CHRONIC PANCREATITIS: RISK FACTORS AND CLINICO-RADIOLOGICAL PROFILE

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ABSTRACT

Chronic pancreatitis is a disease condition characterized by progressive inflammation and fibrosis of pancreas. It manifests with pain abdomen, endocrine and exocrine dysfunction. Diagnosis is often difficult and is relied mostly on radiological examination. The aim of this study was to identify associated risk factors and correlate the clinical presentation with various radiological changes of the pancreas.We conducted a prospective hospital based observational study in patients presenting with abdominal pain and evaluated the etiology, clinical presentation and radiological changes of pancreas among 68 chronic pancreatitis patients visiting Gastroenterology Unit, Department of Medicine, National Academy of Medical Sciences, Bir Hospital during 1 year period (November 2019 to October 2020 AD). The results showed mean age of 35.75 ± 11.43 years with predominant male patients (76.4%). Pain abdomen was present in all patients with mean duration of 16.5 months, followed by diabetes in 27.9%. Alcohol was the major risk (n=42, 61.8%) and no cause was identified in 22 (32.3%) patients. Pancreatic parenchymal calcification in 65 (95.6%), duct dilation in 61 (89.7%) and gland atrophy in 39 (57.3%) were major structural changes detected in computed tomography scan, more reliably than ultrasonography. One third of patients had diabetes mellitus, which was significantly higher in female (63.2%) and had major radiological changes of chronic pancreatitis at diagnosis. Alcohol was the common risk of chronic pancreatitis. Structural changes suggestive of disease was demonstrated better by computed tomography.

KEYWORDS

Alcohol, chronic pancreatitis, computed tomography, pain abdomen

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INTRODUCTION

Chronic pancreatitis (CP) is a syndrome of progressive inflammatory disorder characterized clinically by abdominal pain and endocrine-exocrine pancreatic insufficiency with severe impact on quality of life and long-term sequela.[1,2] Prevalence varies from 6-7/100000 in Europe[3] to 126/100,000 population in South India for idiopathic pancreatitis.[4] The median age of disease affection is 48 years. CP affects male and female in 6.5:1 ratio and mortality rate is approximately 17% at 59 months from the disease onset.[5]

Though 20% patients of chronic pancreatitis are incidentally diagnosed, most patients present with abdominal pain (epigastric, dull aching pain of constant or intermittent nature lasting several hours to even days, radiating to the back or laterally to the flanks) or sequela of pancreatic insufficiency like diabetes, weight loss and diarrhea.[6,7] Idiopathic (41%-67%), alcohol (34%-50%) and smoking (25%) remains the major associated risks of CP.[8-11] Cessation of alcohol intake and smoking in these patients is essential to slow disease progression and improve overall health.[3] Diagnosis is based on a combination of clinical findings, tests for endocrine and exocrine pancreatic insufficiency and radiological findings. Classical diagnostic findings on radiology are gland atrophy, calcification, ductal abnormalities.[7] Data regarding characteristics of CP in Nepal are very few. In this study, we aim to identify the associated risks, clinical presentation and radiological changes [ultrasonography (USG) and computed tomography scan (CT scan)] of chronic pancreatitis.

MATERIALS AND METHODS

This is a prospective, cross sectional, hospital based observational study among 68 CP patients conducted at Gastroenterology unit, Bir Hospital, National Academy of Medical Sciences after approval from the Institutional Review Board (IRB) from November 2019 to October 2020 AD. Patients of age eighteen years and above, with pain abdomen undergone ultrasonography examination with any evidence of chronic pancreatitis were further assessed with computed tomography scan for gland atrophy, calcification and ductal abnormalities were included. Patients not providing consent, pregnant and other causes of pain abdomen were excluded. The most characteristic imaging features defined are pancreatic atrophy (size less than 21 mm, 14 mm and 7 mm in head, body and tail respectively), calcification and ductal abnormalities (dilation if > 3 mm in the head and 2 mm upstream if stricture or irregular contour) currently in practice as standard reporting system in use in radiology.[12] Burnout disease causes endocrine insufficiency of which diabetes mellitus is common and is diagnosed by clinical and laboratory examination. Fasting blood glucose ≥126mg/dl, random plasma glucose ≥200mg/dl with symptoms of hyperglycemia or HbA1c ≥6.5% was considered diabetes mellitus in our study as defined by American Diabetes Association.[13] Chronic diarrhea was defined clinically as passage of more than three stools/day for 4 weeks.[14] Ascites was defined by presence of peritoneal fluid by imaging and raised ascitic amylase greater than five times the upper limit of normal value. Presence of jaundice was defined as serum bilirubin level greater than 1.5 mg/dl, hypercalcemia and hypertryglyceridemia associated pancreatitis if the serum calcium was >11mg/dl and triglyceride level was >1000mg/dl respectively.[14] Alcohol use problem was defined as consumption of >14 standard drinks/week in male and >7 standard drink/week in female[15] and smoking consumed if on daily basis for more than 5 years. USG changes were then compared with CT changes for diagnostic characteristics and correlation was done with various clinical features.

Statistical Analysis: Data was processed in Microsoft Excel 2010 and analysis done in SPSS version 16.0. The data analysis tools are descriptive (frequency table with percentage) as well as inferential (t-test, chi-square test, kappa value). The P-value< 0.05 was taken as significant statistical differences.

RESULTS

The mean age was 35.75 ± 11.43 years. Fifty two patients (76.4%) were male among them 8 (11.7%) were under 20 years of age. The most common associated risks were alcohol (61.7%), followed by smoking (45.5%) and idiopathic (32.3%) as shown in table 1. Two male patients had positive family history of pancreatitis. Alcohol intake and smoking were significantly higher in male than female. None of the patients had hypertriglyceridemia or hypercalcemia as cause of CP.

All patients presented with pain abdomen of average duration of 16.5 months, followed by diabetes (27.9%) which was significantly higher in female patients (table 2).

Table 1: Risk Factors

Parameters	Gender		Total	p-value
	Male	Female		
Smoking	29 (93.5%)	2 (6.5%)	31(45.59%)	0.006
Alcohol	20 (95.2%)	2 (4.8%)	42 (61.76%)	0.000
Smoking and alcohol	27 (93.10%)	2 (6.90%)	29 (42.65%)	0.000
Family history	2 (100%)	0 (0%)	2 (2.94%)	0.296
Idiopathic	8 (36.36%)	14 (63.63%)	22 (32.35%)	0.000

Table 2: Clinical Presentation

Presentation	Sex		Total	p-value
	Male	Female		
Pain abdomen	52 (76.4%)	16 (23.9)	67 (98.53%)	0.765
Diarrhea	4 (100%)	0 (0%)	4 (5.89%)	0.566
Diabetes	7 (36.8%)	12 63.2%	19 (27.94%)	0.000
Ascites	10 (100%)	0 (0%)	10 (14.71%)	0.135
Jaundice	6 (75%)	2 (25%)	8 (11.76%)	0.917
Abdominal lump	9 (100%)	0 (0%)	9 (13.24%)	0.172

Pancreatic calcification (95.5%), duct dilatation (89.7%) with average duct size of 6.33mm and atropy (57.3%) were the commonest features identified by CT scan with higher diagnostic reliablity than USG (44.1%, 45.5%, 29.4% respectively). Pseudocyst was present in 21 (30.88 %) patients with mean size of 7.86cm. Intraductal calculi was also detected in greater proportion by CT scan i.e, 33 patients (48.5%) with mean size of 4.85 mm. All the radiological features of CP studied were detected significantly in higher frequency by CT scan than USG with moderate agreement as shown in table 3.

Diabetic patients had a mean pain duration of 18.6 months, longer than others (15.6 months), their mean fasting blood glucose level was 128.89 mg/dl and HbA1C of 8.07%. Diarrhea was an uncommon presentation (5.8%) and none reported steatorrhea. Clinical correlation with radiological changes demonstrated a significant pancreatic structural and ductal changes if patient had pain abdomen, diabetes,

Table 3: Radiological profile

Features		Method		Kappa value	p-value
		USG	CT scan		
Calcification		30 (44.12%)	65 (95.59%)	0.07	0.115
Calculi		14 (20.59%)	35 (51.47%)	0.277	0.004
Stricture		2 (2.94%)	10 (14.71%)	-0.052	0.551
Duct abnormality	Dilation	41 (45.59%)	61 (89.71%)	0.175	0.011
	Irregularity	11 (16.18%)	24 (35.29%)	0.449	0.000
Atropy		20 (29.41%)	39 (57.35%)	0.473	0.000
Pseudocyst		17 (25%)	29 (42.65%)	0.619	0.000

ascites and lump abdomen as shown in table 4. Majority of patients presenting with pain had ductal changes and calcification with almost 52.2% having intraductal calculi of varying sizes.

Nine patients (13.2%) had common bile duct dilatation with stricture causing jaundice in 8. 11.7% (8) had pleural effusion (6 left and 2 right). Other infrequent clinical findings includes portal vein thrombosis=3, weight loss=2, splenomegaly=2, long term use of nonsteroidal inflammatory drugs for pain abdomen=2. Pancreatic cystic neoplasm was detected in three patients and one patient had carcinoma of pancreas at diagnosis. Palpable abdominal lump was found in nine patients, predominantly the pseudocyst and pancreatic ascites in 10 male patients.

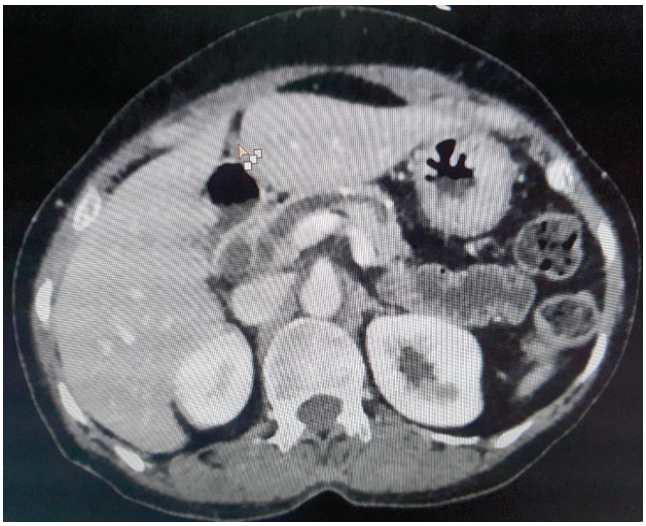

Fig. 1: CT scan image demonstrating atrophied pancreas with dilated duct and few parenchymal calcification

Table 4: Clinico- radiological correlation

Presentation	N	Features	USG	CT Scan	p-value
Pain abdomen	67	Duct dilation	31(46.27%)	61(91.04%)	0.034
		Calcification	29 (43.28%)	64 (95.52%)	0.000
		Calculi	14 (20.89%)	35 (52.24%)	0.000
		Irregularity	11 (16.42%)	24 (35.82%)	0.011
		Atropy	19 (28.36%)	38 (56.72%)	0.001
		Pseudocyst	16 (23.88%)	26 (38.81%)	0.063
Diabetes mellitus	19	Calcification	5 (26.32%)	19 (100%)	0.000
		Duct dilation	9 (47.37%)	19 (100%)	0.001
		irregularity	3 (15.79%)	8 (42.11%)	0.018
Jaundice	8	Calcification	4 (50%)	8 (100%)	0.002
		Duct dilation	5 (62.5%)	8 (100%)	0.20
		Pseudocyst	2 (25%)	4 (50%)	0.061
Ascites	10	Calcification	4 (40%)	9 (90%)	0.057
		Duct dilation	2 (20%)	9 (90%)	0.005
		Atropy	4 (90%)	9 (40%)	0.057
Abdominal lump	9	Calcification	4 (44.44%)	9 (100%)	0.029
		Stricture	2 (22.22%)	9 (100%)	0.002
		Duct dilation	3 (33.33%)	9 (100%)	0.009
		Atropy	3 (33.33%)	9 (100%)	0.009

DISCUSSION

In this study conducted at a referral hospital, chronic pancreatitis could be assessed in 68 patients during one year amid the Covid pandemic during study period. Mean age of affected patients was 35.75 ± 11.43 years, range 18-65 years. More than 2/3rd (76.4%) cases were male and 15.3% were of age below 20 years. Forty two (61.8%) patients were alcohol consumers, 31 (45.6%) were smokers and 22 (32.3%) had no identifiable risk factors. Alcohol and smoking were significantly higher in male patients. We observed relatively younger patients affected in whom assessment of genetic risks is important cause which is limited in our settings due unavailability of resources. Twenty nine (42.65%) patients had history of both alcohol use and smoking as shown in table 1.

Pain abdomen was present in all patients since it was considered as major inclusion criteria and is a frequent reason for hospital visits. Assessment of asymptomatic chronic pancreatitis is important because the diagnostic features used currently appear only with chronic inflammation and subsequent fibrosis. Development of pancreatic insufficiency results only when greater than 90% of the organ is damaged denoting a long asymptomatic course.[7,16] Diabetes was observed in 27.9%, predominantly in female, lower than reported from study from Eastern Nepal (n=37, 67.3%) and India (n= 1086, 40.5%).[9,17] Nine (13.24%) of our patients presented with palpable abdominal lump and 10 (14.71%) presented with ascites implicating the complications associated with disease at diagnosis itself. Only 4 patients complained diarrhea.

As the disease presents clinically only after greater proportion of irreversible of loss of function, detection at an early course and avoidance of risk factors and management of impending complications is the main stay of therapy for better quality of life.[3] No single method is defined as gold standard for diagnosis of CP, the combination of characteristic clinical, laboratory and radiological features defines irreversible inflammation and subsequent fibrosis suggestive of CP.[7] Most important radiological changes in disease include pancreatic parenchymal changes include gland atrophy, calcification, duct changes, pseudocysts and stricture.[7,18] Calcification, duct dilation, atrophy of gland were present in our study in higher frequency with better diagnostic reliability of CT scan than USG similar to others.[7,19] Atrophy (n=39, 57.35%) was more common than a study from Eastern Nepal (n=20, 36.4%).[9] Intraductal calculi of mean size 4.85 mm was identified in 35 (51.47%), demanding endotherapy to prevent further damage of gland. CT scan significantly detected pseudocyst in 29 (42.65%) versus USG in 17 (25%) (p value: 0.03) patients similar to study by Rosso *et al.*[20]

Pain and diabetes remains the major features at diagnosis. Both clinical manifestations were better correlated with the structural changes like atrophy, duct dilation, calcification, intraductal calculi as demonstrated in imaging studies implicating these features only develop after long standing pancreatic inflammation, as in our patients with mean pain duration of 16.5 months. This study also demonstrated common bile duct stricture in 9 (13.2%) patients as sequela of chronic pancreatitis. Diabetics had higher HbA1C level 8.04 ± 1.34 implying difficult to control. Few patients (4) also had pancreatic neoplasm which highlights the role of imaging in early diagnosis.

This study has several limitations. We couldn't diagnose asymptomatic CP patients which is a major step in management of disease in early stage to prevent complications. Outcome of therapies and study of genetic risk factors was limited by availability of resources. Moreover this is a hospital based study with small sample size. Larger population based studies are needed to estimate the disease burden and diagnose at an early stage for appropriate management.

In Conclusion, Chronic pancreatitis is a disease with significant morbidity. Alcohol was the main avoidable risk factor identified in our study. CT scan was key to diagnose structural changes of pancreas in chronic pancreatitis.

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