes Care 27 (2004), pp.1047-1053.
6. Ramachandran A, Snehalatha C, Kapur A, et al. High prevalence of diabetes and impaired glucose tolerance in India. National Urban Diabetes Survey. Diabetologia 44(2001),pp.1094-1101
7. Mohan V, Deepa R, Rema M. Correlation between fasting plasma glucose and two-hour plasma glucose during oral glucose tolerance test in South Indians. Metabolism. 2000; 49(4):455-7.
8. Champe PC, Harvey RA, Ferrier DR, editors. Biochemistry. Lippincott Williams & Wilkins;2005
9. Bai PV, Krishnaswami CV, Chellama-riappan M, Kumar GV, Subramaniam JR.Glycosuria and diabetes mellitus in children and adolescents in south India. Diabetes Res ClinPract. 1991 Aug;13(1-2):131-5.
10. Bai PV, Krishnaswami CV, Chellama-rippan M, Kumar GV, Subramaniam JR, Srivatwa A, Subramanyam B, Rao MB.Prevalence of diabetes in the young in south India.IndianPediatr. 1995, Nov;32(11):1173-6
11. Feltbower RG, McKinney PA, Parslow RC, Stephenson CR, Bodansky HJ. Type 1 diabetes in Yorkshire, UK: time trends in0-14 and 15-29-year-olds, age at onset and age-period-cohort modelling. Diabet

Med 2003;20:437–441

12. Harron KL et al. Rising rates of all types of diabetes in South Asian and non-south Asian children and young people aged 0–29 years in West Yorkshire, UK, 1991–2006. Diabetes Care 2011; 34:652
13. Schober E, Holl RW, Grabert M, Thon A, Rami B, Kapellen T, Seewi O, Reinehr T. Diabetes mellitus type 2 in childhood and adolescence in Germany and parts of Austria. Eur J Pediatr 2005;164:705
14. Ortega-Rodriguez E, Levy-Marchal C, Tubiana N, Czernichow P, Polak M. Emergence of type 2 diabetes in an hospital based cohort of children with diabetes mellitus. Diabetes Metab 2001;27:574-8.
15. Feltbower RG, McKinney PA, Campbell FM, Stephenson CR, Bodansky HJ. Type 2 and other forms of diabetes in 0-30 year olds: a hospital based study in Leeds, UK. Arch Dis Child 2003;88:676-9.
16. Kida K. Type 2 diabetes in Japanese youths. (Abstract). J Pediatr Endocrinol Metab 2000;13:S4,1209
17. Kitagawa T, Owada M, Urakami T, Tajima N. Epidemiology of type 1 (insulin-dependent) and type 2 (non-insulin-dependent) diabetes mellitus in Japanese children. Diabetes Res ClinPract 1994;24:S7,13.