Young-onset Diabetes in Central Kerala –A Preliminary Report

Annie Abraham & P. J. Geevarghese

ABSTRACT

Out of a total of 1603 patients, 58 patients had the onset of diabetes below 20 years . The most common type of diabetes was IDDM (67%) , followed by FCPD (19%) and NIDDM (14%). The number of FCPD patients in Kerala are decreasing. The IDDM group has more of congenital anomalies and viral infections, prone to ketosis, and required on an average of 44 units of insulin per day for control of diabetes, whereas the FCPD group had the lowest BMI, no ketosis, all had pancreatic pain and calculi and required 61 units of insulin per day. NIDDM patients had a strong family history of diabetes as compared to the other groups, suggesting genetic factors in its causation . Retinopathy is present in all three types after 5 years of the onset of diabetes but it is of earlier onset FCPD and of later onset in NIDDM.

INTRODUCTION

The incidence of childhood diabetes-onset below of twenty years of age, in hospital and diabetic clinics of our country, is reported to be below 2% (1,2,3,). However, a higher incidence upto 10% (4) has been found in Keralastate, due to high prevalence of fibrocalculous diabetes (FCPD). Although there are other studies on insulin dependent diabetes mellitus (IDDM) (5, 6, 7, 8, 9) and FCPD (10), we conducted the present study in order to find out the relative incidence of both IDDM and non-insulin dependent diabetes Mellitus (NIDDM) according to the WHO classification (11) , adding the third category of FCPD that is prevalent in tropical countries in this young age group. We have also made an attempt to find out the probable causes of these three types, and the development of retinopathy in relation to the duration of diabetes in each of these three groups.

MATERIAL AND METHODS

Out of 1603 patients attending our diabetic clinic from May 1985 to April 1989, 58 patients with onset of diabetes below 20 years of age formed the material for this study. They were admitted to the hospital, treated with insulin or oral hypoglycemic agents (OHA) and grouped into three categories. Those who did not respond to OHA were put on three daily injections of soluble insulin. There were 50 such patients. Eleven of them who had pancreatic pain in the past, before the onset of diabetes and also pancreatic calculi on plain x-ray of the abdomen were put under the category of FCPD . The remaining 39 of the 50 patients who required insulin had no pancreatic calculi and they were put under the category of IDDM. Eight patients out of the total of 58 subjects could be controlled with OHA and were put under the group of NIDDM, although three of them had to be changed over to insulin later, due to development of retinopathy in two and secondary failure to OHA after six years use in one.

TABLE 1
Data for classification

	Total (58)		IDDM (39)		NIDDM (8)		FCPD (11)	
	No	%	No	%	No	%	No	%
BMI		19.45		19.06		21.3		18
INSULIN	53	91.38	39	100	3	37.5	11	100
OHA	5	8.62	-	-	5	62.5	0	0
KETOSIS	12	20.7	12	30.8	-	-	-	
ABDOMINAL PAIN	19	32.76	8	20.5	-	-	11	100
PANCREATIC CALCULI	11	18.97	-	-	-	-	11	100

From: St. Mary's Diabetic Centre, S.R.M. Road, Cochin-632 018. Kerala.

RESULTS

The detailed criteria for grouping the 58 patients into the three categories of IDDM, NIDDM, and FCPD are given Table 1.

The incidence, male to female ratio and age of onset of diabetes in the three groups is shown in Table 2.

The mean age of onset of diabetes in IDDM was 12.4 years, in NIDDM 18 years and FCPD 17.

The causative factors in the three types are:

1. Viral infections prior to the onset of diabetes in 14 cases, IDDM 11, NIDDM 1 and FCPD 2 patients . In IDDM patients with viral infections, viral hepatitis was present in 43%, mumps in 29% and chicken pox in 7%.

2. Congenital anomalies in 4 patients (6.9%), of these 3 were of IDDM group-one having congenital blindness in one eye, the second with congenital icthyosis and the third having loss of hearing and speech from birth. Left renal agenesis was detected by CT scan of the abdomen in a child of the NIDDM group.

3. A family history of diabetes in first and second degree relatives was obtained in 20 patients; in IDDM 12, NIDDM 6 and in FCPD 2. Family history was strong in NIDDM with first degree relatives having diabetes in 62.5% , more than two members of the family (in one case 12 members) having diabetes in 67% and vertical transmission in 25%.

Diabetic retinopathy was present in 12 out of 58 patients (20.69%); in IDDM it was present in 7, in NIDDM 2 and in FCPD 3. Patients with retinopathy were classified into three further groups based on the duration of diabetes is tabulated below.

Proliferative Retinopathy with vitreous haemorrhage was present in two patients (3.4%) of the FCPD groups. Both these patients had nephropathy and hypertension as well and one died in renal failure.

DISCUSSION

Although the incidence of childhood diabetes is reported to be less than 2% (1,2,3), we have noted a higher incidence of 3.6% in the present study. This is due to the 11 cases of FCPD which is still prevalent in Kerala. However, FCPD is less in Kerala now, as previous reports from Kerala in 1965 had shown an incidence of 10% (4).

In the categorisatin of these three types of diabetes, BMI is taken as an index of protein deficiency which is a feature of FCPD patients. In our present study, the average BMI was 18 in FCPD, 19 in IDDM and 21 in NIDDM.

TABLE 2
INCIDENCE, AGE OF ONSET AND SEX DISTRIBUTION

	Total (58)		IDDM (39)		NIDDM (8)		FCPD (11)	
	No	%	No	%	No	%	No	%
INCIDENCE	58	3.61	39	67.24	8	13.79	11	18.97
MALE FEMALE RATIO	25:33	1:1.3	20:19	1:1	3:5	1:1.6	2:9	1:4.5
AGE OF ONSET OF DIABETES								
< 5 yrs	5	8.62	5	12.8	-	-	-	-
6-15 yrs	27	46.55	22	56.4	2	25	3	27.3
16-20 yrs	26	44.83	12	30.8	6	75	8	72.7

TABLE 3
Incidence of Diabetic retinopathy and relation to duration of diabetes

	Total (58)		IDDM (39)		NIDDM (8)		FCPD (11)	
	No	%	No	%	No	%	No	%
Duration of Diabetes								
< 5 yrs	23	39.65	15	38.5	3	37.5	5	45.4
6-15 yrs	23	39.65	17	43.6	4	50	2	18.2
16-30 yrs	12	20.7	7	17.9	1	12.5	4	36.4
Retonopathy Incidence	12	20.69	7	17.95	2	25	3	27.3
Relation to Duration of Diabetes								
< 5 yrs	-	-	-	-	-	-	-	-
6-15 yrs	3	13.04	1	5.9	1	25	1	50
16-30 yrs	9	75	6	85.7	1	100	2	50

Therefore, we consider BMI a reliable index to distinguish NIDDM from the precalcific stage of FCPD. Another feature of FCPD is the absence of ketosis. Since both IDDM and FCD are insulin-dependent and ketosis is present in 30.8% of our IDDM patients only, ketosis is a helpful point to distinguish IDDM from FCPD in the absence of pancreatic calcification.

In this connection, it has to be emphasized that 8 of our 39 cases of IDDM had abdominal pain, suggestive of pancreatitis in childhood but no calculi were detected even on CT scan of the abdomen in 4 of them. None of them had ketosis either, and therefore only follow-up will show whether they will change over to FCPD.

The mean age of onset of diabetes was lowest, 12.4 in IDDM as compared to 18 years in NIDDM and 17 years in FCPD. Since IDDM has the lowest mean age of onset congenital anomalies and viral infections could be more common in them. In our study there were 3 patients in IDDM group with these anomalies such as congenital blindness in one eye, congenital icthyosis and loss of hearing and speech from birth. The incidence of viral infections such as viral hepatitis and mumps were also highest in the IDDM group (28.2%).

The cause of diabetes in fibrocalculous pancreatic disease can be partly explained by the amount of insulin required for control of diabetes . In the FCPD cases in our study, the average daily requirement was 61 units and in IDDM 44 units. This higher dose in FCPD could be due to relative preservation of A cells with destruction of B cells in the pancreas as a result of pancreatitis.

A strong family history of diabetes in first degree relatives in 62.5% cases, involving multiple members in 67%, and vertical transmission in 25% shows the importance of heredity in NIDDM, whereas in IDDM and FCPD, family history was elicited only in 30.8% and 18.2% respectively.

The incidence of retinopathy in childhood diabetes reported in other studies in India varies from 24.6 to 44% (5,7,9). In our patients, the overall incidence was 20.7%. As usual, retinopathy was absent in all three groups with diabetes of less than 5 years duration. However, it has to be emphasized that with a duration of 6-15 years, retinopathy was more in FCPD group (50%) and less in the others, 25% in NIDDM and 5.9% in IDDM, whereas with a duration of 15-30 years, it was less in FCPD (50%), more in IDDM (86%) and maximum in NIDDM (100%) , suggesting that in the late stage of pancreatic failure, malnutrition may protect a

patient from retinopathy in FCPD. Proliferative retinopathy also occurs in FCPD as observed in our previous studies (12,13,14) and in two cases in the present one, as also reported by Mohan and his group (15).

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