Clinical Audit

Indications, outcomes, and complications of endoscopic retrograde cholangiopancreatography: A retrospective analysis of 750 procedures from Kauvery hospitals, Trichy

R Rajakumari[1]*, K Arivarasan[2], B Thinakarmani[3]

[1]First year Dr NB Resident, Kauvery Hospital, Trichy, Tamil Nadu
[2]Consultant Medical Gastroenterologist, Kauvery Hospital, Cantonment, Trichy, Tamil Nadu
[3]Consultant Medical Gastroenterologist, Kauvery Hospital, Tennur, Trichy, Tamil Nadu
*Correspondence

Abstract

Background: Endoscopic retrograde cholangiopancreatography (ERCP) is an established therapeutic modality for the management of pancreaticobiliary disorders. Although highly effective, ERCP is associated with procedure-related complications.

Aim: To evaluate the clinical indications, procedural outcomes, and complications of ERCP performed in Kauvery Hospitals, Trichy.

Methods: This retrospective observational study included 750 ERCP procedures performed at Kauvery Hospitals, Trichy. Demographic details, indications for ERCP, interventions performed, stent placement, procedural success, and complications were analysed. Statistical analysis was performed and the results were expressed as mean ± standard deviation or frequency with percentage.

Results: A total of 750 ERCP procedures were included. The mean patient age was 55.9 ± 17.7 years, with male predominance (56%). The most common indication was choledocholithiasis (72.7%), followed by malignant biliary obstruction and benign biliary strictures. The overall procedural success rate was 94.9%. Procedure-related complications occurred in approximately 5–6% of cases, with post-ERCP pancreatitis being the most frequent complication, followed by bleeding and cholangitis. Statistical analysis did not demonstrate significant associations between sex and disease type or between diagnosis type and complication rate.

Conclusion: ERCP remains a safe and effective therapeutic procedure for pancreaticobiliary diseases when performed in experienced centres, with high success rates and acceptable complication rates.

Keywords: ERCP; Choledocholithiasis; Biliary obstruction; Biliary stenting; post-ERCP pancreatitis

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1. Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) has evolved from a predominantly diagnostic procedure into a primarily therapeutic intervention for pancreaticobiliary diseases. With the advent of non-invasive imaging modalities such as magnetic resonance cholangiopancreatography (MRCP) and endoscopic ultrasound (EUS), ERCP is now primarily utilized for therapeutic purposes, including stone extraction, biliary drainage, and stent placement. Common indications for ERCP include choledocholithiasis, malignant biliary obstruction, benign biliary strictures, and cholangitis. Despite its therapeutic benefits, ERCP carries potential risks such as post-ERCP pancreatitis, bleeding, cholangitis, and perforation. Large institutional series evaluating ERCP outcomes are essential to assess procedural success rates, complication profiles, and quality indicators. The present study aimed to analyze the indications, outcomes, and complications of 750 ERCP procedures performed at Kauvery Hospital, Trichy.

2. Materials and Methods

Study Design: Retrospective observational study.

Study Setting: Department of Medical Gastroenterology, Kauvery Hospitals, Trichy, Tamil Nadu, India.

Study Population: All patients who underwent ERCP during the study period were included. Total ERCP procedures analyzed: 750.

Data Collection: Data was retrieved from hospital electronic medical records and endoscopy registers.

The following variables were analyzed:

- Age
- Sex
- Indication for ERCP
- Type of intervention
- Stent placement
- Procedural success or failure
- Procedure-related complications

3. Outcome measures

Primary outcomes:

- Indication profile
- Procedural success rate
- Complication rate

Secondary outcomes:

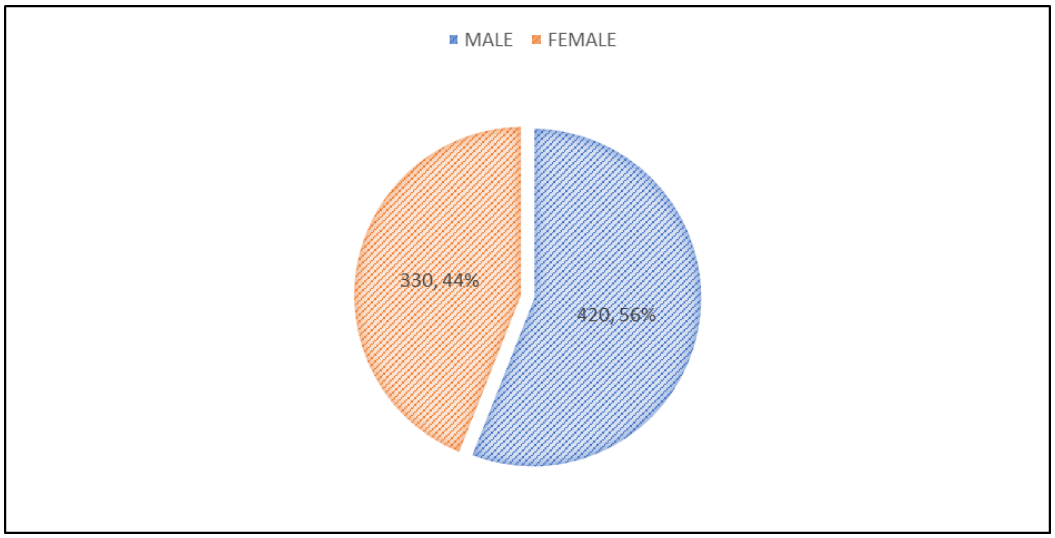
- Association between diagnosis type and complications
- Association between stent usage and procedural success

4. Results

Demographic Characteristics

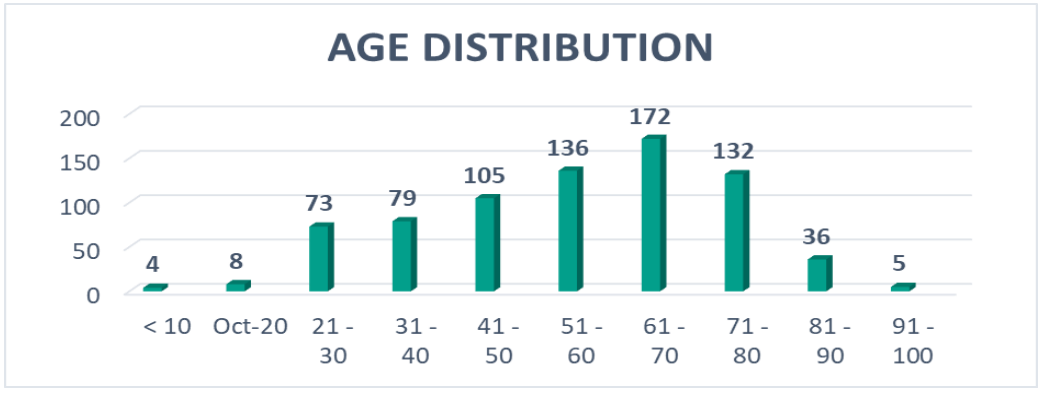
Sex Distribution

A total of 750 ERCP procedures were included in the analysis.



Variable	Value
Mean age	55.9 ± 17.7 years
Male	420 (56%)
Female	330 (44%)

Male patients constituted a slightly higher proportion of the study population.



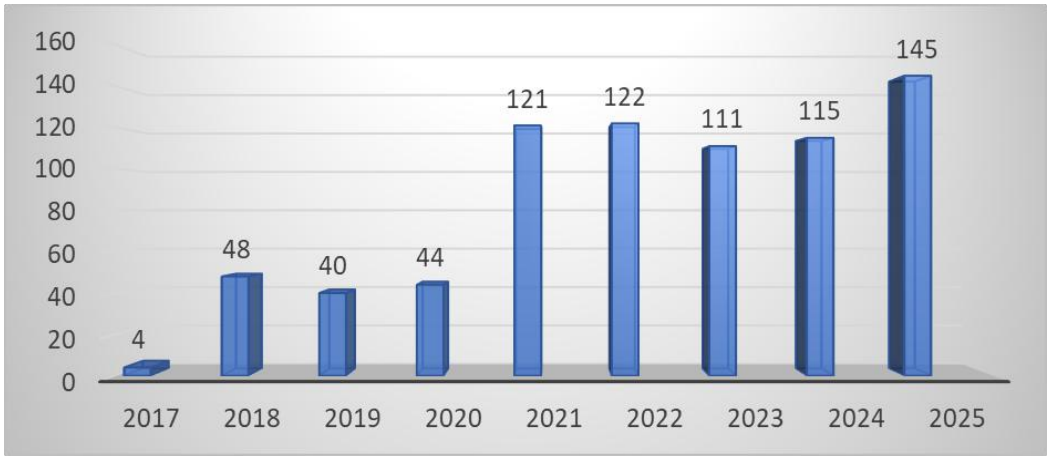
5. Indications for ERCP

The most common indication was choledocholithiasis

Benign	Cases	%
Choledocholithiasis	545	73%
Stricture	30	4%
Chronic pancreatitis	18	2%
Others	2	0.3%
Mirizzi	13	2%
Distal CBD Stricture	7	1%
EHPVO	6	1%
Bile leak following surgery	5	1%
CBD Sludge	4	1%
Lemmel	3	0.4%
Total	633	84%

Malignant	Cases	%
Hilar cholangiocarcinoma	40	5%
Periampullary carcinoma	38	5%
Others	12	2%
CA Pancreas	13	2%
CA GB	13	2%
Distal CBD Stricture	1	0.1%
TOTAL	117	16%

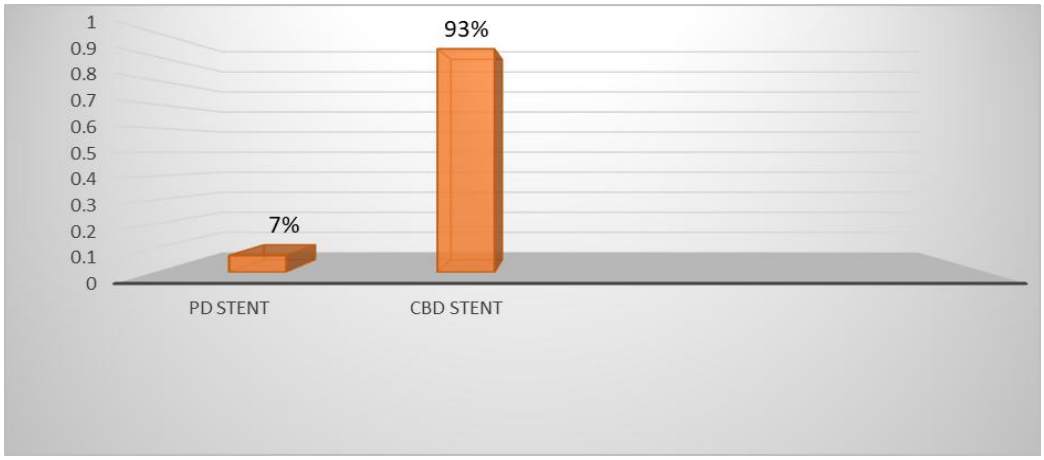
6. ERCPS performed in each year

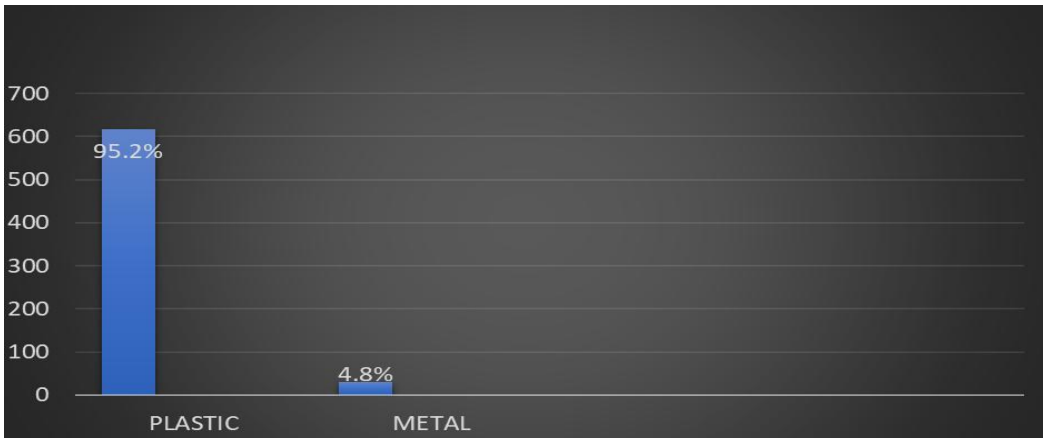


7. Therapeutic interventions

Interventions performed during ERCP included:

- Endoscopic sphincterotomy
- Plastic stent placement
- Self-expanding metal stent placement





Plastic stents were predominantly used in benign biliary conditions, while metal stents were primarily used for malignant obstruction.

8. Special procedures performed

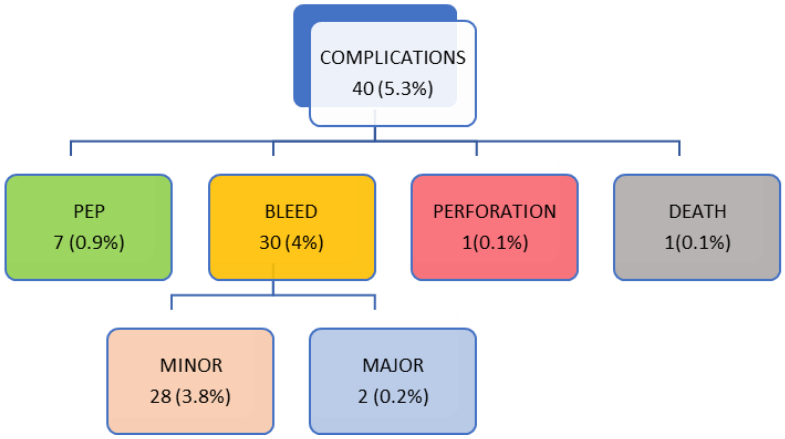
Rendezvous technique (n = 3)

The rendezvous technique was utilized in patients with difficult biliary cannulation. This involved combined percutaneous and endoscopic access, where a guidewire introduced via the percutaneous transhepatic route was retrieved endoscopically to facilitate successful biliary cannulation.

Radiation-free ERCP (n = 2)

Radiation-free ERCP was performed in 2 pregnant females using ultrasound guidance without fluoroscopy. Successful biliary cannulation, stone extraction, and stent placement were achieved without radiation exposure.

9. Complications

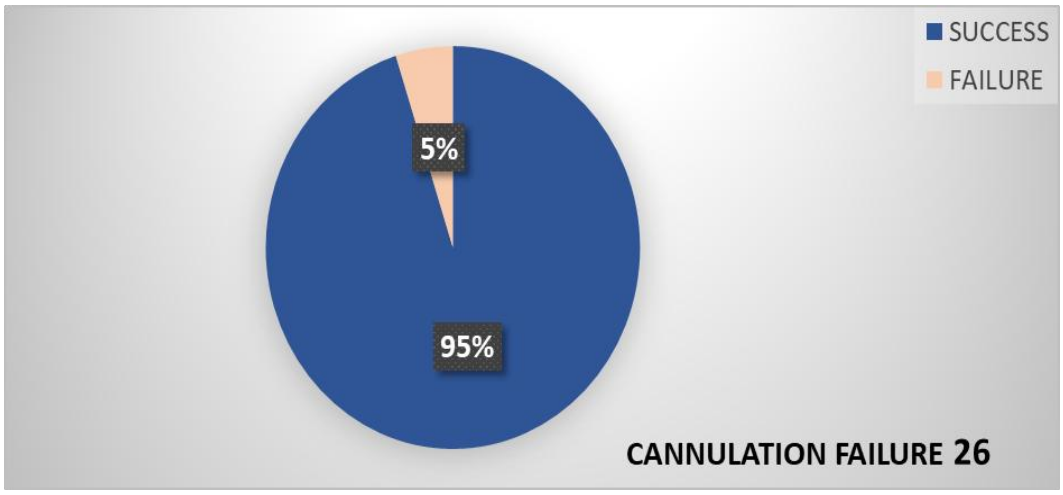


Complication	Number	%
None	710	94.7%
Mild bleeding	28	3.8%
Major Bleeding	2	0.2%
Post-ERCP pancreatitis	7	0.9%
Perforation	1	0.1%
Death	1	0.1%
Balloon detachment during stone extraction	1	0.1%

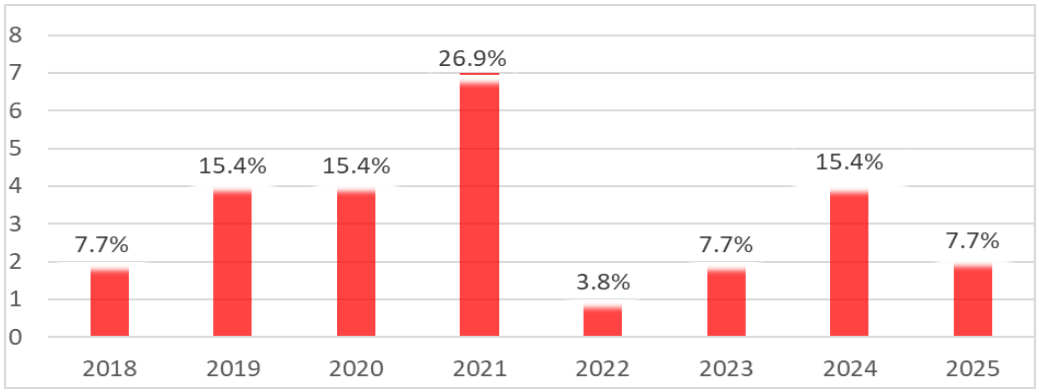
10. Procedural outcome

Outcome	Number	%
Successful ERCP	724	94.9%
Failed ERCP	26	5.1%

Procedural failure was mainly due to difficult cannulation, large, impacted stones, or altered anatomy. Complete stone clearance could not be achieved in 38 patients due to large /impacted stones.



Cannulation failure in each year



11. Comparison of ERCP outcomes with previous studies

	Garciano-cano et al	Dahale et al	Rai et al	Our center
No of ercp	507	17163	1024	750
Cannulation rate %	94.9	95	94	95
All complica-tions %	10.85	3.3	10.9	5.3
Severe compli-cations %	3.35	1.7	5.6	0.2
Mortality %	0.79	0.4	0.5	0.1
Hemorrhage %	1.6	0.3	13	0.1
Pep %	5.5	1	6	0.9
Perforation %	1.4	0.02	1	0.1%

12. Discussion

The present study evaluated 750 ERCP procedures performed at a tertiary care gastroenterology center, representing a substantial single-center experience. The most frequent indication for ERCP in this study was choledocholithiasis, accounting for the majority of procedures. This finding is consistent with previously reported studies where bile duct stones represent the most common indication for therapeutic ERCP. Another important quality indicator of ERCP is the successful cannulation rate. In the present study, the overall cannulation success rate was 94.9%, which is comparable with internationally accepted quality standards that recommend a cannulation success rate of more than 90% in experienced centres. This finding reflects the technical expertise and procedural proficiency of the endoscopy team at our centre. Post-ERCP pancreatitis (PEP) is the most frequently reported complication of ERCP, with an incidence ranging from 3–10% in most published series. In our study, the incidence of PEP was 0.9%, which is relatively lower than that reported in many large studies. Most complications were mild and managed conservatively without major morbidity.

In our study, complete stone clearance could not be achieved in 38 patients, primarily due to the large size of common bile duct stones, which made retrieval difficult using conventional balloon or basket extraction techniques. In such cases, temporary biliary stenting was performed to ensure adequate biliary drainage. The use of cholangioscopy-

guided lithotripsy (Spyglass system), which allows direct visualisation and fragmentation of large bile duct stones, may have facilitated successful stone clearance in these patients. Previous studies have demonstrated that cholangioscopy-guided electrohydraulic or laser lithotripsy significantly improves the success rate of difficult stone removal, particularly in cases of large, impacted, or multiple CBD calculi.

A small subset of patients required advanced techniques such as rendezvous ERCP and radiation-free ERCP, highlighting the need for procedural adaptability in complex biliary interventions. These approaches were particularly useful in difficult cannulation and in situations where fluoroscopy avoidance was preferred.

Statistical analysis did not demonstrate a significant association between diagnosis type and complication rates. These findings suggest that ERCP outcomes are primarily influenced by technical and disease-related factors rather than demographic characteristics. Overall, the results of this study confirm that ERCP performed in experienced centres is a safe and effective therapeutic modality for pancreaticobiliary diseases.

13. Conclusion

ERCP continues to be an effective therapeutic modality for the management of pancreaticobiliary diseases. In this study of 750 procedures, ERCP demonstrated a high technical success rate with a low incidence of complications, supporting its safety and efficacy when performed in experienced centres.

References

[1] Cotton PB, Lehman G, Vennes J, et al. Endoscopic sphincterotomy complications. Gastrointestinal Endosc.1991;37(3);383-393

[2] Freeman ML, Nelson DB, Sherman S, et al. Complications of endoscopic biliary sphincterotomy. N Engl J Med.

[3] Dumonceau JM, et al. ERCP-related adverse events. Endoscopy.

[4] Andriulli A, et al. Incidence rates of post-ERCP complications. Am J Gastroenterol.