

Original Article

Retrospective Analysis of the Indications and Outcomes of Endoscopic Retrograde Cholangiopancreatography (ERCP), Experience at Tertiary Care Center

Kiran Fatima,¹ Samia Kausar,² Muhammad Najm Ul Hassan Shafi,³ Syed Hammad Wajid Talha,⁴ Irfan Ali,⁵ Hassam Zulfiqar⁶

^{1,2}Department of Medicine, Islamic International Medical College Trust, Pakistan Railway Hospital, Rawalpindi; ³NUST School of Health Sciences, Islamabad; ⁴Department of Gastroenterology, Islamic International Medical College Trust, Pakistan Railway Hospital, Rawalpindi; ⁵Bahria University Medical College, Islamabad; ⁶Hamad Medical Corporation, Doha, Qatar

Abstract

Background: As the population ages, the number of biliary tract diseases also increase leading to increased demand of endoscopic retrograde cholangiopancreatography which is currently has been used more for therapeutic purposes than as diagnostic modality.

Objective: The aim of the study was to analyze the characteristics, indications and outcomes of endoscopic retrograde cholangiopancreatography retrospectively.

Methods: This cross sectional study was conducted in the Medicine and Gastroenterology department of Pakistan Railway Hospital, Rawalpindi from 1st Jan 2022 to 31st Dec 2022 retrospectively. Ethical approval was granted by the hospital ethical committee. The study included data of patients who had undergone elective ERCP procedures. Data was collected from electronic record of hospital and endoscopy room data.

Results: Out of 111 ERCPs performed, 50(45.04%) patients were male and 61(54.95%) were female. The mean age of the patients at presentation was 54.42 ± 14.71 years. The most common indication for ERCP was choledocholithiasis 39 (35.1%), followed by benign biliary stricture 23 (20.7%), and cholecystodocholithiasis 20 (18%). The most common complication was acute pancreatitis 6 (5.4%). Cholangitis occurred in 3 (2.7%) while bleeding and duodenal perforation occurred in only one patient (0.9%) respectively. Mortality was reported in only 1 patient (0.9%).

Conclusion: Our study has revealed that the most common indication was for ERCP is choledocholithiasis and most common complication is pancreatitis. The indications and outcomes are comparable to local and international studies.

Received: 19-11-2024 | **1st Revision:** 20-05-2025 | **2nd Revision:** 19-09-2025 | **Accepted:** 30-01-2026

Corresponding Author | Dr. Kiran Fatima, Assistant Professor, Department of Medicine, Islamic International Medical College Trust, Pakistan Railway Hospital, Rawalpindi; **Email:** kiranfatima07@gmail.com

Keywords | Endoscopic retrograde cholangiopancreatography (ERCP), Choledocolithiasis, complication, common bile duct

How to cite: Fatima K, Kausar S, Shafi MNUH, Talha SHW, Ali I, Zulfiqar H. Retrospective Analysis of the Indications and Outcomes of Endoscopic Retrograde Cholangiopancreatography (ERCP), Experience at Tertiary Care Center. Ann King Edw Med Univ.2026;32i1:13-18.



Production and Hosting by KEMU

<https://doi.org/10.21649/akemu.v32i1.5929>
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Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is an advanced endoscopic and fluoroscopic procedure for diagnosis followed by therapeutic intervention of hepatobiliary and pancreatic region

when indicated. ERCP was initially introduced in 1968 as a diagnostic procedure but over the years it has evolved as a therapeutic tool of first-choice treatment for common bile duct (CBD) disorders and periampullary disease. It is increasingly being used for managing biliary tract disease due to lower rate of complications and decreased mortality associated with it when compared to surgical intervention.¹

The rates of ERCP are increasing globally with increase in average age. Patients with advanced age and complex co morbidities also require endoscopic procedures which makes it a challenging task for even experienced endoscopists. The estimated rate of ERCPs in United States is 450,000 per year.² In United Kingdom, forty eight thousand ERCPs were done in a year and it was found to be associated with a complication rate of 5 to 10% and mortality rate after thirty days of ERCP was 0.3-1%.³ In particular, common bile duct stones (CBDS) are the most common indication for ERCP.⁴ The patients commonly present with obstructive jaundice to life threatening complications like ascending cholangitis and pancreatitis. It is indicated for obstructive jaundice caused by cholangiocarcinoma or pancreatic cancer as a palliative procedure. It is also used for placement of stents in benign and malignant strictures and treatment of complications after cholecystectomy or bile duct surgeries.^{5,6}

The patient's demographics for ERCP have changed over past few years and there is a considerably growing number of patients requiring endoscopic procedures for various medical problems. Biliary tract disorders are a common cause of hospitalization in medical and gastroenterology wards.⁷

Despite that ERCP has been accepted as a gold standard modality for diagnostic and therapeutic purposes, it is more difficult than other endoscopic techniques.⁸ The procedure requires not only skill and experience of operator but patients also need sedation and they are exposed to ionizing radiation. It carries a high risk for complications like pancreatitis (3.5%), bleeding (1.3%), perforation (0.6%), cholangitis (1%) and sepsis among with duodenal perforation is extremely dangerous requiring immediate attention.^{9,10}

Post ERCP pancreatitis (PEP) is most common complication which is mostly mild but it can progress to severe pancreatitis resulting in prolonged hospitalization and it can even lead to mortality in 0.1 to 1.0% patients. During the procedure, complications such as hypoxia, aspiration pneumonia and cardio-pulmonary depression can occur due to extended anesthesia time.^{11,12} Develop-

ment of post ERCP pancreatitis is associated with several factors including mechanical, chemical, microbiological and allergic reactions. Prolonged cannulation, recurrent injection of pancreatic duct and inexperienced operator are other factors that lead to increased rate of complications.¹³

Numerous studies have been conducted to assess the indications and outcomes of ERCP worldwide to improve quality and set guidelines. We aim to study indications and outcome of patients with ERCP in our hospital to evaluate local trends, success rate and complications.

Methods

This retrospective cross sectional study was conducted at Department of Medicine and Gastroenterology of Pakistan Railway hospital, Rawalpindi from 1st Jan 2022 to 31st Dec 2022. After taking approval from Institutional ethical review Board, the study was started. A total of 111 patients who were above 12 years of age and undergoing elective ERCP were included in the study. Those patients who had sepsis, previous history of ERCP or patients with previous history of pancreato-biliary surgery were excluded. Patients were admitted in medical wards before procedure. Detailed history and clinical examination were done. All patients were assessed for anesthesia fitness one day before procedure with laboratory investigations and electrocardiogram (ECG). Informed consent was taken from every patient before procedure and risks and benefits were explained. Indications of ERCP were assessed with laboratory investigations and radiographic data i.e. ultrasound, computed tomography (CT) scan and magnetic resonance cholangiopancreatography (MRCP). All images were reviewed by same radiologist. All procedures were performed by two trained Gastroenterologists and all sedations were provided by anesthetist. The details of the procedure were recorded by gastroenterologists who had performed ERCP. Data was collected about patients' demographics, indications of ERCP, findings of procedure, and procedural complications including pancreatitis, perforation, bleeding and cardio-pulmonary complications from hospital's electronic record and endoscopic room data. Serum blood samples for total leukocyte count, level of haemoglobin, C reactive protein, liver function tests and serum amylase levels were checked and X ray abdomen was done to assess for complications after procedure. PEP was defined as a condition associated with new or worsened abdominal pain combined with elevated pancreatic enzymes that was amylase or lipase more than or equal to three

times upper limit of normal resulting in prolonged hospital stay and requiring hospital admission after an ERCP.¹⁴ Cholangitis was defined as presence of fever more than 38°C with chills, abdominal pain, jaundice, biliary obstruction on liver function tests, raised inflammatory markers, imaging suggestive of biliary obstruction, plus absence of acute cholangitis in the week before ERCP.¹⁵

Data was analyzed using statistical package for the social sciences version 23.0. Mean and standard deviation was calculated for age. The frequencies and percentages were calculated for gender, indications, complications and outcome of ERCP.

Results

A total of 111 therapeutic ERCPs were done. The mean age of patients was 54.42 ± 14.71, 50 (45.04%) were male and 61 (54.95%) were female. Patient with cholecystocholedocholithiasis underwent ERCP followed by laparoscopic cholecystectomy. ERCP with biliary cannulation and sphincterotomy was done followed by balloon trawling to remove sludge and stones. Balloon sphincteroplasty was needed in 9 (10%) of cases to remove complicated stones. Majority cases were successfully cannulated. About 83 (74.77%) were successfully cleared off stones and in 25 (22.52%) we were unable to extract stone. CBD was cleared of stones or sludge and bile drainage was established by plastic endobiliary stent in some patients who were planned for laparoscopic cholecystectomy within same admission or 2 weeks after ERCP. This was to prevent obstruction of CBD by stone slippage from gallbladder and bile flow was established in 95 (85.58%) of the patients.

Table 1: Indications of Endoscopic Retrograde Cholangiopancreatography (ERCP) (n=111)

Indications/diagnosis	N	%
Cholecystocholedocholithiasis	20	18
Choledocholithiasis	39	35.1
Mirizi Syndrome	3	2.7
Cholangitis	2	1.8
Benign biliary strictures	23	20.7
Post-cholecystectomy biliary leak	4	3.6
Post Liver transplant anastomotic stricture/leak	2	1.8
CA head of Pancreas	3	2.7
Peri-ampullary growth	10	9
Cholangiocarcinoma	3	2.7
Replacement or removal of stent	2	1.8
Total	111	100

Three patients (2.7%) were diagnosed with Mirizzi syndrome underwent successful ERCP with stent placement in common bile duct to manage acute cholangitis and subsequent surgical correction. Our record showed 2% ERCPs were done for recurrent CBD stones.

Indications of ERCP are shown in Table 1. The complications & outcome that occurred during and after the procedure are listed in Table 2.

Table 2: Complications and Outcome that occurred during and after ERCP

Complications & Outcome	N	%
Pancreatitis	6	5.4
Cholangitis	3	2.7
Bleeding	1	0.9
Duodenal Perforation	1	0.9
Mortality	1	0.9
Procedure success rate	105	94.59
Complete stone extraction	83	74.77
Balloon trawling	59	65.49
Successful Biliary drainage	95	85.582
Stone extraction failed	25	22.52
Balloon sphincteroplasty	9	10
Stent placement	90	81.08
Plastic stent	69	76.59
Metallic stent	21	23.31

Discussion

In our study most common therapeutic indication was choledocholithiasis seen in 35.1% patients followed by benign biliary stricture in 20.7% and malignant biliary obstruction in 14.41% patients respectively. Worldwide most common indication for suspected or confirmed bile duct stone is therapeutic ERCP1-4. A study from Saudi Arabia 52.6% patients had ERCP for bile duct stone while studies from Canada and Pakistan reported 61%, and 47% respectively for the same indication.^{3,4,5} Around 75% patients had successful stone extraction and our result was comparable to study done by Chayanon et.al¹⁶ while study from Pakistan Amin et.al reported ERCP stone clearance rate of 68%.¹⁷ For stone smaller than 1 cm, the clearance score can be as high as 90%.¹⁸

For difficult stones, like large and impacted stones and patients who were not fit for surgery, we have placed stent to reduce the size of stone and its impaction and ascending cholangitis. Stones then can be removed on repeat ERCP which is a safe and effective strategy.¹⁹ ERCP is good diagnostic and therapeutic technique

before surgery. It has role to relieve associated bacterial cholangitis by establishing pus and bile drainage.²⁰

Another common therapeutic indication for ERCP in our study was benign biliary strictures. Strictures result from iatrogenic injury after laparoscopic cholecystectomy, liver transplant, infection and chronic pancreatitis. ERCP is safe and it can be repeated when compared with surgery. It may increase overall cost due to multiple sessions and is associated with reduced compliance of patients. Stent placement on ERCP provides effective long term biliary patency almost 90% in postoperative biliary stricture and 65% in pancreatic stricture.²¹ We used plastic stent and it was successful in 76.59% cases. We performed ERCP for biliary leak following laparoscopic cholecystectomy in 2.7% cases and rate is lower than reported by Sayed et al.³

ERCP with biliary stenting is effective decompression procedure for palliative relief of malignant biliary obstruction. It has lower cost, morbidity and mortality compared with surgery but carries risk of stent blockage. It is more physiological compared with percutaneous biliary drainage. In our patients, obstructive jaundice occurred due to distal malignant biliary obstruction by periampullary cancer, pancreatic head carcinoma and extrahepatic cholangiocarcinoma as well as hilar biliary obstruction with Klatskin tumor. We used ERCP to relieve obstruction by placing transpapillary biliary stent. It was successful technically in 85.58% of cases. Woo Huyn et al compared ERCP with EUS- guided drainage and found that ERCP was clinically successful in 94.5% and our results matched them.²²

ERCP is associated with significant complications despite technology refinement and prudent patient selection. Most common complication we encountered was PEP. Worldwide frequency of PEP varies between 1 to 40%. The frequency can be reduced by identifying risk factors which can be either procedure related or patient related although there is no accepted safe method to avoid it. Usually post ERCP pancreatitis is mild in 80-90% but can be serious in 0.3-0.6% cases. A study from Bangladesh reported frequency of PEP 19.6%.²³ A study from Pakistan reported PEP in 16.4% while others reported frequency of 4.9%, 2.1%.^{3,4} Our results are comparable with these studies.

Post ERCP cholangitis results from instrumentation leading to infection or from contrast material. Chen et al had 2.4% rate of Post ERCP cholangitis in his study on 102 patients. It is seen more frequently in elderly, patients with hilar obstruction and patients who had previous ERCP. We had only 3(2.7%) cases of post

ERCP cholangitis.²⁴

We had one case (0.9%) with post ERCP bleeding after sphincterotomy and its incidence was found 0.3% to 2% in various studies. Post ERCP bleeding is one of the most serious complications largely associated with the presence of liver cirrhosis, renal failure, coagulopathy and cholangitis before procedure, use of anticoagulation after procedure and if precut sphincterotomy is done in such patients.^{8,25}

Only one patient (0.9%) had developed duodenal perforation. Studies had shown an incidence rate of 0.29% to 3.5%. It is one of the life threatening complications with a mortality rate of 34.4%. However, mortality can be reduced by early diagnosis with the help of pre operative and post operative X-ray examination.⁹

Our study had few limitations. We did random patient selection without consideration for age and impact of associated co morbidities on outcome. Also we had not followed patients after discharge as it is a retrospective study conducted in single center. Therefore, more prospective and generalized studies are required and needs follow up patients after discharge.

Conclusion

ERCP provides effective and quick relief of pancreato-biliary obstruction. Most common indication was chole-docholithiasis followed by benign and malignant strictures. Most common complication was pancreatitis followed by cholangitis.

Ethical Approval: The Institutional Review Committee, Islamic International Medical College, Rawalpindi approved this study vide letter No Appl.# Riphah/ IRC/ 23/ 3091.

Conflict of Interest: The authors declare no conflict of interest.

Funding Source: None

Authors' Contribution:

KF: Acquisition of data, analysis & interpretation of data, drafting of article, critical revision for important intellectual content, final approval of the version to be published

SK: Drafting of article, critical revision for important intellectual content, final approval of the version to be published

MNHS: Analysis & interpretation of data, critical revision for important intellectual content

SHWT: Analysis & interpretation of data, drafting of article

IA: Drafting of article

HZ: Final approval of the version to be published

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