A study of magnitude of diabetes and its management in chronic pancreatitis

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Abstract

Background: Chronic pancreatitis is a heterogeneous disease which leads to endocrine and exocrine dysfunction. Diabetes in chronic pancreatitis is important. Diabetes can develop by consequences of other diseases too.

Aim: To assess the magnitude of Diabetes in Chronic Pancreatitis subjects.

Materials and Methods: A cross sectional study was done among chronic pancreatitis subjects. The age group studied was between 25-60 years. The study period was 6 months. The sample size was based on case records. HbA1c levels were measured at 0th day (registration), 3rd month and 6th month. Data was collected with regard to alcohol consumption and smoking habits.

Results: The study group ranged between 25 to 60 years, 60 was males and 3 females. The HbA1C levels were measured and subjects classified. A total of 53 subjects were diabetic. 8 subjects were started on OHA and 45 subjects on insulin. The HbA1C levels were measured again at the end of 3rd month. The subject's on OHA there was not much of reduction in HbA1C levels so they were stated on insulin. At the end of 6 months there was significant decrease in HbA1C levels when compared to OHA.

Conclusion: Our study suggests that diabetes is common in chronic pancreatitis. Diabetes in chronic Pancreatitis was more in smokers. This study also suggests insulin therapy is more effective than OHA in chronic pancreatitis

Keywords: Chronic pancreatitis (CP), Oral hypoglycaemic agents (OHA), Insulin.

Introduction

Chronic pancreatitis leads to both endocrine and exocrine dysfunction. Chronic pancreatitis secondary to any cause may lead to permanent diabetes, which is difficult to control. Diabetes mellitus is defined by persistent hyperglycaemia.[1]

Type 2 diabetes is the most prevalent form, which is identified initially by impaired insulin sensitivity and thereafter by an inadequate insulin response. Diabetes can also develop as a direct consequence of other diseases, including diseases of the exocrine pancreas. Diabetes due to diseases of the exocrine pancreas was described as pancreatogenic diabetes mellitus, but literature refers to it as type 3c diabetes. The origin of this term is attributed to a table published annually by the American Diabetes Association until 2014.[2]

The most common identified cause of type 3c diabetes is chronic pancreatitis. For instance, in a large single-centre review, the distribution of causes for type 3c diabetes consisted of chronic pancreatitis (79%), pancreatic ductal adenocarcinoma (8%), haemochromatosis (7%), cystic fibrosis (4%), and previous pancreatic surgery (2%).[3] Chronic pancreatitis is a heterogeneous disease. Worldwide, alcoholism is the most common cause of chronic pancreatitis.[4,5]

There has been no systematic nationwide study on the clinical profile of subjects with chronic pancreatitis from the Indian subcontinent, although many sporadic reports from some regions exist in the medical literature.[6]

Here in our study, we have aimed to assess the magnitude of Diabetes in Chronic Pancreatitis and to evaluate glycemic control with oral hypoglycaemic agents (OHA) and insulin in diabetes secondary to chronic pancreatitis.

Aim

To assess the magnitude of Diabetes in Chronic Pancreatitis subjects.

Objectives

1. To evaluate glycemic status in chronic pancreatitis
2. To evaluate glycemic control with oral hypoglycemic agents (OHA) and insulin in diabetes secondary to chronic pancreatitis.

Material and methods

Study design
Cross Sectional study.

Study period
From July 2019 to December 2019.

Study population
All adults above the age 21 reporting to out-patient in the department of medicine**.**

Inclusion criteria
All subjects with chronic pancreatitis above age 21 willing to give consent for study were included.

Exclusion criteria
Severely ill and multiple comorbid conditions. Already known cases of diabetes and patients with acute on chronic pancreatitis were excluded. Patients not will to give consent were excluded from the study.

Sample size

The sample size was calculated based on case records of admitted patients who presented with one or more of the complaints of the inclusion criteria.

A total of 63 case records of admitted patients were taken under the study. All the 63 subjects were included and evaluated.

Study variables

Measurements – HbA1c levels at 0th day (registration), 3rd month and 6th month

Habits- Smoking and alcohol consumption.

Treatment given to subjects

Out of 63 subjects 10 subjects have diabetes. Depending upon their HbA1c levels 8 subjects were started on OHA and 45 subjects on insulin. After 3 months based on the HbA1c levels all the 8 subjects were started who were on OHA were changed to insulin.

Data analysis

The collected data was coded, entered into Microsoft excel work sheet and exported to SPSS. Data was analyzed using SPSS version 21. Data is presented as percentage in categories and then presented as tables. Chi-square test used for test of significance, Odd's ratio and 95% confidence interval was used.

Result

Table 1: Distribution of subjects (chronic pancreatitis) according to age (n=63)

Age group	Number	Percentage
25-34	06	9.5
35-44	26	41.3
45-54	13	20.7
> 54	18	28.5
Total	63	100%

Table 1 shows age group ranged between 25-60 years. Out of the 63 subject's majority affected belonged between ages 35-44 years. 18 subjects were above 54 years and 13 and 6 subjects were between 45-54 years and 25-34 years respectively (Table 1).
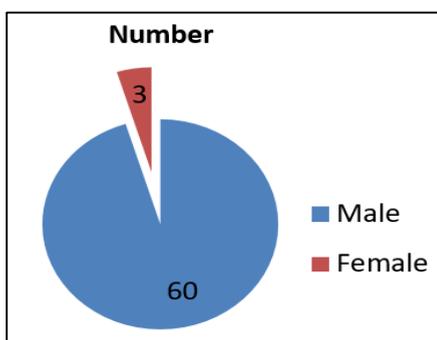

Fig. 1: Distribution of subjects according to sex (n=63)

The sex distribution, males were 60 and females 03.[Fig. 1]

Table 2: Distribution of subjects according to hba1c levels at time of registration (n=63)

HbA1c levels	Number	Percentage
>6.5 mg/dl	53	85
<6.5 mg/dl	10	15
Total	63	100%

The HbA1C levels were measured for all the subjects. 53 subjects had HbA1C above 6.5 mg/dl and the remaining 10 subjects levels were below 6.5 mg/dl (Table 2).

Table 3: Distribution of subjects according to smoking and alcohol consumption (n=63)

Variable	Yes	No	Total
Smoking	44	19	63
Alcohol	46	17	63

Addictions were taken into consideration namely smoking and alcohol consumption. Out of the 63 subjects 44 were smokers and 46 alcoholics (Table 3).

Table 4: HbA1c levels at time of registration (n=53)

HbA1c levels	Number	Percentage
7-8.5mg/dl	8	15%
>8.5mg/dl	45	85%
Total	53	100%

At the time of registration the 8 subjects had HbA1c levels between 7-8.5 mg/dl and 45 subjects levels were above 8.5 mg/dl (Table 5).

Table 5: HbA1C levels at the 3rd month (n=53)

Type of treatment	HbA1c levels	Number	HbA1c levels	Number
OHA	7.7-7.9 mg/dl	3	>8 mg/dl	5
Insulin	7.5 mg/dl	39	>7.5mg/dl	6
Total		42		11
Total			42+11=53	

Table 4 shows the HbA1c levels after starting the subjects on OHA and insulin respectively. 8 subjects who had HbA1c between 7-8.5 mg/dl were started on OHA the HbA1c level reduced to 7.7 – 7.9 mg/dl in 3 subjects and 5 subjects had HbA1c above 8 mg/dl. Whereas 45 subjects who had HbA1c levels >8.5 mg/dl were started on insulin, among them 39 subjects at the end of three months HbA1c was 7.5mg/dl and 6 subjects levels were >7.5 mg/dl.

Table 6: HbA1C levels at the 6rd month (i.e. at the end of 3 months treatment from OHA changed to insulin (n=53)

HbA1c levels	Number	HbA1c levels	Number
7.1 mg/dl	7	>7.1 mg/dl	1
<6.9 mg/dl	43	>6.9 mg/dl	2
Total	50		3
Total subjects	50+3=53		

Table 6 shows all the subjects who were on OHA for 3 months were changed to insulin therapy. At the end of six months the 8 subjects who were on OHA previously, 7 subjects had their HbA1c at 7.1 mg/dl and only subject had levels above 7.1 mg/dl. Whereas 45 subjects who were started on insulin at the end 6 months had levels <6.9 mg/dl (43 subjects) and only 2 subjects had levels >6.9 mg/dl.

Table 7: Effectiveness of OHA and insulin in chronic pancreatitis subjects

HbA1c levels	OHA (changed to insulin)	Insulin	p-value
6.9-7.1mg/dl	7	43	p<0.02

The final outcome after the subjects who were changed to insulin after 3 months of OHA and subjects on insulin therapy since registration there was a reduction in HbA1c levels significantly. This was statistically proven too (p<0.02) that insulin is more effective and rapid acting than OHA among chronic pancreatitis (Table 7).

Discussion

In the present study subjects with CP who smoked and had alcohol consumption were at a higher risk of diabetes mellitus which are similar to other studies conducted. Chronic pancreatitis patients with history of alcohol abuse or smoking carried a 2.0-fold (HR, 1.96; 95% CI, 1.49–2.57; P< 0.001) or 1.4-fold (HR, 1.37; 95% CI, 1.05–1.77; P = 0.02) increase in DM risk, respectively.[7] 3 independent risk factors for DM development were identified: male sex (HR, 1.51; 95% CI, 1.08–2.11; P = 0.02), alcohol abuse (HR, 2.00; 95% CI, 1.43–2.79; P< 0.001), steatorrhea.[8] We also observed a positive correlation between alcohol abuse and DM in our study and similar findings was seen in study by Cote GA, Yadav D et al (HR, 2.00; 95% CI, 1.43–2.79). Alcoholic cause is the most common etiology of CP in western countries.[8] In the present study subjects with CP who smoke are at a higher risk of diabetes mellitus which are similar to other studies conducted. Maisonneuve et al revealed that the risk of DM was higher in CP patients who were smokers than non-smokers, even independent of alcohol consumption.[9] Experimental results revealed that smoking might lead to insulin resistance in peripheral tissues,[10] and elevated level of catecholamines due to smoking might also cause insulin resistance.[11] The present study shows the reduction in HbA1c levels effectively after insulin being used. Out of the 53 subjects 50 subjects at the end of 6 months had their HbA1C levels below 7 mg/dl.

This suggests that insulin therapy is effective in chronic pancreatitis patients. The similar findings were seen in a study done by Moran A, Brunzell C, Cohen RC, et al. suggested that Oral hypoglycemic agents are not recommended in T3cDM, as they are not as effective as insulin in improving nutritional and metabolic outcomes [12] Another study by Philip C. Johnston, Judith Thompson et al. The main defect in CP-DM is insulin deficiency, for most patients, insulin is the mainstay of treatment and is initiated when oral therapy has not worked or there is uncontrolled hyperglycemia.[13]

Conclusion
Our study suggests that diabetes is common in chronic pancreatitis subjects. Diabetes in chronic Pancreatitis was more in smokers. This study also suggests insulin therapy is more effective than OHA in chronic pancreatitis.

Conflicts of Interest
None.

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