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Risk factor analysis of post-ERCP cholangitis: A single-center experience

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ABSTRACT

Background: Endoscopic retrograde cholangiopancreatography (ERCP) may have complications. Our study aimed to investigate the risk factors and prevention of post-ERCP cholangitis.

Methods: We retrospectively analyzed 4234 cases undergone ERCP in the Affiliated Drum Tower Hospital of Nanjing University Medical School from January 2008 to December 2013. Patient-related factors and procedure-related factors were analyzed to find the risk factors of post-ERCP cholangitis. The time point of post-ERCP cholangitis was also analyzed. Univariate and multivariate analyses were performed to define the independent risk factors of post-ERCP cholangitis.

Results: The success rate of ERCP was 96.8% (4099/4234). The overall complication rate was 9.4% (399/4234). Post-ERCP cholangitis occurred in 102 cases (2.4%, 102/4234). The most dangerous time of post-ERCP cholangitis was from 24 h–48 h after ERCP (45.1%, 46/102). Univariate analysis revealed that age, hypertension, diabetes, previous ERCP history, biliary stent insertion, pancreatography, endoscopic sphincterotomy, balloon dilation and hilar obstruction were risk factors of post-ERCP cholangitis ($P < 0.05$). Multivariate analysis indicated that age, previous ERCP history and hilar obstruction were independent risk factors ($P < 0.05$). While endoscopic stone extraction was the potential protective factor.

Conclusions: Many risk factors are involved in post-ERCP cholangitis. Among them, old age, previous ERCP history and hilar obstruction were independently related to this post-ERCP complication.

Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is an important diagnostic and therapeutic modality for hepatobiliary and pancreatic diseases, including choledocholithiasis, acute cholangitis, biliary stricture and chronic pancreatitis [1]. Although ERCP is a minimally invasive technique, the procedure may cause complications including pancreatitis, cholangitis, bleeding, and perforation [2,3]. Post-ERCP cholangitis is one of the most common complications. However, the risk factors of post-ERCP cholangitis are not clear. The present study was to analyze the risk factors, the strategies of prevention and the treatment.

Methods

Patients

A total of 4234 cases undergone ERCP procedure from January 1, 2008 to December 31, 2013 in the Affiliated Drum Tower Hospital of Nanjing University Medical School were retrospectively analyzed. Among them, 102 cases were diagnosed as post-ERCP cholangitis. The post-ERCP cholangitis was diagnosed as postoperative fever caused by the biliary system (temperature more than 38 °C) without preoperative fever. Cholecystitis and other possible infections were ruled out.

Procedure

Patients were left in prone position. Conventionally we insert duodenoscope to the descending part of duodenum so as to find duodenal papilla, insert pull knife through duodenal papilla from endoscopic biopsy channel, and use guide wire to

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ultra-elect bile duct. In case of repeatedly failed intubating (intubating time over 10 min, repeated intubating more than 5 times), we choose the double guidewire technique or needle-like knife precutting and have endoscopic sphincterotomy after ultra-election duct. During the ERCP procedure, the related technique of ERCP included cholangiography, pancreatography, setting nasobiliary drainage, papillary muscle balloon dilatation, sphincterotomy, extracting bile duct stones, bile duct dilatation, biliary stent placement, lithotripsy, cholangiopancreatography, the nasopancreatic tube placement, pancreatic duct dilatation, pancreatic stent placement, pancreatic duct stone extraction, papillary muscle precut, intraductal ultrasound, cholangiocarcinoma brushings, etc.

Observational index

Age, gender, medical history, blood test, records of ERCP, postoperative clinical symptoms and signs, treatment records of the patients and endoscopic diagnoses after ERCP procedure were collected. Possible related risk factors of post-ERCP cholangitis were analyzed by univariate and multivariate analyses.

Statistical analysis

SPSS16.0 software was used to analyze all of the data. For quantitative data, independent sample *t* test was performed. For qualitative data, Chi-square test or Fisher's exact test was used to determine the correlation between collected data and post-ERCP cholangitis. For the statistically significant factors, multivariate logistic regression analysis was exerted to estimate the various risk factors. A *P* value less than 0.05 was considered statistically significant.

Results

General information

A total of 4234 cases undergone ERCP procedure were collected, among which 102 cases (2.4%) were diagnosed as post-ERCP cholangitis. They are 51 males and 51 females with mean age of 66.9 ± 14.2 years old. The mean hospital stays were 25.4 ± 17.3 days. The mean postoperative hospital stays were 17.4 ± 14.5 days.

ERCP cholangitis dangerous time-point analysis

Post-ERCP cholangitis occurred in one case (1.0%, 1/102) on the same day of procedure, 46 (45.1%, 46/102) on the first postoperative day (POD1), 18 (17.6%, 18/102) on POD2, 24 (23.5%, 24/102) on POD3, 5 (4.9%, 5/102) on POD4, 1 (1.0%, 1/102) on POD5, 4 (3.9%, 4/102) on POD6, and 3 (2.9%, 3/102) on POD8 (Fig. 1).

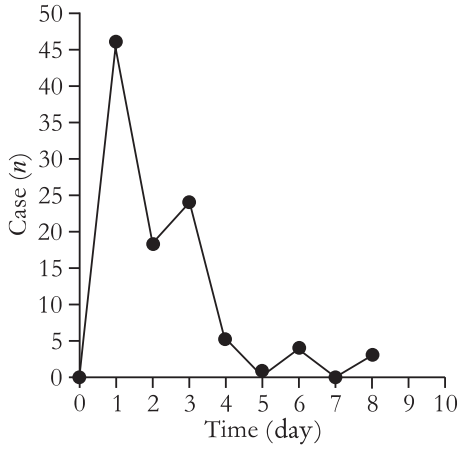

Fig. 1. Time point analysis of post-ERCP cholangitis occurrence.

Table 1
Univariate analysis of post-ERCP cholangitis.

Factors	Cholangitis (*n*)	No cholangitis (*n*)	X^2	*P* value
Gender				
Male	51	2174	0.273	0.602
Female	51	1958		
Age				
≥60 year	74	2438	7.570	**0.006**
<60 year	28	1694		
Cholecystectomy				
Yes	38	1496	0.047	0.828
No	64	2636		
Previous history of ERCP				
Yes	55	1132	34.715	**0.000**
No	47	3000		
Hypertension				
Yes	33	584	26.543	**0.000**
No	69	3548		
Diabetes				
Yes	13	243	8.256	**0.004**
No	89	3889		
Preoperative jaundice				
Yes	68	2626	3.085	0.079
No	34	1506		
Difficult intubation				
Yes	3	240	1.513	0.219
No	99	3892		
Lien guide wire of the pancreatic duct				
Yes	1	103	0.950	0.330
No	101	4029		
Papillary muscle precut				
Yes	2	154	0.875	0.350
No	100	3978		
Biliary stent				
Yes	46	793	42.046	**0.000**
No	56	3339		
Pancreatic duct stent				
Yes	2	249	2.950	0.090
No	100	3883		
Pancreatography				
Yes	2	338	5.235	**0.022**
No	100	3794		
Endoscopic sphincterotomy				
Yes	29	2113	20.531	**0.000**
No	73	2019		
Balloon dilatation				
Yes	35	282	0.011	**0.000**
No	67	3850		
Endoscopic stone extraction technique				
Yes	24	2077	28.465	**0.000**
No	78	2055		
Obstruction sites				
Hilar	38	167	20.041	**0.000**
Common bile duct	27	377		
Stent categories				
Plastic	41	670	0.994	0.319
Metal	7	173		
ENBD placement				
Yes	40	1693	0.127	0.760
No	62	2439		
ENBD flow (the first day)				
Yes	37	1668	0.693	0.405
No	65	2464		

Preoperative jaundice: preoperative serum total bilirubin higher than 34.2 μmol/L. Difficult intubation: the intubation cannot be completed within the pipeline for trying 10 min or 10 times at least. Papillary muscle precut: needle-like knife was used to cut layer by layer from 11 o'clock position of the papillary uplift highest point to papillary openings or needle-like knife was vertically used to pierce and fenestrate via the highest point of papilla highest bump. ENBD: endoscopic nasobiliary drainage.