

Predictive Factors for Therapeutic Endoscopic Retrograde Cholangiopancreatography-Related Complications in the Treatment of Choledocholithiasis

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Abstract

Original Research Article

Aims: Endoscopic retrograde cholangiopancreatography (ERCP) is now the exclusive endoscopic therapeutic modality for biliary as well as pancreatic diseases. The aim of our study is to evaluate the complication rate of ERCP in the treatment of choledocholithiasis and to assess the factors related to their occurrence. **Methods:** This is a retrospective descriptive and analytical study including 1048 patients who underwent ERCP for choledocholithiasis between January 2007 and August 2021. The factors associated with the occurrence of post-ERCP complications were studied by logistic regression analysis. **Results:** Among the patients studied, 60.5% had a simple lithiasis, 27.6% had multiple choledochal stones and 11.9% had large stones (> 15mm). Clinically, 18.7% of the patients presented with cholangitis and 9.4% with acute pancreatitis. A periampullary diverticulum was found in 9.4% of cases. A common bile duct stenosis was present in 6.5% of cases. The primary vacuity rate was 77.3%. However, additional manoeuvres were used in 20.5% of cases. Complications were reported in 5.8% of cases, including hemorrhage in 4.5%, pancreatitis in 0.8%, cholangitis in 0.2%, perforation in 0.1% and dormia impaction in 0.2%. No death was reported due to our procedures. In a multivariate analysis following adjustment of confounding factors, only the presence of a large stone (OR= 5.9, CI (1.460- 23.875), p=0.013) and female gender (OR= 1.867, CI (1.012-3.444), p=0.046) increased the risk of complications during ERCP. **Conclusion:** Our study suggests that female gender and the presence of a large gallstone are associated with a high risk of post-ERCP complications.

Keywords: Endoscopic retrograde cholangiopancreatography, choledocholithiasis, complications.

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INTRODUCTION

It is estimated that about 10 to 20% of people will have cholelithiasis [1] and that 15% of these will develop choledocholithiasis [2].

Available guidelines generally recommend ERCP as the first-line treatment for choledocholithiasis [3-6]. Therapeutic ERCP procedures have a high risk of complications, including post-ERCP pancreatitis (PEP), cholangitis, bleeding, and perforation, with an overall incidence of 4.0–15.9% of patients [7, 8].

Complications during ERCP can occur due to many factors such as the selection of patients, the endoscopist's experience, and the anatomical variations [9,10]. Patient-related risk factors (e.g. anticoagulant therapy, cirrhosis, end-stage renal failure, advanced age, etc.) need to be evaluated before the procedure in order to take precautions to reduce complications [9].

The aim of our study is to evaluate the complication rate of ERCP in the treatment of choledocholithiasis and to assess the factors related to their occurrence.

METHODS

Patients and Methods

Study design, setting, and participants

This is a retrospective descriptive and analytical study including 1048 patients who underwent ERCP for choledocholithiasis between January 2007 and August 2021, in the endoscopic department of Mohammed V Military Hospital, Rabat, Morocco.

Variables

We extracted the epidemiological history, demographic data, comorbidities (anticoagulant therapy, cirrhosis, end-stage renal failure), procedures indication, procedures complications, risk factors for

complications, and the management of these complications.

STATISTICAL ANALYSIS

Descriptive data are presented as means (\pm standard deviation [SD]) for normally distributed continuous variables. Categorical variables were presented as counts and percentages.

We performed logistic regression with adjustment for potential confounders to calculate odds ratios (ORs) and 95% confidence intervals (CIs) to identify the risk of complications during ERCP.

A two-tailed P-value of <0.05 was considered statistically significant. All statistical analyses were performed using SPSS version 22.0 program.

RESULTS

The average age of our patients was $58,91 \pm 14,38$ years, with extremes ranging from 19 to 98 years, and the predominant age range was from 50 to 60 years (Figure 1).

Our series was characterized by a female predominance estimated at 59.7%, with a sex ratio of

0.67. Among the patients studied, 60.5% had a simple lithiasis, 27.6% had multiple choledochal stones and 11.9% had large stones ($> 15\text{mm}$).

Clinically, 18.7% of the patients presented with cholangitis and 9.4% with acute pancreatitis. A periampullary diverticulum was found in 9.4% of cases.

A common bile duct stenosis was present in 6.5% of patients. The primary vacuity rate was 77.3%. However, additional manoeuvres were used in 20.5% of cases.

Complications were reported in 5.8% of cases, including hemorrhage in 4.5%, pancreatitis in 0.8%, cholangitis in 0.2%, perforation in 0.1% and dormia impaction in 0.2%. No death was reported due to our procedures.

In a multivariate analysis following adjustment of confounding factors, only the presence of a large stone (OR= 5.9, CI (1.460- 23.875), $p=0.013$) and female gender (OR= 1.867, CI (1.012-3.444), $p=0.046$) increased the risk of complications during ERCP (Table 1).

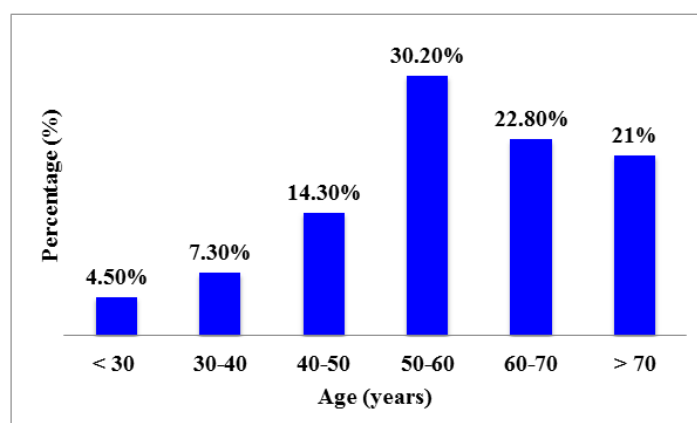


Fig-11: Distribution of patients by age group.

Table-1: Factors associated with the use of endoscopic haemostasis in multi-variate analysis

	OR	95% CI	<i>p</i>
Age	0.855	0.782-1.004	0.850
Gender (female)	1.867	1.012-3.444	0.046
Presence of a common bile duct stenosis	0.711	0.429-1.578	0.867
presence of a large stone	5.9	1.460- 23.875	0.013
presence of periampullary diverticulum	0.749	0.193- 1.968	0.623

DISCUSSION

Several factors are involved in the development of post-ERCP complications. These complications, may occur due to patient-related, procedure-related, and endoscopist-related risk factors.

The rate of post-ERCP pancreatitis (PEP) is 3–10% [11]. In our study, the incidence of PEP was 3.6%.

The risk factors for this particular complication were mostly patient-related. The strategies to reduce PEP risk can be listed as avoiding unnecessary ERCP procedures, limiting cannulation attempts, lowering the amount of contrast agent administered into the pancreatic duct, placing a pancreatic stent as prophylaxis, and using rectal non-steroidal anti-inflammatory drugs [12].

The incidence of bleeding after endoscopic sphincterotomy (EST) varies from 0.3% to 9.6% [13]. This complication can be taken under control mostly endoscopically during the procedure or conservatively after the procedure, but with a low rate; additional endoscopic or surgical interventions may be required [13].

Procedure-related risk factors include difficult cannulation, papillary abnormalities, and impacted stone at the ampulla, performing pre-cut or zipper-cut [14].

In our study, bleeding rate after EST was found in 2% of cases. All bleedings were taken under control during the procedure via balloon dilatation of papilla, adrenaline injection, and electrocauterization. Endoscopic reinterventions were required in 20% of these patients due to rebleeding and they were all treated via endoscopic interventions, no surgical intervention was required.

The most feared post-ERCP complication is perforation. Factors such as choledoscope manipulation, sphincterotomy, atypical papillary localization and pre-cut can cause perforation [15]. Post-ERCP perforation rate for experienced endoscopists is >1% [15]. Mortality rate for patients with perforation is 7.8–9% [16]. In our study, perforation occurred in 0.6% of patients and esophageal laceration occurred in one patient.

No deaths occurred among patients with perforation in our series. Another post-ERCP complication is cholangitis. Factors such as biliary tract obstruction, defective bile transportation, and bacterial translocation take part in the pathogenesis of cholangitis. Biliary stent placement is recommended for patients with insufficient biliary stone extraction in order to prevent cholangitis [17].

Data reveal the incidence of post-ERCP cholangitis as 1–2.4% and mortality as 0.1%. In our study, the incidence of cholangitis was 1.83%.

CONCLUSION

Due to ERCP being an invasive procedure, determination of predictable risk factors before the process, and close follow-up during and after the procedure may help reduce complication rates and enhance treatment success.

Our study suggests that female gender and the presence of a large gallstone are associated with a high risk of post-ERCP complications.

Conflicts of Interest

All authors have no conflict of interest.

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