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Original Article

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Clinical Characteristics of Fibrocalcous Pancreatic Diabetes (FCPD) In Children and Adolescents in a Tertiary Hospital

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Abstract

Background: Fibrocalculous pancreatic diabetes (FCPD) is a unique form of diabetes secondary to nonalcoholic, chronic, calcific, pancreatitis seen in tropical, developing countries of the world. **Objective:** The purpose of the present study was to determine the clinical features & the glycemic status of the children and adolescents with FCPD. **Methodology:** This descriptive study was undertaken in the department of paediatrics and at the data retrieval centre of Bangladesh Institute of Research and Rehabilitation in Diabetic, Endocrine and Metabolic Disorders (BIRDEM). **Result:** Among Seventy two cases of FCPD patients, majority (69.4%) of the patients were between 11-15 years age group and most (81%) of the study population were female. Most (68%) of them came from rural areas and belongs to lower socioeconomic class. Important clinical presentations were typical symptoms of diabetes mellitus (70.83%), abdominal pain (68.1%) and chronic diarrhoea (36.11%). The study population had poor glycaemic control, their mean (SD) HbAlc were 16.58 4.07. Cataract was the most common complication (47.2%). Only one patient developed Diabetic Keto Acidosis (DKA). **Conclusion:** Majority of FCPD were female coming from rural areas with poor socio-economic. [J Shaheed Suhrawardy Med Coll, December 2014;6(2):53-56]

Keywords: Fibrocalculous pancreatic diabetes (FCPD), malnutrition Related Diabetes Mellitus (MRDM), Protein Deficient Pancreatic Diabetes (PDPD).

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Introduction

Diabetes is one of the most common chronic diseases of young people[1]. The number of children with diabetes is growing. The increasing incidence of type 1 and type 2 diabetes in children and adolescent is an emerging problem worldwide[2]. Once thought to be uncommon in the developing world, diabetes has now emerged as an important public health problem in Asia[3]. In Bangladesh, like many other developing countries the number of new cases of diabetes mellitus is increasing every year[4]. Children with diabetes are at risk of developing disabling and life-threatening complication at an early age, placing a significant human and economic burden on families and societies[2]. Malnutrition Related Diabetes Mellitus (MRDM) was recognized by the 1985 WHO study group on Diabetes Mellitus as a major clinical type of diabetes distinct from type 1 and type 2 diabetes unique to some tropical and developing countries[5]. MRDM was subdivided into Fibrocalculous Pancreatic Diabetes (FCPD) and Protein Deficient Pancreatic Diabetes (PDPD). In the recent, expert committee of classification of Diabetes[6] the entity known as 'Malnutrition Related Diabetes Mellitus' was deleted and FCPD is now classified as a `disease of exocrine pancreas' under the category of 'Other types of Diabetes'. Fibrocalculous pancreatic diabetes (FCPD) is a unique form of diabetes secondary to nonalcoholic, chronic, calcific, pancreatitis seen in tropical, developing countries of the world.

This study on FCPD may reflect some of the characteristics of FCPD in children and adolescents, which may lead to

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better understanding of the disease as well as its complications. Early detection and treatment of the disease and its complications may reduce the morbidity and mortality of the children and adolescents with FCPD. The purpose of the present study was to determine the clinic-demographic characteristics and biochemical parameters of FCPD in children and adolescents.

Methodology

The retrospective study was conducted at the data retrieval center and in the department of Paediatric of BIRDEM hospital for five years from January 2002 to December 2006. Seventy two cases of FCPD diagnosed during the study period that have complete data record. All diagnosed cases of FCPD admitted in the department of pediatric of BIRDEM hospital from January, 2002 to December, 2006 who had complete information that were required for the study. Children and adolescents who are less than 18 years of age were included as study population. FCPD patients aged 18 years or more and children with other forms of diabetes mellitus. Data were retrieved from the data retrieval center at BIRDEM as well as from the department of paediatric with the help of patient register book and clinical history sheet. Patients having typical signs and symptoms of DM (increase thirst, increase frequency of micturition, increase appetite, weight loss) as well as pancreatic calcification and fibrosis on abdominal x-ray and ultrasonography were diagnosed as FCPD. Data was recorded with the help of preformed data collection sheet. Patients personal information, socioeconomic status, presenting complain during admission, physical examination findings, laboratory investigations supporting the diagnosis and determining the complications and complications of the disease that presented the patient during the period of admission were recorded in the data collection sheet.

Results

A total number of 72 patients were enrolled for this study. Majority were in the age group of 11-15 years which was 50 (69.4%) cases followed by 16-18 years and 5-10 years age group which were 17 (23.6%) cases and 5 (6.9%) cases respectively. The mean age of the study population was 13.92 (1.972) years (Table 1).

Table: 1. Distribution of the patients by age group (n=72)

Age group	Frequency (%)	Mean (SD)
5-10 years	5 (6.9%)	
11-15 years	50 (69.4%)	13.92 (1.972)
16-18 years	17 (23.6%)	
Total	**72 (100.0%)**	

Pie chart showing only 21% had family history of Diabetes Mellitus and rest 79% had no family history of Diabetes Mellitus (Figure 1).

Figure 1: Distribution of the patients by family history of DM (n=72)

Table 2: Distribution of the patients by Clinical characteristics (n=72)

Symptoms	Frequency	Percentage
Typical symptoms* of DM	51	70.83
Abdominal pain	49	68.1
Chronic Diarrhoea	26	36.11
Acetonuria	12	16.7

Multiple responses; *typical symptoms: polyuria, polydipsia, increase appetite, weight loss

Typical symptoms of DM were reported in 51(70.83%) cases. Abdominal pain was complained by 49(68.1%) cases. Chronic diarrhoea was reported by 26(36.11%) cases. Acetonuria was found in 12(16.7%) cases (Table 2).

Table 3: Glycaemic status among the patients with Fibrocalculous pancreatic Diabetes (n=72)

Parameter	Mean & SD	Range
FBS (mmol/L)	18.833 6.128	6.1-37.0
2 hrs ABF (mmol/L)	26.75 6.56	5.7-41.6
HbA1c (%)	16.58 4.07	8.9-37.2

*FBS= Fasting blood glucose; 2 hrs ABF =Blood glucose 2 hours after breakfast

The mean fasting blood sugar was 18.833 6.128 mmol/L with a range of 6.1 to 37.0 mmol/L. The mean two after breakfast was 26.75 6.56 with a range of 5.7 to 41.6 mmol/L. The mean HbA1c (%) was 16.58 4.07 (Table 3).

Table 4: Distribution of patients by complications

Parameter	Frequency	Percentage
Cataract	17	47.2
Hypoglycemia	9	25.0
Peripheral neuropathy	5	13.9
Nephropathy	3	8.3
Retinopathy	1	2.8
Total	**35**	**100.0**

Plain X-ray of abdomen showed multiple large, rounded, discrete shadows confined to the pancreatic duct in all 72(100.0%) cases. USG of pancreas showed dilated pancreatic duct with multiple echogenic structures within the duct in all 72(100.0%) cases (Table 5).

Discussion

Bangladesh is a tropical developing country and it has a significant number of children and adolescent with FCPD. One study in Bangladesh Institute of Research and Rehabilitation for Diabetes Endocrine and Metabolic Disorder (BIRDEM) showed that the percentage of FCPD of children under 18 years was 29.6%[7]. FCPD is predominantly a disease of youth and the usual age at onset is between 20-40 years[8]. Although the aetiology of FCPD is still unclear, the role of micronutrient (antioxidant) deficiency is emerging as a possible aetiologic or predisposing factor. The contribution of genetic factor and environmental toxins are cyanogenic glycosides or other

nutritional/ toxic factors, merit further study[9]. There are characteristic feature of FCPD radiologically, ultrasonographically, on endoscopic retrograde cholangiopancreatography and on histopathology which distinguish it from chronic pancreatitis of other aetiologies seen in temperate zone, e.g. alcoholic chronic pancreatitis[9]. The cardinal triad of FCPD is abdominal pain, pancreatic calculi and diabetes. In the natural history of FCPD quite often the first manifested symptom is abdominal pain. The diabetes is usually severe. Most patients require insulin for control of their diabetes.

Table 5: Imaging findings of pancreas of the study population

Imaging	Findings	Frequency	Percentage
Plain x-ray abdomen	Multiple large, rounded, discrete shadows confined to the pancreatic duct	72	100
USG of pancreas	Dilated pancreatic duct with multiple echogenic structures within the duct	72	100

This hospital based study was done on 72 patients to know the clinical characteristics of Fibrocalculous Pancreatic Diabetes (FCPD) in BIRDEM Hospital, during 2002-06. Their mean age was 13.92 (SD 1.972) years and range was 7-17 years. Majority 50(69.4%) of the patients were from 11-15 years age group. 17(23.6%) patients were from 16-18 years age group and rest 5(6.9%) were from 5-10 years age group. FCPD is predominantly a disease of youth and the usual age at onset is between 20-40 years[9].

The sex distribution shows that, majority 58(81%) were female and rest 14(19%) were male. Female preponderance was also found in other national[7] and international studies[14]. The reason behind female preponderance was unexplained. About 49(68%) of the respondents were from rural areas and rest 23(32%) were from urban areas. Fibrocalculous Pancreatic Diabetes (FCPD) was found more among rural people in other studies[10]. The level of education of the respondents showed that majority 34(47.2%) were from primary level, 24(33.3%) were from secondary level and rest 14(19.4%) had no education. About 21% had positive family history and rest 79% had absent family history of Diabetes Mellitus. This result accords with the studies of Mohsin et al[7] were about 30% had positive family history of Diabetes Mellitus.

Clinical characteristics in patients with Fibrocalculous pancreatic Diabetes, shows that majority 51(70.83%) presented with typical symptoms of DM, 49(68%) had abdominal pain, and 26(36.11%) had chronic diarrhoea. The cardinal triad of FCPD is abdominal pain, pancreatic calculi and diabetes. In the natural history of FCPD quite often the first manifested symptom is abdominal pain. Abdominal pain was found very common in other national and international studies[11-12].

Glycaemic status among the patients with Fibrocalculous pancreatic Diabetes shows that, Fasting blood glucose 18.833 (SD 6) mmol/L and range was 6.1-37.0, Blood glucose 2 hours after breakfast 26.75 (SD 6.56) (mmol/L) and range was 5.7 to 41.6, and HbA1c level was 16.58 (SD 4.07) and range was 8.9 to 37.2%. This findings show very high blood glucose level and poor glycemic control of the study population. This finding is similar with many other studies[9-10] with FCPD patients.

In this study distribution of study population by complications shows that, majority 17(23.6%) had cataract, among them 15(88.2%) were girls and rest 2(11.8%) were boys. Five (5) patients (6.9%) had peripheral neuropathy and all were girls. Three (3) patients (4.2%) had nephropathy and 1 patient (1.4%) had retinopathy. About their associated problems, 16(22.2%) had skin disease and majority of the suffers were girls, 15(20.83%) had urinary tract infection and 9(12.5%) had bilateral parotid swelling. Current studies have shown that various micro vascular complications occur in FCPD patients[9]. It was found that prevalence of retinopathy or neuropathy was similar in FCPD patients and type 2 diabetic patients. Nephropathy and left ventricular dysfunction also occur in FCPD patients. Rema et al[14] reported advanced retinopathy in FCPD patients, which has been confirmed by others. Only one (1.4%) patient developed DKA. This finding is similar with another study13 which shows that patients with FCPD rarely develop ketoacidosis even if their insulin injections are withdrawn for prolonged period.

In this study Plain x-ray abdomen and USG of pancreas were done of all the selected patients that revealed pancreatic calcifications. Other studies[7,9,13] described the same imaging findings of the pancreas.

Conclusion

Majority of FCPD were female coming from rural areas with poor socio-economic status which needs attention. Early detection and treatment of the disease and its complications may reduce the morbidity and mortality of the children and adolescents with FCPD.

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