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Research Article

Prospective study of physical, clinical and radiological profile of patients with pancreatic diabetes

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ABSTRACT

Background: Pancreatic diabetes (PD) is the unique kind of diabetes which is secondary to tropical pancreatitis. The present study was performed to elucidate the prevalence, clinical profile and underlying nutritional factors of secondary or pancreatic diabetes (PD) mellitus along with the role of exocrine failure in the absence of radiological evidence of calcification.
Methods: A total 891 diabetes mellitus patients who were attending the diabetes education and care clinic, Jabalpur from October 2013 to April 2015 were studied. Diagnosis of pancreatic diabetes was done on the basis of history of recurrent abdominal pain from an early age, history of chronic alcoholism, the presence of pancreatic calculi seen on plain abdominal X-ray, absence of gall stone or hyperparathyroidism and diabetes mellitus. A detailed history, glycemic and lipid parameters along with micro and macrovascular complications were studied in all the patients with pancreatic diabetes.
Results: Out of 891 diabetes patients, 3 (0.34%) were having pancreatic diabetes. Most of them belong to age group of 36-45 years. BMI was <19 kgm^2 in all the patients. Chronic alcoholism was seen in all the patients with PD. All the patients were having uncontrolled diabetes (FPG > 200 mg/dl, PPG >320 mg/dl and HbA1c > 8.5%). All three patients had retinopathy and peripheral neuropathy problem. Macrovascular complications were less present.
Conclusions: The prevalence of pancreatic diabetes was 0.34%, usually occurs in men with 3rd decade of age, low BMI and low socioeconomic status. Patients usually have uncontrolled diabetes (high FPG, PPG and HbA1c). Abdominal pain was the most common presenting symptom in patients. Microvascular complication was present in all the patients with pancreatic diabetes.

Keywords: Pancreatic diabetes, Secondary diabetes, Abdominal pain, Pancreatic calculi

INTRODUCTION

Pancreatic diabetes (PD) is the unique kind of diabetes which is secondary to tropical pancreatitis. PD mainly affects patients with poor socioeconomic status, patient who are lean (low BMI) and those who are malnourished.[1] The main distinctive characteristic in patients with PD is abdominal pain in childhood and radiological analysis showing presence of pancreatic calculi. In such patients severe form of diabetes is seen usually requiring insulin as a treatment.[1]

Exocrine part of pancrease also plays a very important role in the development of pancreatic diabetes and related complications. Disturbance in the exocrine part of the pancreas can lead to neuropathy in patients with pancreatic diabetes because of malabsorption of crucial nutrients.[2]

Any particular diabetes related complication are not recorded however, microvascular complications such as retinopathy and peripheral neuropathy is reported in some patients. Other clinical presentations of PD are not clear.[3]

The present study was performed to elucidate the prevalence, clinical profile and underlying nutritional factors of secondary or pancreatic diabetes (PD) mellitus along with the role of exocrine failure in the absence of radiological evidence of calcification.

METHODS

The present study was done at diabetes education and care clinic, Jabalpur, India from October 2013 to April 2015 and all the patients who were attending the OPD were evaluated for pancreatic diabetes. The cases which dropped during follow up or could not be fully investigated were excluded from analysis of data.

Criteria for diagnosis of pancreatic diabetes

- History of recurrent abdominal pain from an early age.
- History of chronic alcoholism, the presence of pancreatic calculi seen on plain abdominal X-ray.
- Absence of gall stone or hyperparathyroidism and diabetes mellitus.

All the patients underwent a detailed history and through clinical examination and recorded in preapproved proforma. All the data were analyzed using IBM SPSS-ver.20 software. Analysis was performed using chi-square test and independent sample student t test. P values <0.05 was considered to be significant.

RESULTS

Out of 891 diabetic patients registered in diabetic clinic, 838 (94.05%) (478 (57.04%) males and 360 (42.95%)) were T2DM, 50 (5.61%) were T1DM and 3 (0.34%) were pancreatic diabetes (PD) patients, out of this, one was the case of pseudopancreatic cyst and two of these cases were of pancreatic calcification.

Out of 3 PD patients, 2 (66.67%) belong to age group of 36-45 years and 1 (33.33%) patients was above 45 years of age. Out of 3 PD patients, 2 (66.67%) were males and 1 (33.33%) was female.

BMI was <19 kgm^2 in patients with PD, prominent malar bone with hyperpigmentation of face, jaundice was present in all cases. Nails were normal, no clubbing was seen, lymph nodes were not palpable and parotid gland normal and immature cataract was recorded in one case. Low protein diet on history was recorded by all three patients.

Table 1: Characteristic of patients suffering from pancreatic diabetes in present study.

Disease Characteristic	
Family history	Absent
Age of onset	36-45 years
Duration of diabetes at the time of entry in the study	≥10 years
Prevalence of alcoholism	Chronic alcoholic ≥12 years
Socioeconomic status	Rs. 1001-2000/month
Total calories intake/day	<1500
Carbohydrates	51-60%
Fat	20-30%
Proteins	10%-20%
Presenting Symptoms	Pain in abdomen
FPG (mg/dl)	>200
PPG (mg/dl)	>320
Serum Cholesterol()	150-250
TG (mg/dl)	100-150
HDL-C (mg/dl)	36-45
HbA1c (%) (diabetes control)	>8.5%
Treatment	2 pt on insulin, 1 on OADs
IHD	None
Cardio thoracic ratio	>0.5
Neurological involvement	Peripheral neuropathy
Ocular complication	Retinopathy
Renal complication	1 pt proteinuria (2.5 gm/2 hrs)
	3 pt serum creatinine 1.5-2.5 mg%
PVD	2 pt intermittent claudication
Cerebral vascular disease	None
Exocrine pancreatic function	Amylase level in pancreatic juice reduced

IHD; ischemic heart disease, PVD; peripheral vascular disease, OADs; oral hypoglycaemic agents; FPG; Fasting plasma glucose, PPG; post prandial glucose, TG; triglyceride, HDL-C; high density lipoprotein cholesterol.

DISCUSSION

Type 1 and type 2 diabetes are two major classes of the diabetic population. There are certain types of diabetes which do not fit into either of these categories. In tropical countries diabetes associated with malnutrition, such as J type diabetes and tropical pancreatic diabetes, have been described.[4]

Previous studies have suggested the various characteristics of tropical pancreatic diabetes. These patients belong to low socioeconomic status of society and appear grossly emaciated with signs of severe protein

calorie malnutrition. The patients are severely insulin dependent and often require large doses of insulin for stabilization of diabetes. However, they are resistance to ketosis on withdrawal of insulin even for sever weeks. A history of cassava ingestion is very common in diabetes mellitus of pancreatic origin. It is easy to diagnose in its late stages of calculi formation, but however it is difficult to recognize it earlier.[4]

Confirmatory evidence of this disease is the demonstration of pancreatic calculi on a plain X-ray of abdomen.[4] Calculi are mainly present to the right of the first or second lumbar vertebrae, but also may overlap the spine.[5] In present study, the pancreatic calculi were revealed radiologically in one patient. This is significantly less than the findings of other workers like Pitchumani et al (85%) who had studied the problem of pancreatic calcification.[6] But Mohan V et al did a similar study and reported a lower prevalence (0.09%) as compared to present study.[5] But later Mohan et al performed a similar study and reported almost similar prevalence of pancreatic diabetes (0.36%).[7]

The prevalence of pancreatic diabetes was 0.34% with male predominance. Pancreatic diabetes was most common at 3rd decade of life with low BMI. All the patients were chronic alcoholics (≥12 years). Almost similar results were depicted by Mohan et al.[8]

Mohan et al performed a similar study on cohort of 370 patients with fibrocalculous pancreatic diabetes and reported that 98% were reported to have pancreatic calculi with abdominal pain (81%). Which is very high prevalence as compared to present study findings; this may be due to inclusion of all type of diabetes patients in present study. They also reported that most of them were male and age of onset of abdominal pain was 21±14 years which is consistent with the present study data.[8]

Ralapanawa et al studied a case of fibrocalculous pancreatic diabetes to study aetio-pathogenesis and reported that malnutrition mainly overt protein calorie malnutrition (25% of patients) as one of the factor responsible for the development of secondary diabetes which is consistence with the present study data.[9] He also reported that abdominal pain, diabetes and steatorrhoea are other presentation of secondary diabetes.[9] Patients usually feel severe epigastric pain with several periods of remission and aggravation. Pain usually transfers to the back and usually stops when patients stoop forward or rest in prone position.[5]

Patients with pancreatic diabetes have severed diabetes requiring insulin; ketoacidosis is not seen in such patients.[3] In present study also FPG was >200 mg/dl, PPG was >320mg/dl and HbA1c was >8.5% which is consistence with the results obtained by Yajnik et al.[3]

Reports have shown that patients with pancreatic diabetes may suffer from retinopathy mainly mild background diabetic retinopathy and sight-threatening proliferative diabetic retinopathy.[2] In present study all the patients had retinopathy and peripheral neuropathy.

Because of the mixed effect of both exocrine and endocrine deficiency, one cannot clearly say, whether malnutrition in pancreatic diabetes is its cause or it is its effect. Weight loss in such patients may be due to insulinopenia which can lead to uncontrolled diabetes or catabolic cascade.[10] Even Mohan's group have favored that malnutrition (low BMI) is the effect of pancreatic diabetes.[11,12]

The present study had few limitation of being less in sample size; a large randomized clinical trial is needed to confirm the present study findings.

CONCLUSIONS

The prevalence of pancreatic diabetes was 0.34% with male predominance. Pancreatic diabetes was most common at 3rd decade of life in patients with low BMI and socioeconomic status. Patients usually have uncontrolled diabetes (high FPG, PPG and HbA1c). Abdominal pain is the most common presenting symptom in patients. Microvascular complication was reported in the patients with pancreatic diabetes.

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