

# ACUTE PANCREATITIS – A POST ERCP COMPLICATION

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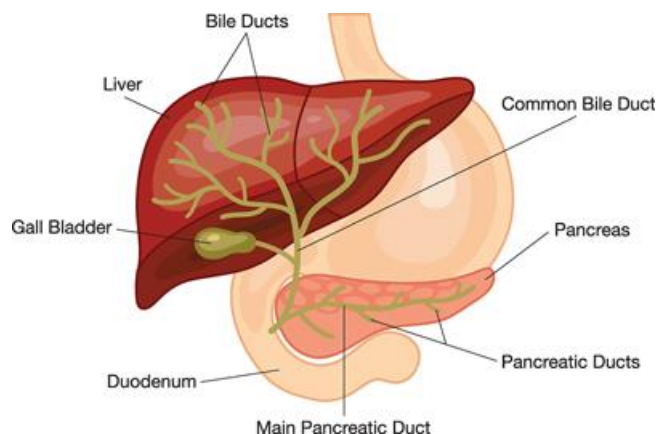
**Abstract:** ERCP stands for endoscopic retrograde cholangiopancreatography. It is an endoscopic procedure where a bendable, lighted tube endoscope about the thickness of an index finger is placed through the mouth and into your stomach and the first part of the small intestine. The most common reasons to do ERCP include abdominal pain, weight loss, jaundice, or ultrasound or CT scan that shows stones or a mass in these organs. ERCP is a procedure that is used to diagnose diseases of the gallbladder, biliary system, pancreas, and liver. ERCP can be used as both a screening as well as the diagnostic procedure. It can screen the pathologies related to the biliary and pancreatic ducts and can be used in pathologies associated with the same like CBD and pancreatic duct stones, structures and polyps. Although it is a highly advanced procedure with multiple advantages at the same time ERCP has its own risks. This endoscopic procedure can lead to a number of complications and acute pancreatitis is one of them. ERCP is associated with a 5%-10% risk of pancreatitis. There are several potential underlying mechanisms of pancreatic injury during ERCP, including mechanical, thermal, chemical, hydrostatic, enzymatic, and microbiologic insults. Appropriate hydration, close monitoring and use of pharmacoprevention can help decrease the incidence of this complication. Once the patient has developed acute pancreatitis, adequate hydration is very important. Pain control, monitoring infection and attention to nutrition are other important aspects to cover for all patients with acute pancreatitis.

**Keywords:** endoscopic, gallbladder, pancreas, CT scan, ERCP.

## 1. INTRODUCTION

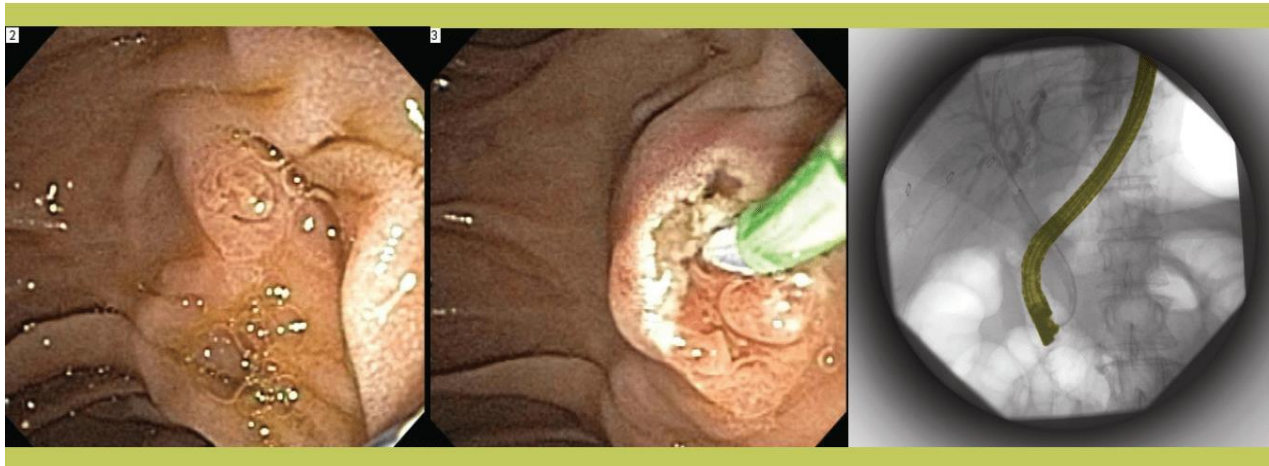
### ERCP

ERCP stands for endoscopic retrograde cholangiopancreatography. This procedure is used to diagnose diseases of the gallbladder, biliary system, pancreas, and liver. In addition, ERCP can be used to treat any pathologies in these parts of the digestive system. The test looks "upstream" where the digestive fluid comes from – the liver, gallbladder, and pancreas-to where it enters the intestines [1]. The most common reasons to do ERCP include abdominal pain, weight loss, jaundice (yellowing of the skin), or ultrasound or CT scan that shows stones or a mass in these organs.



A bendable, lighted tube endoscope about the thickness of an index finger is placed through the mouth and into your stomach and the first part of the small intestine (duodenum). In the duodenum, a small opening-ampulla is identified and a small plastic tube (cannula) is passed through the endoscope and into this opening. Dye (contrast material) is then injected and X-rays are taken to study the ducts of the pancreas and liver by tracing the passage of the contrast through the ducts [2].

ERCP may be used pre or post gallbladder surgery to assist in the performance of the operation. Bile duct stones can be diagnosed and removed with an ERCP. Tumors, both cancerous and noncancerous, can be diagnosed and then treated with indwelling plastic tubes that are used to bypass a blockage of the bile duct.



*ERCP normal ampulla*

*ERCP sphincterotomy*

*X-ray image obtained during ERCP*

Preparation for ERCP-Your stomach must be empty, so you should not eat or drink anything for approximately 8 hours before the examination. Your physician will be more specific about the time to begin fasting depending on the time of day that your test is scheduled.

Doctors perform ERCP when your bile or pancreatic ducts have become narrowed or blocked because of

- Gallstones that form in your gallbladder and become stuck in your common bile duct
- Infection.
- Acute Pancreatitis.
- Chronic Pancreatitis.
- Trauma or surgical complications in your bile or pancreatic ducts.
- Pancreatic pseudocysts.
- Tumors or cancers of the bile duct.
- Tumors or cancers of the pancreas [3].

The risks of ERCP include complications such as the following:

- Pancreatitis.
- Infection of the bile ducts or gall bladder.
- Excessive bleeding, called hemorrhage.
- An abnormal reaction to the sedative, including respiratory or cardiac problems.

- Perforation in the bile or pancreatic ducts, or in the duodenum near the opening where the bile and pancreatic ducts empty into it.
- Tissue damage from x-ray exposure.
- Death, although this complication is rare.

### **ACUTE PANCREATITIS**

Pancreatitis is a disease in which the pancreas becomes inflamed. Pancreatic damage happens when the digestive enzymes are activated before they are released into the small intestine and begin attacking the pancreas.

There are two forms of pancreatitis: acute and chronic.

Acute pancreatitis is a sudden inflammation that lasts for a short time. It may range from mild discomfort to a severe, life-threatening illness [4].

#### **Symptoms of acute pancreatitis:**

- Upper abdominal pain that radiates into the back; it may be aggravated by eating, especially foods high in fat.
- Swollen and tender abdomen
- Nausea and vomiting
- Fever
- Increased heart rate

Complications of acute pancreatitis:

The main complications of acute pancreatitis are

- Low blood pressure and shock.
- Damage to other organs.
- Infection of the pancreas.
- Pancreatic pseudocyst.

#### **Diagnosis:**

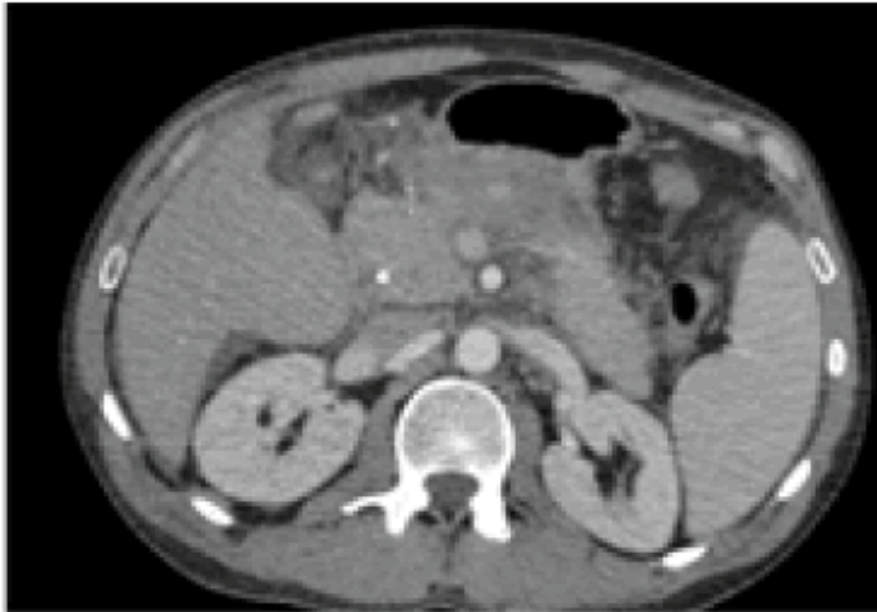
- Blood tests.
- Imaging tests.

#### **Treatment:**

- Fluids by vein.
- Pain relief.
- Measures to support nutrition.
- Sometimes endoscopy or surgery [5]

ERCP plays a role in gallstone pancreatitis and complicated acute and chronic pancreatitis. Randomized trials have proven that ERCP will decrease morbidity and have suggested a decrease in mortality for certain patients with gallstone pancreatitis [7].

ERCP is associated with a 5%-10% risk of pancreatitis. The risk is increased in those cases where cannulation of the ducts is difficult, the pancreas is normal, or when a sphincterotomy is performed in the setting of the sphincter of Oddi dysfunction. A prior history of ERCP-induced pancreatitis is also a risk factor [7].



**Figure 1. Computed tomography reveals peri-pancreatic fluid and stranding two days after ERCP in 40 year-old man with severe epigastric pain and fevers.**

PEP is defined as two of the following three criteria being present post-procedure: 1) epigastric pain, 2) amylase or lipase greater than three times the upper limit of normal, and 3) cross-sectional imaging findings consistent with pancreatic inflammation [9].

Since post-ERCP pancreatitis (PEP) is important and potentially preventable, a comprehensive approach to risk reduction should be employed by all who perform ERCP.

It is essential for the modern advanced endoscopist to recognize Post-ERCP Pancreatitis(PEP), understand the risk factors, measures for prevention, and the necessary steps in management.

Strategies to reduce the incidence of PEP, which should be considered in every case, including thoughtful patient selection, risk-stratification, sound procedural technique, prophylactic pancreatic stent placement, and pharmacoprevention [10].

Assuming a mid-range post-ERCP pancreatitis rate of 5%, more than 35,000 cases of PEP occur in the US each year; average Medicare reimbursement for PEP is approximately \$6000, resulting in an estimated annual cost burden in excess of \$200 million (1). Furthermore, PEP is a source of significant endoscopist stress (78) and has been the most common reason for malpractice lawsuits relating to ERCP (33). Given the magnitude of this problem, the prevention of PEP remains a major clinical and research priority [10].

#### **Mechanism of Post-ERCP Pancreatitis**

There are several potential underlying mechanisms of pancreatic injury during ERCP, including mechanical, thermal, chemical, hydrostatic, enzymatic, and microbiologic insults [11,12].

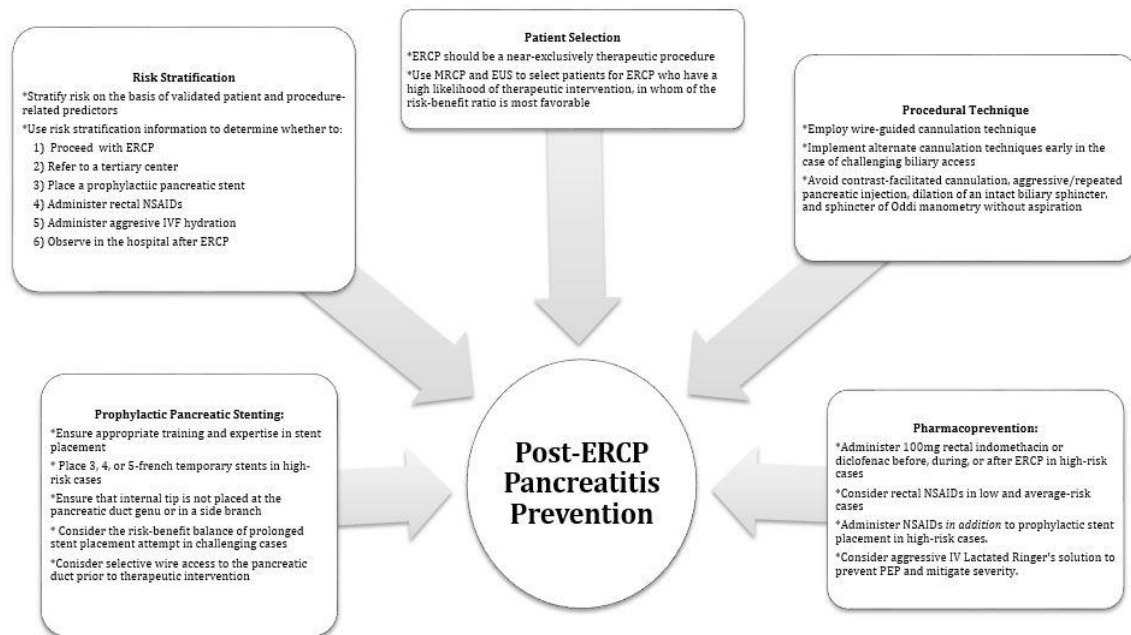
Prolonged manipulation of the papillary orifice, difficult cannulation of the biliary tree, and repeated inadvertent instrumentation of the pancreatic duct resulting in ductal injury or injury to the ampulla [13,14,15].

#### **Prevention of Post-ERCP Pancreatitis**

Until recently, research on pharmacologic prophylaxis of PEP yielded generally disappointing results. Vasoactive drugs, such as nifedipine, lidocaine, epinephrine, botulinum, and nitrates have been administered with the aim of improving ductal drainage by relaxing the sphincter of Oddi. Controlled trials of these agents yielded disappointing results for prevention of PEP [16,17,18].

Since PEP is potentially preventable, a comprehensive approach to risk reduction should be employed by all who perform ERCP. Preventive strategies can be broadly divided into 5 areas:

- (1) Appropriate patient selection.
- (2) Risk stratification of patients undergoing ERCP and meaningful use of this information in clinical decision-making.
- (3) Atraumatic and efficient procedural technique.
- (4) Prophylactic pancreatic stent placement.
- (5) Pharmacoprevention.



### Treatment:

Hematocrit is the best laboratory marker to follow in monitoring patients with acute pancreatitis. The relationship of hematocrit to severity implies that the opposite is also true: i.e. that maintaining the hematocrit in the normal range protects against pancreatic necrosis. Early, vigorous intravenous hydration to expand the intravascular volume (hemodilution) is imperative. Too often patients with acute pancreatitis are given inadequate intravenous hydration. Acute pancreatitis typically results in significant intravascular losses. Intravenous hydration should be at least 250-300 mL per hour and titrated to the hematocrit [121]. Pain control, monitoring infection and attention to nutrition are important for all patients with acute pancreatitis.

## 2. METHODOLOGY

In this review article, the data is pooled from various kinds of literature referring the web to understand the existence, symptoms, diagnosis, management, and prevention of complications of Post-ERCP Pancreatitis.

To understand this medically relevant and fatal association, we collected information from the studies done in the past throughout the world and made a relevant conclusion accordingly.

We can conclude that it is a severe and life-threatening condition which is fatal yet preventable and which need immediate medical attention to avoid life-threatening complications and prevent mortality and morbidity. Proper and appropriate precautions like hydration and pharmacoprevention can prevent acute pancreatitis in most of the patients.

Although, approximate conclusions can be made from the pooling of the data from the past literature, a definitive plan of action on how to prevent this condition and adequately treating it to avoid damage to body organs needs further research and studies.

### 3. RESULTS AND CONCLUSIONS

ERCP is a procedure that is used to diagnose diseases of the gallbladder, biliary system, pancreas, and liver. A bendable, lighted tube endoscope about the thickness of an index finger is placed through the mouth and into your stomach and the first part of the small intestine. The most common reasons to do ERCP include abdominal pain, weight loss, jaundice, or ultrasound or CT scan that shows stones or a mass in these organs.

ERCP has its own risks. This endoscopic procedure can lead to a number of complications and acute pancreatitis is one of them. ERCP is associated with a 5%-10% risk of pancreatitis. There are several potential underlying mechanisms of pancreatic injury during ERCP, including mechanical, thermal, chemical, hydrostatic, enzymatic, and microbiologic insults.

Appropriate hydration, close monitoring and use of pharmacoprevention can help decrease the incidence of this complication. Once the patient has developed acute pancreatitis, adequate hydration is very important. Pain control, monitoring infection and attention to nutrition are other important aspects to cover for all patients with acute pancreatitis.

Since PEP is potentially preventable, a comprehensive approach to risk reduction should be employed by all who perform ERCP.

### REFERENCES

- [1] <https://www.webmd.com/digestive-disorders/digestive-diseases-ercp#1>
- [2] <https://www.sages.org/publications/patient-information/patient-information-for-ercp-endoscopic-retrograde-cholangio-pancreatography-from-sages/>
- [3] <https://www.niddk.nih.gov/health-information/diagnostic-tests/endoscopic-retrograde-cholangiopancreatography>
- [4] <https://www.webmd.com/digestive-disorders/digestive-diseases-pancreatitis#1>
- [5] <https://www.merckmanuals.com/home/digestive-disorders/pancreatitis/acute-pancreatitis>
- [6] <https://www.uptodate.com/contents/acute-pancreatitis-beyond-the-basics>
- [7] <https://pancreasfoundation.org/ercp-endoscopic-retrograde-cholangiopancreatography/>
- [8] <http://pancreas.imedpub.com/prevention-and-management-of-postercp-pancreatitis.php?aid=162>
- [9] Cotton PB, Lehman G, Vennes J, et al. Endoscopic sphincterotomy complications and their management: an attempt at consensus. *Gastrointest Endosc* 1991;37:383-93. [PMID: 2070995]
- [10] <https://www.pancreapedia.org/reviews/prevention-of-ercp-induced-pancreatitis>
- [11] [https://www.mayoclinicproceedings.org/article/S0025-6196\(16\)30718-2/fulltext](https://www.mayoclinicproceedings.org/article/S0025-6196(16)30718-2/fulltext)
- [12] Freeman, M.L., Disario, J.A., Nelson, D.B. et al. Risk factors for post-ERCP pancreatitis: a prospective, multicenter study. *Gastrointest Endosc*. 2001; 54: 425-434
- [13] Johnson, G.K., Geenen, J.E., Johanson, J.F., Sherman, S., Hogan, W.J., Cass, O., and Midwest Pancreaticobiliary Study Group. Evaluation of post-ERCP pancreatitis: potential causes noted during the controlled study of differing contrast media. *Gastrointest Endosc*. 1997; 46: 217-222
- [14] Freeman, M.L. and Guda, N.M. Prevention of post-ERCP pancreatitis: a comprehensive review. *Gastrointest Endosc*. 2004; 59: 845-864
- [15] Fogel, E.L., Eversman, D., Jamidar, P., Sherman, S., and Lehman, G.A. Sphincter of Oddi dysfunction: pancreaticobiliary sphincterotomy with pancreatic stent placement has a lower rate of pancreatitis than biliary sphincterotomy alone. *Endoscopy*. 2002; 34: 280-285
- [16] Shao LM, Chen QY, Chen MY, et al. Nitroglycerin in the prevention of post-ERCP pancreatitis: a meta-analysis. *Dig Dis Sci* 2010;55:1-7. [PMID: 19160042]
- [17] Schwartz JJ, Lew RJ, Ahmad NA, et al. The effect of lidocaine sprayed on the major duodenal papilla on the frequency of post- ERCP pancreatitis. *Gastrointest Endosc* 2004;59:179-84. [PMID: 14745389]
- [18] Xu LH, Qian JB, Gu LG, et al. Prevention of post-endoscopic retrograde cholangiopancreatography pancreatitis by epinephrine sprayed on the papilla. *J Gastroenterol Hepatol* 2011;26:1139-44. [PMID: 21392105]