

## ERCP and acute pancreatitis

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**Abstract.** – Acute biliary pancreatitis (ABP) is a serious complication of biliary stones disease and is associated with significant morbidity and mortality. The role of ERCP in the management of ABP has been the focus of discussion in recent years. In this report, we evaluated a protocol of emergency Endoscopic retrograde Cholangiopancreatography (ERCP) (within 24 hours) and early ERCP (within 72 hours).

From July 1997 to July 2000, were observed 45 patients (19 man and 26 women) with acute biliary pancreatitis. Mean age of patients was 63.4 years (range 21-87 years). Diagnosis of ABP was based on anamnesis and clinical assessment and was confirmed by specific laboratory data (hyperamylasemia, hyperlipasemia, total and fractionated bilirubinemia,  $\gamma$ -GT, transaminase, alkaline phosphatase, hypocalcemia, hyperglycemia, leukocytosis).

Ultrasound scanning within 24 h of admission was performed in 45 patients (100%) and it revealed gallbladder stones and muddy bile in 39 patients (87%). Computed tomography (CT) performed in all patients, showed a severe acute pancreatitis in the second or subsequent week following admission.

The severity of acute pancreatitis was established by Glasgow's criteria and by clinical details of patients.

ERCP and Endoscopic Sphincterotomy (ES) was performed in all 45 patients with acute biliary pancreatitis. Twenty-six patients (57%) were classified as having a severe attack (> 4) 19 as having a mild attack<sup>1-3</sup> by Glasgow's criteria. ERCP associated with ES was performed within 24 hours in 22 patients (49%), 11 (50%) showed a severe attack and 11 (50%) showed a mild attack. A total of 2 complications (4%) occurred and the mortality was of 2 patients (4%).

In 23 patients (51%) ERCP and ES was performed within 72 hours after conservative therapy, 8 (35%) showed a mild attack and 15 (65%) showed a severe attack. A total of 5 complications (9%) occurred and the mortality was of 3 patients (6%).

Our study showed that ERCP with endoscopic sphincterotomy can be performed safely by skilled endoscopist, without adverse consequences soon after the onset of acute biliary

pancreatitis even within the first 24 hours and it showed that is better than ERCP within 72 hours after conservative therapy.

*Key Words:*

Acute pancreatitis, Gallstones, ERCP, Common bile duct stones.

### Introduction

The role of early endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic sphincterotomy (ES) in patients with acute pancreatitis is controversial<sup>1,2</sup>. Gallstones and alcohol are the main cause of acute pancreatitis, gallstones account for 34% to 54% of the 4.8 to 24.2 cases of acute biliary pancreatitis (ABP) per 100,000 people annually<sup>3</sup>. ERCP within 72 h of admission to hospital may improve outcome, but there are concerns that this policy may aggravate the severity of the disease. However, the results of a number of clinical trials examining the role and potential benefits of ERCP and ES suggest that this policy in gallstone-associated pancreatitis is beneficial, and that clearance of gallstones from papilla or common bile duct can prevent exacerbation of the pancreatitis by persistent or recurrent impaction of stones.

The major causes of acute pancreatitis are reported on Table I.

Although little is known about the fundamental acinar cellular events that trigger acute pancreatitis in gallstone disease, evidence is accumulating that intermittent or continuous pancreatic ductal hypertension may induce acinar damage and initiate the pancreatitis. This ductal hypertension may be caused by intermittent or continuous stone impaction in the papilla of Vater before the stone passage which may cause local edema.

Table I. Conditions associated with acute pancreatitis.

Cholelithiasis	Choledocholithiasis or biliary microlithiasis
Ethanol misuse	
Drugs	
	Azathioprine, 6-mercaptopurine, asparaginase
	Pentamidine, didanosine
	Hydrochlorothiazide, furosemide
	Tetracyclines, sulphonamides
	Valproic acid
	Estrogens
	Sulfasalazine
Iatrogenic (ERCP)	
Trauma	
Hypercalcemia	
Hyperlipidemia	
Pancreas divisum	
Familial pancreatitis	
Ischemia	
Penetrating gastric or duodenal ulcer	
Pancreatic tumors	
Pregnancy	
Infections	
	Mycoplasma
	Mumps
	Coxsackie B
Venoms (spider bites/scorpion)	
Sphincter of Oddi dysfunction	
Idiopathic	

Whether or not a bile influx in pancreatic duct is important has not been clearly elucidated. Since gallstone impaction, temporary obstruction of the papilla of Vater by stones or sludge passing through the papilla are thought to be responsible for permanent or intermittent pancreatic duct hypertension<sup>4</sup> and thus for induction or persistence of acute pancreatitis. An accurate and safe treatment of gallstone disease at the very beginning of biliary pancreatitis could interrupt an essential part of pathogenic mechanism and add to the healing and help to avoid severe pancreatic and biliary complications.

The diagnosis of tiny biliary stones, especially when located in the papillary region, is often difficult. Traditionally, transcutaneous ultrasonography (US) and other radiologic techniques are used to detect biliary stones. If no cause is determined for the attack of pancreatitis after thorough investigation, patients are usually labelled as having idiopathic pancreatitis, which occurs in more than 20% of all cases<sup>5-7</sup>.

ERCP is still the gold standard for detection and treatment of biliary ductal stones.

Small papillary stones may only be seen during or after sphincterotomy and pulling out with Fogarty catheter through the bile ducts. A sphincterotomy and stone removal from the bile ducts reestablishes an accurate bile flow and prevents bacterial cholangitis<sup>8-10</sup>. Sphincterotomy may also facilitate the flow of pancreatic juice.

The ERCP, in experienced hands and dedicated center, has been shown to be a safe, accurate and effective diagnostic and therapeutic tool for treatment of bile duct stones and biliary pancreatitis<sup>11,12</sup>.

Early ERCP offers several advantages over early surgery, especially in severe pancreatitis: lower morbidity and mortality rates, unnecessary laparotomy and in most cases no general anaesthesia is needed<sup>11,13</sup>.

## Patients and Methods

From July 1997 to July 2000, were observed 45 patients (19 men and 26 women) with acute biliary pancreatitis. Mean age of patients was 63.4 years (range 21-87 years). Diagnosis of ABP was based on anamnesis and clinical assessment and was confirmed by specific laboratory data (hyperamylasemia, hyperlipasemia, total and fractionated bilirubinemia,  $\gamma$ -GT, transaminase, alkaline phosphatase, hypocalcemia, hyperglycemia, leukocytosis).

Ultrasound scanning within 24 h of admission was performed in 45 patients (100%) and it revealed gallbladder stones and muddy bile in 39 patients (87%). Computed tomography (CT) performed in all patients, showed a severe acute pancreatitis in the second or subsequent week following admission.

The severity of acute pancreatitis was established by Glasgow's criteria (Table II) and by clinical details of patients (Table III).

Initial therapy consisted of analgesics, intravenous fluids, broad-spectrum antibiotics (gentamicin 80 mg i.v. every 8 hours and ampicillin 1 g i.v. every 6 hours). All patients were fasting with nasogastric drainage, and same if necessary were put on oxygen supplement.

Whenever common bile duct or ampullary stones were found, endoscopic sphincterotomy was performed and Fogarty catheter was

Table II. Glasgow's score for acute pancreatitis.

Age	> 55 years
WBC	> 15,000/mm <sup>3</sup>
Serum glucose	> 180 mg/ml
Nitrogen urea	> 0.96 g/l
Serum calcium	< 8.3 mg/dl
Blood albumina	< 3.2 g/dl
LDH	> 600 U/l
SGOT and/or SGPT	200 U/l
PO <sub>2</sub>	< 60 mmHg

Table III. Clinical details.

Epigastric pain radiating to back	35 (78%)
Nausea and/or vomiting	41 (91%)
Fever and/or chills	12 (27%)
Biliary stones disease after cholecistectomy	5 (11%)
Biliary stones disease without cholecistectomy	11 (24%)
Serum amylase on admission	1215 (490-2725) U/l
Total serum bilirubin	4.2 (0.9-17) mg/dl
Alkaline phosphatase on admission	243 (98-545) U/l

used to clear the common bile duct by stones. In presence of residual stones, temporary drainage was established using a naso-biliary catheter until stones were cleared during the next session.

Table IV. Complications.

Bleeding	2 (4%)
Phlegmon	2 (4%)
Cardiac failure	1 (2%)
Respiratory infection	1 (4%)
Pancreatic necrosis	1 (4%)

### Results

ERCP and ES was performed in all 45 patients with acute biliary pancreatitis. Twenty-six patients (57%) were classified as having a severe attack (> 4) by Glasgow's criteria, 19 as having a mild attack (1-3) by Glasgow's criteria. ERCP associated with ES was performed within 24 hours in 22 patients (49%), 11 (50%) showed a severe attack and 11 (50%) showed a mild attack. A total of 2 (4%) complications occurred and the mortality was of 2 patients (4%).

In 23 patients (51%) ERCP and ES was performed within 72 hours after conservative therapy, 8 (35%) showed a mild attack and 15 (65%) showed a severe attack. A total of 5 complications (9%) occurred and the mortality was of 3 patients (6%). The complications are showed in Table IV and statistical analysis for the two groups of patients in Table V.

### Discussion

In 1980, a case series by Acosta et al.<sup>14</sup> describing operative decompression of the biliary tree in a group of patients with gallstone pancreatitis revived the interest of surgeons in this procedure. The authors found a mortality of only 2.9% (1 of 46) in their patients. A subsequent prospective trial, however, reported 48% mortality after early surgery compared with 11% after delayed surgery<sup>15</sup>.

The first prospective, randomised trial of urgent ERCP for acute pancreatitis was published by a group from Leicester, England, in 1988<sup>1</sup>. In this study a total of 121 patients with acute biliary pancreatitis were randomised to receive either conventional or urgent ERCP within 72 hours of onset of the attack; endoscopic sphincterotomy and stone extraction was performed

Table V. Statistical analysis of two groups.

	Severe	Mild	Complications	Mortality
Emergency ERCP	11 (24%)	11 (24%)	2 (4%)	2 (2%)
Early ERCP	15 (34%)	8 (18%)	5 (11%)	3 (6%)



Figure 1. ERCP demonstration of ampullary obstruction by stone.

only in those patients whose ERCP showed common bile duct stones. In our experience the sphincterotomy was performed in all patients with acute biliary pancreatitis. The authors reported that ERCP can be performed safely in acute pancreatitis by an experienced endoscopist; there was a statistically reduction in major complications of severe pancreatitis secondary to common bile duct stones after ERCP, endoscopic sphincterotomy and stone extraction (12% versus 61%); and endoscopic treatment of acute biliary pancreatitis almost halved the hospital stay for patients with predictive severe attack (9.5 days versus 17 days).

Our study showed that ERCP with endoscopic sphincterotomy can be performed safely by skilled endoscopist, without adverse consequences soon after the onset of acute biliary pancreatitis even within the

first 24 hours and it showed that is better than ERCP within 72 hours after conservative therapy.

When ERCP with endoscopic sphincterotomy was performed within 24 hours it's a safe and accurate tool for diagnosis and management of acute biliary pancreatitis.

However ERCP with endoscopic sphincterotomy have to be performed in emergency 24 hours for severe and mild attack, because it stops an essential part of pathogenesis of acute biliary pancreatitis, and reestablishes an accurate biliary flow and thus prevents prolonged damage to pancreatic tissue and bile duct infections. Furthermore an early sphincterotomy prevents recurrent occlusion of the ampulla of Vater by stones or sludge and so recurrent attacks of acute pancreatitis and bacterial cholangitis.

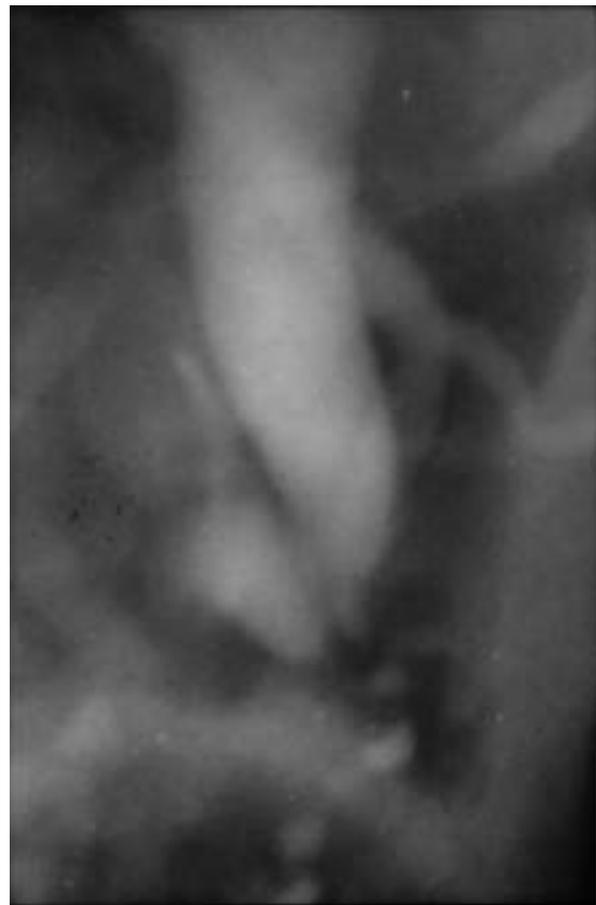


Figure 2. ERCP demonstration of Wirsung and CBD dilated by impacted stone.

References

- 1) NEOPTOLEMOS JP, CARR-LOCKE DL, LONDON NJM, BAILEY IA, JAMES D, FOSSARD DP. Controlled trial of urgent endoscopic retrograde colangiopancreatography and endoscopic sphincterotomy versus conservative treatment for acute pancreatitis due to gallstones. *Lancet* 1988; 2: 979-983.
- 2) NOVAK A, NOWAKOWSKA-DULAWA E, MAREK TA, KACZOR R. Timing of endoscopic sphincterotomy for acute biliary pancreatitis-a prospective study. *Gastrointest Endosc* 1996; 143: 401 (Abstract).
- 3) GO V, EVERHART J. Pancreatitis. In Everhart J (ed.): *Digestive Diseases in the United States: Epidemiology and Impact*. Publication no. 94-1447. Washington, DC, US Government Printing Office, 1994, pp 691-712.
- 4) LEE SP, NICHOLLS JF, PARK HZ. Biliary sludge as cause of acute pancreatitis. *N Engl J Med* 1992; 326: 589-593.
- 5) COFIELD AP, COOPER MJ, WILLIAMSON RCN. Acute pancreatitis: a lethal disease of increasing incidence. *Gut* 1985; 26: 724-729.
- 6) PARK J, FROMKES J, COOPERMAN M. Acute pancreatitis in elderly patients: pathogenesis and outcome. *Am J Surg* 1986; 152: 638-642.
- 7) LIU CL, LO CM, CHAN JK, POON RT, FAN ST. EUS for detection of occult cholelithiasis in patients with idiopathic pancreatitis. *Gastrointest Endosc* 2000; 51: 28-32.
- 8) FAN ST, LAI ECS, MOK FPT, LO CM, ZHENG SS, WONG. Early treatment of acute pancreatitis by endoscopic papillotomy. *N Engl J Med* 1993; 328: 228-232.
- 9) NEOPTOLEMOS JP, STONELAKE P, RADLEY S. Endoscopic sphincterotomy for acute pancreatitis. *Hepatogastroenterology* 1993; 40: 550-555.
- 10) SEMEL L, SCHRIEBER D, FROMMON D. Gallstone pancreatitis: support for a flexible approach. *Arch Surg* 1983; 118: 901-904.
- 11) ROSCHER R, BERGER HG. Bacterial infection of pancreatic necrosis. *Heidelberg Springer* 1987; 314-317.
- 12) CLASSEN M, OSSENBERG W, WURBS D, DAMMERMAN R, HAGENMULLER F. Pancreatitis-An indication for endoscopic papillotomy? *Endoscopy* 1978; 10: 223.
- 13) NEOPTOLEMOS JP, CARR-LOCKE DL, LONDON NJM. ERCP findings and the role of endoscopic sphincterotomy an acute gallstones pancreatitis. *Br J Surg* 1988; 75: 954-960.
- 14) ACOSTA JM, PELLEGRINI CA, SKINNER DB. Etiology and pathogenesis of acute biliary pancreatitis. *Surgery* 1980; 88: 118-125.
- 15) KELLY TR, WAGNER DS. Gallstone pancreatitis: A prospective randomised trial of the timing of surgery. *Surgery* 1988; 104: 600-605.