

Original Article

Pancreato-biliary Endoscopic Ultrasound in Opium Addicts Presenting with Abdominal Pain

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Abstract

Objective: Asymptomatic dilatation of bile duct and symptomatic sphincter of Oddi dysfunction have been reported in opium addicts. Except one case report, there is no report in the literature on endoscopic ultrasound (EUS) study of pancreato-biliary system in opium addicts. The aim of the present study was to report the EUS features of pancreato-biliary system in opium addicts presenting with abdominal pain.

Patients and Methods: A total of 15 opium addicts presenting with upper abdominal pain and dilated common bile duct (CBD) and or pancreatic duct (PD) on abdominal ultrasound were included in this study. EUS findings of pancreato-biliary system were analyzed in these patients.

Results: All the 15 patients were males (mean age 53.3 years) presented with upper abdominal pain. Mean duration of opium addiction was 20.1 years. On EUS CBD was dilated in all the patients while PD was dilated in six patients. Gall bladder, liver and pancreatic parenchyma was normal in all these patients. Surface area of papilla of Vater (SPV) was increased in 12 patients.

Conclusion: Opium addiction causes obstruction at ampulla and produces dilatation of bile duct and PD. Bile duct dilatation was seen in all the patients while PD dilatation was seen in few patients. Increase in SPV was a peculiar finding and appears to be as a result of direct effect of opium on ampulla.

Keywords: papilla of Vater; bile duct; endoscopic ultrasound; opium addict; pancreatic duct

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INTRODUCTION

It has been shown that opiates cause increase in the basic pressure and frequency of phasic contractions of sphincter of Oddi (SOD) causing increase in internal pressure of common bile duct (CBD) and its dilatation.^{1,2} Asymptomatic bile duct dilatation and symptomatic SOD dysfunction have been described in opium addicts.³⁻⁶ Dilated CBD is always seen in these patients while dilated pancreatic duct (PD) is seen in only a few patients. Except one case report⁷ there is no literature on endoscopic ultrasound (EUS) study of pancreato-biliary system in symptomatic opium addicts. In the present study, EUS findings of 15 opium addicts presenting with upper abdominal pain and dilated CBD and or PD on abdominal ultrasound (US) were reviewed and presented.

PATIENTS AND METHODS

A total of 50 opium addicts were seen by first author for pain upper abdomen between February 2011 and 2013. Patients with dilated CBD ($n = 15$) or PD ($n = 2$) on abdominal US and those who were subjected to EUS were included in the study. Liver function tests (LFT), serum amylase (S. amylase) and lipase, human immune-deficiency virus (HIV) antibodies, hepatitis B antigen, anti-hepatitis C virus were done in all the patients. Information about the amount of opium intake and route of administration was obtained from patients. History of alcohol intake was taken. One patient having severe pain abdomen was subjected to endoscopic retrograde cholangiopancreatography (ERCP) while all other patients were put on nifedipine 10 mg 3 times a day before meals and were asked to come for follow-up after 1 month. All the procedures were done after taking informed consent from the patients.

11 of these patients were subjected to radial and four patients were subjected to linear EUS using Olympus

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(GF-UE 160-AL5 and GF-UCT180-AL5) echoendoscopes. Procedures were carried out under conscious sedation using intravenous midazolam. In all the patients a detailed analysis of EUS findings of biliary tree, ampullary diameter and surface area of papilla of Vater (SPV), PD, pancreatic parenchyma, gall bladder and liver was done. For visualization of ampulla duodenal relaxation was achieved using intravenous hyoscine butylbromide and water was instilled into duodenum whenever required and the transducer was placed perpendicular to papilla of Vater.

CBD and PD were considered dilated if they measured more than 7 mm and 2 mm (in body of pancreas) respectively. Ampulla was considered enlarged if it measured more than 10 mm⁸ but actual SPV was calculated as suggested by Skalicky.⁹ The SPV above 25 mm² was considered abnormal. The SPV was calculated from a two dimensional measurement. The height (hPV) and width (wPV) of the hemispherical papilla of Vater were measured and SPV was calculated by using the equation: $SPV = hPV \times wPV/2$. It is known that the papilla of Vater (PV) is prism-shaped, so a correction factor (*F*_{kor}) was calculated on the basis of an isosceles triangular prism using the equation: $F_{kor} = P1/P2 + P3 = 1.27$ where *P*₁ represents the surface area of the virtual isosceles triangle at the bottom of the PV and *P*₂ and *P*₃ represent the surface area of the isosceles triangle on each side of the stylized hemispheric papilla. The SPV was calculated using this correction factor, as follows: Corrected SPV = SPV/*F*_{kor} = SPV/1.27.

In three patients after completion of EUS sublingual nifedipine was given and diameter of CBD was measured on abdominal US before and after 15 min after administration of nifedipine. All patients were asked to come for follow-up after 1 month and as and when required. A telephonic contact was also made with all the patients 6-12 month after procedure.

RESULTS

EUS findings of 15 opium addicts having dilated CBD and or PD on abdominal US and those who were subjected to EUS between February 2011 and 2013 were analyzed in the present study. All patients were males and the mean age was 53.3 years (35-70 years). Mean duration of opium addiction was 20.1 years (range: 05-40 years). All patients presented with upper abdominal pain. aspartate transaminase and alanine transaminase were raised less than 2 times upper limit of normal in five patients. Alkaline phosphatase was minimally raised in two patients. S. amylase and lipase were normal in all the patients. All the patients were negative for HIV, hepatitis B and C. All the 15 patients were having dilated CBD on abdominal US while PD was dilated in two patients. None of the patient in the present series underwent cholecystectomy in the past. Patients were consuming opium orally in various forms. Five patients were consuming crude dried milk of opium, 10-15 g/day, remaining patients were using powder of dried cover of opium fruit (3-5 kg/month) boiling in water and drinking the extract of boiled material (warm decoction). Three patients took alcohol for initial 3-5 years ranging in amount from 120 to 200 mL whisky/day but stopped due to poor financial position. Patient characteristics are shown in (Tab. 1).

Bile duct was dilated in all the patients (Figs. 1 and 2) while PD was dilated in six patients only (Fig. 3). Increase in SPV was seen in 12 patients (Fig. 4). Dilated bile duct in some cases appeared like choledochal cyst (Fig. 2). There was thickening of the wall of CBD in two patients. Results of EUS findings are shown in (Tab. 2). There was no correlation between CBD diameter and duration of opium addiction but PD dilatation was only seen in patients with more than

Table 1. Clinical characteristics of patients

Age (years)	Addiction (years)	Presentation	LFT	S. amylase/lipase	Abdominal US
45	15	Pain epigastrium	Normal	Normal	Dilated CBD, normal PD
38	20	Pain RUQ	Normal	Normal	Dilated CBD and PD
62	20	Pain RUQ, epigastrium	ALT↑, AST↑, ALP normal	Normal	Dilated CBD, PD normal
70	30	Pain whole upper abdomen	Normal	Normal	Dilated CBD, normal PD
64	15	Pain epigastrium, LUQ	Normal	Normal	Dilated CBD, normal PD
50	20	Pain epigastrium	Normal	Normal	Dilated CBD, normal PD
55	30	Pain RUQ, epigastrium	ALT↑, AST↑, ALP normal	Normal	Dilated CBD, normal PD
60	40	Pain RUQ, epigastrium	ALT↑, AST↑, ALP↑	Normal	Dilated CBD, normal PD
40	10	Pain whole upper abdomen	Normal	Normal	Dilated CBD, normal PD
52	15	Pain whole upper abdomen.	Normal	Normal	Dilated CBD, normal PD
50	12	Pain RUQ, epigastrium	ALT↑, AST↑, ALP normal	Normal	Dilated CBD, normal PD
60	20	Pain whole upper abdomen	Normal	Normal	Dilated CBD, normal PD
35	5	Pain whole upper abdomen	Normal	Normal	Dilated CBD, normal PD
52	20	Pain whole abdomen	Normal	Normal	Dilated CBD, normal PD
67	30	Pain epigastric	ALT↑, AST↑, ALP↑	Normal	Dilated CBD and PD

RUQ: Right upper quadrant; LUQ: Left upper quadrant; CBD: Common bile duct; PD: Pancreatic duct; ALT: Alanine transaminase; AST: Aspartate transaminase; ALP: Alkaline phosphatase; LFT: Liver function test; US: Ultrasound; S. amylase: Serum amylase

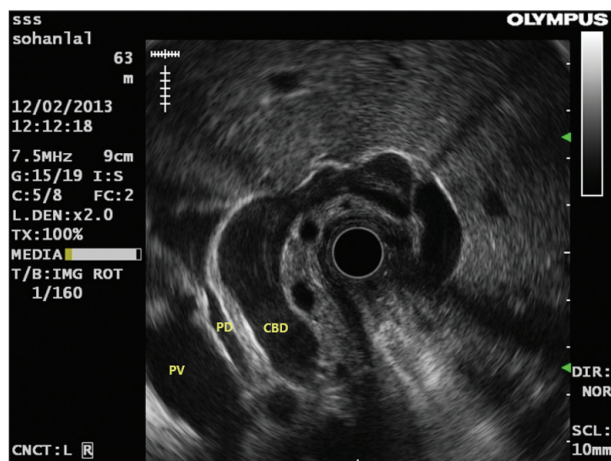


Figure 1. Radial endoscopic ultrasound showing grossly dilated extrahepatic bile duct and dilated pancreatic duct

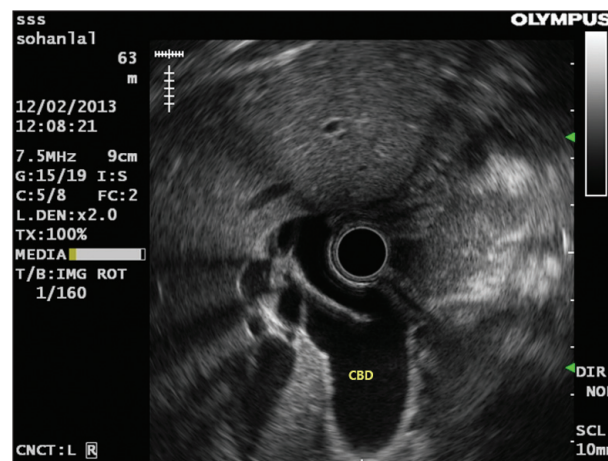


Figure 2. Radial endoscopic ultrasound showing grossly dilated common bile duct (CBD), and cystic duct with thickening of CBD wall

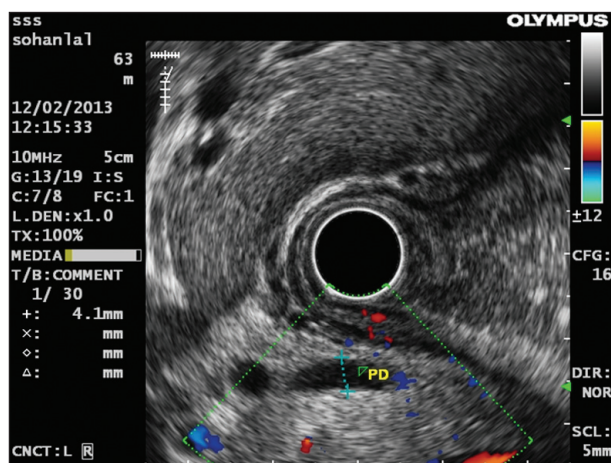


Figure 3. Radial endoscopic ultrasound showing dilated pancreatic duct in body of pancreas

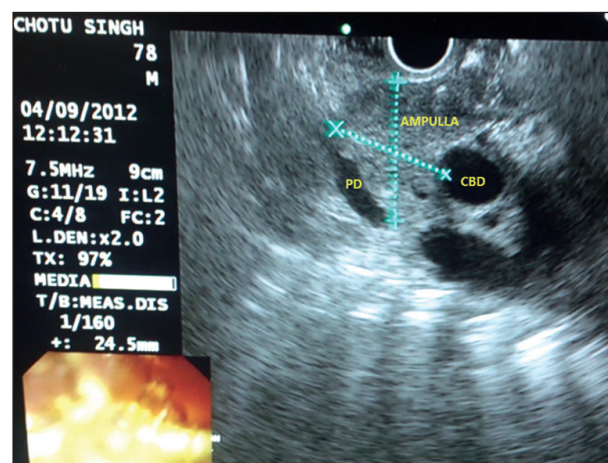


Figure 4. Linear endoscopic ultrasound showing enlarged ampulla with dilated common bile duct and pancreatic duct

15 years addiction. Pancreatic parenchyma was normal in all the patients and no changes of chronic pancreatitis were seen in any patient. Increase in SPV was maximal in patients with 10-15 years of addiction though it was seen in other addicts also irrespective of duration. Visible liver and gallbladder were also normal. Sublingual administration of nifedipine caused 1-2 mm decrease in diameter of CBD in two of three patients examined.

DISCUSSION

It has been shown that opiates cause an increase in the basic pressure and frequency of phasic contractions of SOD leading to increased CBD internal pressure and its dilatation.^{1,2} If the person is exposed to effects of opium for long time than there may be permanent dysfunction of SOD. Asymptomatic dilatation of bile duct³⁻⁵ and symptomatic SOD dysfunction with dilated CBD and or PD have been described in opium addicts.⁶ These patients present with

minimal pain due to high pain threshold because of opium addiction and diagnosis of underlying pancreato-biliary disorder often go unrecognized. In the present series all but one patient presented with mild upper abdominal pain and had dilated bile duct and or PDs on abdominal US. LFTs were minimally elevated in few patients while S. amylase and lipase were normal. Even in the presence of dilated CBD alkaline phosphatase was normal in majority of the patients. It is likely that CBD dilatation in opium addicts occur over a long period (many years) and this may be the reason behind normal alkaline phosphatase in these patients. At our center, we have been seeing symptomatic SOD due to opium addiction over last 13 years and we reported our initial experience in 2002.⁶ ERCP in these patients is associated with pancreatitis in up to 25% cases. Since symptoms are mild so we routinely treat these patients with oral nifedipine with good symptomatic relief. Those patients who do not respond to nifedipine are subjected to ERCP. In the present series, also all the patients were put on oral nifedipine and only one patient was subjected to ERCP due to uncontrolled

Table 2. Endoscopic ultrasound findings

CBD (mm)	PD (mm)	Ampullary diameter (mm) (height × width)	SPV (mm ²)
7	1.5	8×6	18.89
14	3.2	8×6	18.89
7	2.8	10×8	31.49
11	1.2	10×7	27.55
13.8	4.1	26×23	235.43
7.6	1.1	8×5	15.74
11	2.8	10×8	31.49
7.8	2.1	12×10	47.24
13	1.2	24.5×20	192.91
12	1.2	20×16	125.98
10	1.0	22×19	164.56
8.6	1.6	16×13	81.88
12	1.2	10×7	27.55
7	1.0	10×8	31.49
17.5	3.2	10×7	27.55

CBD: Common bile duct; SPV: Surface area of papilla of Vater; PD: Pancreatic duct

pain. Eight patients are on more than 1-year follow-up with good symptomatic relief.

There is only one case report in literature where double duct sign and hypertrophy of precapillary sphincter has been described on EUS in one patient of long standing opium addiction.⁷ The peculiar EUS findings in the present series were dilatation of CBD in all the cases while PD dilatation producing double duct sign was seen in six patients (40%) and increased SPV in 80% of patients. It appears that pancreatic sphincter is more resistant to the pharmacological effects of opium and also resistance offered by pancreatic parenchyma may contribute to less dilatation of PD. In the present study, there was no correlation between duration of addiction and the diameter of bile duct, but correlation between duration of addiction and CBD diameter has been reported by Farahmand *et al.*⁴ The bile duct diameter decreased in two of the three patients after sublingual administration of nifedipine meaning thereby that in some of the patients obstruction at the ampulla is dynamic for some duration and may become fixed if addiction continues. PD dilatation was uniform without any beading or strictures and pancreatic parenchyma was normal in all the patients. Dilatation of PD appears to be due to persistent increase in pancreatic sphincter pressure due to pharmacological effect of opium on ampulla, which is constantly under the effect of opium as the addicts consumes opium many times a day as the effect starts decreasing.

Bile duct was maximally dilated in extra hepatic part while IHBR dilatation was seen in only in one patient. In 12 patients increase in SPV was seen. It appears that oral intake of opium may exert some local effect on ampulla resulting in edema of ampulla or direct injury to ampulla. Mohammad Alizadeh *et al.*³

have described ulcerative and tumoral features in ampulla in opium addicts. Pre-sphincteric hypertrophy of ampulla was described in a case report by Malay and Balakrishnan.⁷ Routine abdominal US is much less sensitive than EUS to outline complete changes in pancreato-biliary system in opium addicts. Additional information like pancreatic parenchymal changes and study of ampulla are possible with EUS. EUS may help in planning endoscopic treatment specially those patients who do not respond to medical treatment. In these patients, sphincterotomy of PD or CBD sphincter can be decided by dilatation of that particular duct.

CONCLUSION

The present study describes peculiar pancreato-biliary EUS features in opium addicts. These features included dilated CBD mainly in extra hepatic part, dilated PD without any other changes of chronic pancreatitis, enlarged ampulla without mass lesion and normal liver and gallbladder. Ampullary enlargement was a peculiar feature in these patients. EUS should be the investigation of choice for complete evaluation of pancreato-biliary system in opium addicts.

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