

Original Article

Endoscopic Retrograde Cholangiopancreatography (ERCP) Experience in a Tertiary Level Hospital in Bangladesh

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Abstract

Background: Although endoscopic retrograde cholangiopancreatography (ERCP) was first described as a diagnostic technique, now-a-days we mainly do ERCP with a therapeutic intent for management of various biliary and pancreatic diseases. **Objectives:** This study intends to find out the diagnosis obtained by ERCP procedure and the therapeutic interventions done for appropriate cases in a tertiary level hospital in Bangladesh. **Materials and Methods:** This prospective observational study was performed in the Department of Gastroenterology in Enam Medical College & Hospital over a period from June 2014 to October 2016. Eighty patients, aged 15–70 years, were selected only for therapeutic ERCP. They were diagnosed and selected after taking history, physical examination and appropriate investigations. ERCP was done under short-term general anesthesia or deep sedation by using propofol or fentanyl. Results are shown in tables. **Results:** Majority of the cases were choledocholithiasis (53.75%) followed by cholangiocarcinoma (11.25%), ampullary carcinoma (8.75%), carcinoma of the gall bladder (6.25%), biliary ascariasis (6.25%), biliary stricture (5%), papillary stenosis (5%), chronic pancreatitis (2.5%) and sludge in the CBD (1.25%). Types of therapeutic intervention depended on diagnosis. Papillotomy with stone removal was done in patients with choledocholithiasis. Papillotomy with stenting was done in the patients with cholangiocarcinoma, ampullary carcinoma, gall bladder carcinoma, biliary stricture and papillary stenosis. Papillotomy with worm extraction was done in cases of biliary ascariasis. Papillotomy with clearing of sludge was done for sludge in the CBD and only papillotomy was done in two patients of chronic pancreatitis. **Conclusion:** In this study we found that choledocholithiasis and biliary tract malignancy were the two major ERCP findings. Therapeutic interventions were done according to diagnosis. The most common therapeutic intervention was papillotomy with stone removal. Next common intervention was papillotomy with stenting.

Key words: ERCP; Papillotomy; Stenting; Stone extraction

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Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) has evolved into an almost exclusively therapeutic procedure since its first description in the late 1960s as a diagnostic technique.¹ By using moderate sedation², ERCP is performed with a side-viewing duodenoscope that allows identification of the major

papilla and the bile duct is cannulated under endoscopic and fluoroscopic guidance. A variety of catheters, guide-wires, and stents are available to perform the therapeutic interventions. Diagnostic ERCP is still used for facilitating manometry in patients with suspected sphincter of Oddi dysfunction and for establishing the

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diagnosis of primary sclerosing cholangitis when other imaging techniques have been non-diagnostic.³

Now-a-days we mainly do ERCP with therapeutic intent in biliary tract disease for removal of common bile duct calculi, for palliation of malignant biliary obstruction, in management of biliary leaks/damage complicating surgery, for dilatation of benign strictures and primary sclerosing cholangitis. For pancreatic diseases, drainage of pancreatic pseudocysts and fistula are done and pancreatic calculi are removed in selected cases.⁴

Absolute contraindications for ERCP are refusal of the patients to undergo the procedure, unstable cardiopulmonary, neurologic, or cardiovascular conditions and existing bowel perforation. Structural abnormalities of the esophagus, stomach, or small intestine and an altered surgical anatomy may be relative contraindications for ERCP. The presence of acute pancreatitis is typically considered as a relative contraindication unless there is gallstone-related acute pancreatitis where therapeutic goal is to improve the clinical course by means of stone extraction. ERCP with sphincterotomy is relatively contraindicated in the presence of coagulopathy (INR >1.5 or platelet count <50,000/ μ L).⁵

Five major types of complications of ERCP may occur: sedation-related, pancreatitis, bleeding, perforation, and infection. Rates of post-ERCP pancreatitis vary because of differences in patient selection and operator level technique and experience.⁶

Study conducted by Rahman et al⁷ showed that the commonest malignant cause of obstructive jaundice was carcinoma of the pancreas (27%) followed by cholangiocarcinoma (15%) and periampullary carcinoma (8%). Bile duct stone was the commonest benign cause (32%) followed by papillary stenosis (13%) and round worm in biliary tree (5%). Data on ERCP findings and intervention are limited in Bangladesh. Therefore, this study intends to find out the diagnoses obtained by ERCP procedure done in Enam Medical College and Hospital in Dhaka, Bangladesh and the therapeutic interventions done for appropriate cases.

Materials and Methods

This prospective study was done in the Department of Gastroenterology, Enam Medical College & Hospital over a period from June 2014 to October 2016. Eighty patients, aged 15–70 years, with various biliary and pancreatic diseases were selected for therapeutic ERCP. All ERCP procedures were carried out using a PENTAX® Video Duodenoscope (EPK 1000; PENTAX Corporation, Japan). During ERCP short-term general anesthesia or deep sedation was given by using propofol or fentanyl. Patients who refused to undergo endoscopy or patients with an acute unstable cardiovascular or cardiopulmonary condition or severe coagulopathy were excluded from the procedure. Before ERCP each selected patient underwent upper GI video endoscopy to exclude any structural abnormalities in esophagus, stomach, or duodenum.

During ERCP a side-viewing duodenoscope was passed through the esophagus and stomach and into the second part of the duodenum. The major duodenal papilla was identified and inspected for any abnormalities. The minor duodenal papilla is also located in the second part of the duodenum and served as the access point for the dorsal pancreatic duct. Evaluation of the dorsal pancreatic duct with ERCP is rarely performed. After the papilla was examined with the side-viewing endoscope, selective cannulation of either the CBD or the ventral pancreatic duct was performed. Once the chosen duct was cannulated, either a cholangiogram or a pancreatogram was obtained fluoroscopically after injection of radio-opaque contrast material into the duct. Abnormalities that were visualized fluoroscopically were addressed by means of specialized accessories passed through the working channel of the endoscope.

Type of therapeutic intervention depended on diagnosis of the disease. Papillotomy with stone removal was done by balloon catheter or dormia basket for choledocholithiasis. Papillotomy with stenting was done for the management of cholangiocarcinoma, ampullary carcinoma, gall bladder carcinoma, biliary stricture and papillary stenosis. For biliary ascariasis papillotomy with worm extraction was done by dormia basket. Only papillotomy was done for chronic pancreatitis. Papillotomy with clearing of sludge was done for sludge in the CBD. After ERCP procedure patients were followed-up for any post-ERCP complications. All results are shown in the form of tables.

Results

Socio-demographic features

Total eighty selected patients underwent ERCP. Among them 33 (41.25%) were male and 47 (58.75%) were female with mean age 44.61 ± 15.46 years. Among the study subjects 74 (92.5%) were married and 6 (7.5%) were singles. Regarding occupation 43 (53.75%) were housewives, 15 (18.75%) were farmers, 10 (12.5%) were businessmen, 6 (7.5%) were service holders, 2 (2.5%) were day laborers, 1 (1.25%) was student, 1 (1.25%) was teacher and 2 (2.5%) were from other occupations. They came from various educational backgrounds, but mostly (35, 43.75%) they were illiterate. Monthly income was <5000 taka in 34 (42.5%), 5000 to 20,000 taka in 38 (47.5%) and >20,000 taka in 8 (10%) cases.

Clinical features

Most of the patients had multiple presenting

complaints — 73 (91.25%) presented with abdominal pain, 43 (53.75%) with fever, 46 (57.5%) with jaundice, 26 (32.5%) with weight loss, 50 (62.5%) with anorexia, 24 (30%) with itching, and 5 (6.25%) presented with pale stool. Forty eight (60%) patients had clinical signs of jaundice, 36 (45%) had anemia, 15 (18.75%) had scratch marks, 4 (5%) had skin hyperpigmentation, 4 (5%) had palpable gall bladder, 4 (5%) had hepatomegaly, 2 (2.5%) had ascites and one (1.25%) had palpable lump in epigastrium. Twenty nine subjects (36.25%) had history of abdominal operation and 3 (3.75%) underwent ERCP previously.

Investigations done prior to ERCP

All patients were routinely investigated prior to ERCP. Investigation findings are shown in Table I. Serum amylase and lipase levels were estimated in 24 and 35 patients respectively. In addition to these investigations every patient had USG of whole abdomen before ERCP. Results are shown in Table II.

Table I: Laboratory findings prior to ERCP (N=80)

Parameters	Values	Result	
		Number	Percentage
Hemoglobin level (gm/dL)	<8	10	12.5
	8–10	18	22.5
	10–12	42	52.5
	>12	10	12.5
Total leukocyte count (/cu mm)	<4000	3	3.75
	4000–11000	43	53.75
	>1100	34	42.50
Serum bilirubin (mg/dL)	<1.2	20	25
	1.21–2	15	18.75
	>2	45	56.25
SGPT (U/L)	<40	18	22.50
	>40	62	77.50
Alkaline phosphatase (U/L)	<120	23	28.75
	>120	57	71.25
Serum amylase (U/L) (n=24)	<100	3	12.50
	>100	21	87.50
Serum lipase (U/L) (n=35)	<60	10	28.57
	>60	25	71.43
HBsAg	Negative	76	95
	Positive	4	5

CT scan of the upper abdomen was done only in 11 patients before ERCP — six patients had bile duct dilatation and five patients had mass in the CBD on CT.

Upper GI endoscopy was done in all patients. Fifty patients (62.5%) had normal findings, 20 (25%) had gastritis, seven (8.75%) had peptic ulcer disease and three (3.75%) had deformed bulb. Side-viewing duodenoscopy was done in 80 patients; among them 36 patients had normal papilla with bile flow, 37 had normal papilla without bile flow and seven had ampullary growth.

Findings obtained on ERCP of the 80 patients are described in Table III. Choledocholithiasis (43) and biliary tract malignancies (9) were the two major ERCP findings. Therapeutic interventions done are described in Table IV. The most common therapeutic intervention was papillotomy with stone removal (43). Next common intervention was papillotomy with stenting (29).

Table II: USG findings prior to ERCP (N=80)

USG findings		Number	Percentage
Biliary stone	Gall bladder	3	3.75
	CBD	35	43.75
	Both GB and CBD	8	10
	Pancreatic duct	2	2.5
	Total	48	60
Biliary sludge		7	8.75
Bile duct dilatation	Intrahepatic	4	5
	Extrahepatic	12	15
	Both intra- and extra hepatic	42	52.5
	Total	58	72.5
Soft tissue mass	CBD	4	5
	Both GB and CBD	5	6.25
	Total	9	11.25
Worm in CBD		5	6.25
Features of chronic pancreatitis		6	7.50

Table III: ERCP findings of the study subjects (N=80)

ERCP findings	Number	Percentage
Chloledocholethiasis	43	53.75
Cholangiocarcinoma	9	11.25
Ampullary carcinoma	7	8.75
Biliary ascariasis	5	6.25
Carcinoma of the gall bladder	5	6.25
Biliary stricture	4	5
Paillary stenosis	4	5
Chronic pancreatitis	2	2.50
Sludge in the CBD	1	1.25

Table IV: Therapeutic intervention done by ERCP (N=80)

Therapeutic intervention by ERCP	Number	Percentage
Papillotomy with stone removal	43	53.75
Papillotomy with stenting	29	36.25
Only papillotomy	2	2.50
Papillotomy with clearing of sludge	1	1.25
Papillotomy with worm extraction	5	6.25

Discussion

Endoscopic retrograde cholangiopancreatography (ERCP) is a useful procedure for the evaluation and treatment of diseases of the gallbladder and pancreas. During most of the intervening years, ERCP has been invaluable as both a diagnostic and therapeutic procedure. However, advances in noninvasive radiographic and less invasive endoscopic imaging have transformed ERCP into an almost exclusively therapeutic procedure.⁸

Stones within the bile duct during ERCP appear as filling defects and can be detected with a sensitivity and specificity of approximately 95%.⁹ The therapeutic applications of ERCP have revolutionized the treatment of patients with choledocholithiasis¹⁰ and other bile duct disorders. Stones in the bile duct, when cause symptoms, tend to manifest as life-threatening complications such as cholangitis and acute pancreatitis. Therefore, discovery of

choledocholithiasis generally should be followed by some types of interventions to remove the stones. Fifteen percent of patients with gallbladder stones also have bile duct stones. Conversely, in patients with ductal stones, 95% also have gallbladder stones.¹¹ In our study USG showed that 43.75% (35) patients had choledocholithiasis and 10% (8) patients had both gallbladder stone and choledocholithiasis. They were removed by papillotomy with balloon catheter or basket sweeping.

Biliary malignancy is a rare cancer in Europe and North America. It is characterized by wide geographic variation, with high incidence in some areas of Latin America and Asia.¹² It comprises the vast majority of biliary neoplasms and are divided into the carcinomas of the intra- and extrahepatic bile ducts, carcinoma of the gallbladder, and carcinoma of the ampulla of Vater.¹³ Most patients with bile duct cancer are diagnosed in an advanced stage.¹⁴ Non-invasive cross-sectional imaging tests including CT and MRI are useful for diagnosis of intrahepatic cholangiocarcinoma. In contrast, for the diagnosis of extrahepatic bile duct cancer an endoscopic approach such as ERCP and EUS is essential. In this study, 11.25% (9) had cholangiocarcinoma, 8.75% (7) had ampullary carcinoma and 6.25% (5) had carcinoma of the gallbladder with infiltration of common bile duct. They had undergone ERCP either due to intense itching or presence of cholangitis. There were 41% patients with malignant biliary obstruction in the study of Alam & Khan.¹⁵ On the other hand, choledocholithiasis was the highest in number (38%) followed by malignant biliary obstruction (cholangiocarcinoma and periampullary carcinoma, 28%) in the study carried out by Masud et al¹⁶.

The majority of benign bile duct strictures are the results of iatrogenic injury during cholecystectomy and a minority are the sequel of chronic pancreatitis, primary sclerosing cholangitis, trauma, liver transplantation, and choledocholithiasis.¹⁷ The differential diagnoses of cholangitis in a patient with a history of cholecystectomy consist mainly of bile duct stricture and choledocholithiasis. It may be difficult to differentiate stricture and choledocholithiasis on clinical grounds because the symptoms, signs, and liver biochemical test levels may be identical. Most patients with a benign biliary stricture are best managed surgically with resection of the stricture and

an end-to-side Roux-en-Y choledochojejunostomy or hepaticojejunostomy. Endoscopic therapy consists of balloon dilation followed by placement of plastic biliary stents.^{18,19} We found 5% (4) biliary stricture in this study and these were managed by papillotomy and balloon dilation of the stricture with placement of plastic stents.

Ascaris lumbricoides is a common parasite and over a billion people are estimated to be infested with it.²⁰ Their incidence is higher in developing countries. In Bangladesh, different investigators have reported ascariasis prevalence rates differently ranging from 65–92% in rural children and 40–66% in urban children.²¹ The most dramatic and serious presentation is biliary ascariasis in which the adult worm lodges in the bile duct and produces partial bile duct obstruction.²² In India, biliary ascariasis has been reported as being endemic in the Kashmir valley.²³ In Bangladesh, the incidence of biliary ascariasis is not infrequent. Treatment of biliary ascariasis is endoscopic extraction of the worm(s) from the bile duct with or without sphincterotomy, which gives immediate relief.²⁴ In our study, 5% (4) patients had biliary ascariasis requiring papillotomy and basket extraction.

Sphincter of Oddi dysfunction (SOD) is an elusive diagnosis most commonly associated with the post-cholecystectomy syndrome. SOD characteristically leads to biliary colic or pain. Recently, two types of sphincter dysfunction have been proposed on the basis of the underlying pathogenic mechanism — sphincter of Oddi stenosis or papillary stenosis and sphincter of Oddi dyskinesia.²⁵ Sphincter of Oddi stenosis is a structural abnormality in which narrowing of a part or of the entire sphincter occurs due to chronic inflammation and fibrosis. Gallstones, bile duct microlithiasis and sludge may repeatedly induce ductal lesions leading to obstruction and stenosis of the papilla of Vater.²⁶ Endoscopic sphincterotomy (ES) has been introduced as a treatment for SOD. In SOD type I, which is caused by structural changes of the papilla in the majority of patients, ES is the treatment of choice.²⁷ We found 5% (4) patients had papillary stenosis. Papillotomy and stenting were done in these cases.

Endoscopic pancreatic sphincterotomy (EPS) alone is frequently used as the primary treatment modality

in chronic pancreatitis. The rationale for treating chronic pancreatitis with endoscopic therapy is based on the principle of decreasing pancreatic intraductal pressure. Papillary stenosis appears to be a clear-cut indication of EPS in those patients with symptomatic chronic pancreatitis.²⁸ Without significant ductal abnormalities distal to the papilla, pancreatic sphincterotomy by itself can be utilized as the primary endoscopic therapy of choice in these patients. Similarly, mucinous ductal ectasia involving the proximal main pancreatic duct is also a proven indication for EPS in those patients with recurrent pancreatitis.²⁹ We had done endoscopic pancreatic sphincterotomy in two patients who presented with features of chronic pancreatitis without significant pancreatic duct abnormalities.

ERCP is an effective tool for evaluating and managing hepatobiliary and pancreatic diseases. In this study we found that choledocholithiasis and biliary tract malignancy were the two major conditions. Therapeutic interventions were done according to the diagnosis. The most common therapeutic intervention was papillotomy with stone removal. Next common intervention was papillotomy with stenting. Further well-designed studies with monitoring for complications and long term outcome are needed for proper evaluation of ERCP procedure.

Limitations of the study

In this study various biliary and pancreatic diseases were selected mainly for therapeutic ERCP. We did not see the post-ERCP complications and recovery rate after intervention. Presence of altered surgical anatomies, large bile duct stone and stone proximal to stricture could not be managed by ERCP in this study. Subsequent follow-up should be needed to see the ultimate outcome and prognosis of the disease.

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