

Risk Factors of Pancreatitis after Endoscopic Retrograde Cholangiopancreatography

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Abstract

Introduction: Pancreatitis is the common complication of diagnostic and therapeutic endoscopic retrograde cholangiopancreatography (ERCP). Diagnosing the risk factors for post-ERCP pancreatitis is important in the management of patients. In this study, we evaluated possible risk factors of post-ERCP pancreatitis among Iranian patients.

Materials and methods: In this retrospective study, 708 diagnostic and therapeutic ERCPs performed in Imam Reza hospital, Tabriz, Iran between April 2011 and September 2012 were studied. The rate of post-ERCP pancreatitis and possible risk factors were evaluated using a multivariate regression analysis.

Results: Post-ERCP pancreatitis occurred in 4.58% of cases. Unsuccessful ERCP (27% vs. 12.4%, $p=0.02$) and Body mass index (23.48 ± 3.02 vs. 26.11 ± 4.70 kg/m², $p=0.002$) were significantly higher in patients with pancreatitis compared to those without pancreatitis. Regression analysis showed that only lower body mass index was the independent risk factor for post-ERCP pancreatitis occurrence (OR=1.341, CI95%[1.003-1.793], $p=0.04$).

Conclusion: Among identifiable risk factors, only lower body mass index was the independent predictor of post-ERCP pancreatitis.

Keywords: Endoscopic retrograde cholangiopancreatography; Pancreatitis; Risk factor

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Receive date: 2014-08-17 | Accept date: 2014-09-01 | Publish date: 2014-09-21

DOI: 10.7575/aiac.abcmed.15.03.02.07



Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is widely used for the treatment of a variety of pancreatico-biliary diseases. However, it is considered a high risk procedure which accompanies some complications including pancreatitis, bleeding, cholangitis, cholecystitis, and perforation (1).

Pancreatitis is the most common and serious complication of ERCP. Recent studies have shown an incidence rate of 2-5% for post-ERCP pancreatitis (1-5). However, in severe cases it carries a high morbidity and mortality (5, 6). It is possible to minimize the incidence and severity of post-ERCP pancreatitis by identifying high-risk populations. Therefore, it is important to identify risk factors for this complication. Several studies and reviews have identified several risk factors for post-ERCP pancreatitis (3, 7, 8), but studies in Iran are few. In this study, we aimed to evaluate possible risk factors for post-ERCP pancreatitis in Iranian patients.

Materials and Methods

In this retrospective study, we reviewed recorded files of 708 patients who underwent diagnostic and therapeutic ERCP in Imam Reza hospital, Tabriz, Iran, between April 2011 and September 2012. Among 708 performed ERCPs, 48 cases had post-ERCP complications including 37 cases with pancreatitis (9). Patients with a history of biliary sphincterotomy or precut sphincterotomy, pre-procedure active pancreatitis, pregnancy, mental disability, and refusal to participate were excluded. This study was approved by the Institutional Review Board of Tabriz University of medical sciences.

All patients underwent ERCP for suspected and diagnosed pancreatobiliary disease and on the basis of generally accepted diagnostic

indications for ERCP. Similar procedure was performed in all patients.

Data including demographic characteristics and medical history, clinical and biochemical features, and ERCP indications and findings were gathered from recorded files or by interviewing on the day of admission to hospital. The first liver function tests results during the acute admission were used as the screening tests for ERCP. Other laboratory parameters were also measured on the day of admission.

Patients were divided into pancreatitis and non-pancreatitis groups and possible risk factors for pancreatitis occurrence were evaluated.

Statistical analysis

Statistical analyses were performed using the Statistical Package for Social Sciences, version 16.0 (SPSS, Chicago, Illinois). Continuous values were expressed as mean \pm standard deviation. The categorical parameters were compared by χ^2 tests or Fisher's exact test, and the continuous variables were compared by Student's t-tests. Multivariate logistic regression was used to define probable risk factors of post-ERCP pancreatitis. A p value <0.05 was considered significant.

Results

In 630 patients (41.7% male, 58.3% female, mean age of 59.73 ± 17.78 years), 708 ERCP procedures were performed. ERCP complications occurred in 48 (6.8%) cases including pancreatitis in 37 cases (4.58%).

Patients' findings in pancreatitis and non-pancreatitis cases are shown in table 1. Patients with pancreatitis had significantly lower body mass index and lower rate of successful ERCP. Among these two, only body mass index was an independent risk factor for pancreatitis (OR=1.341, CI95%[1.003-1.793], $p=0.04$).

	pancreatitis	Non-pancreatitis	P value
Age	60.05±15.87	59.71±17.90	0.91
Gender (male)	15 (40.5%)	280 (41.7%)	0.9
Body mass index	23.48±3.02	26.11±4.70	0.002*
Coronary artery disease	7 (18.9%)	68 (10.1%)	0.09
Diabetes mellitus	7 (18.9%)	80 (11.9%)	0.2
HBP malignancy	0	7 (1%)	0.9
Cirrhosis	1 (2.7%)	9 (1.3%)	0.41
Renal failure	1 (2.7%)	3 (0.4%)	0.19
History of cholecystectomy	16 (43.2%)	241 (35.9%)	0.38
History of abdominal surgery	4 (10.8%)	33 (4.9%)	0.12
Aspirin use	6 (16.2%)	52 (7.7%)	0.11
Warfarin use	1 (2.7%)	4 (0.6%)	0.23
First time ERCP	26 (70.3%)	542 (80.8%)	0.13
Symptomatic period (months)	4.02±0.69	7.20±0.58	0.2
Coledoc diameter	12.12±5.81	11.98±5.00	0.87
ERCP	Diagnostic	187 (78.4%)	0.45
	Therapeutic	484 (72.1%)	
ERCP	Successful	588 (87.6%)	0.02*
	Unsuccessful	83 (12.4%)	

Table 1: Patients' findings in pancreatitis and non-pancreatitis cases

* P is two-sided significant. ERCP: Endoscopic retrograde cholangiopancreatography.

Discussion

In this study, we evaluated the incidence of pancreatitis and prognostic factors of its occurrence after ERCP. Post-ERCP pancreatitis was observed in 4.58% of ERCPs which was within the reported range in recent articles (1-5). However, compared to Alizadeh and colleagues (2) study among Iranian patients which reported 3.3% incidence of pancreatitis, our results were slightly higher.

Patients with post-ERCP pancreatitis usually present with mild symptoms and signs. Almost 90% of post-ERCP pancreatitis is mild and some patients may develop moderate or severe pancreatitis (8,10,11). It is important to identify post-ERCP pancreatitis earlier to maintain better results and prevent the complication from progressing to severe situation which accompanies high morbidity and mortality (5,6).

Many studies have evaluated the possible factors that increase the risk of post-ERCP pancreatitis. These factors are divided into patient-related risk factors, endoscopist-related risk factors and procedure-related risk factors (3,7,8). Patient-related risk factors are younger age, female gender, suspected or known Oddi's sphincter dysfunction, a small bile duct diameter, normal serum bilirubin levels, history of recurrent acute pancreatitis, history of previous PEP; Factors associated with endoscopist are inexperienced endoscopist, hard cannulation, cannulation without guide wire, abstain from pancreatic duct and stenting at high-risk procedures; and factors associated with ERCP technique are contrast injection to the pancreatic duct, pancreatic sphincterotomy, precut access, balloon dilatation, Oddi manometry and endoscopic ampullectomy (3,7,8).

In this study, we did not measure endoscopist-related risk factors and procedure-related risk factors. It is possible that the operator experience or the volume load of ERCP procedures in the ERCP centers affect the incidence of post-ERCP pancreatitis. However, a recent large multicenter trial by Testoni et al. (7) suggested that although incidence of pancreatitis was higher in high-volume centers (3.9% vs. 3.1%), the rate had no significant difference. Similarly, Freeman et al. (6) observed that case volume did not affect incidence of pancreatitis. In a study by Cheng et al. (8), it was observed that trainee involvement in the procedure is a risk factor for post-ERCP pancreatitis, but Vitte and Morfisse (12) reported no risk associated with operator inexperience. Although we did not evaluate the results of each endoscopist in our center, the low rate of complications could be an indicator of factors not related to the operator.

Although female sex and age are defined risk factors for pancreatitis, these two were not associated with any clinically significant risk of post-ERCP pancreatitis in our study. These results are in agreement with Tetson et al. (7), but are in contrast to other previous reports (13-15).

Unlike mostly identified factors in various studies, there are some factors that have only been reported in one or few studies and require further studies. It is shown that some pancreato-toxic drugs as well as angiotensin

receptor blockers and smoking are risk factors for post-ERCP pancreatitis (16,17), while some have reported smoking as a factor that reduces the post-ERCP pancreatitis (12).

BMI is another possible risk factor for post-ERCP pancreatitis which needs further studies. In this study we observed that lower BMI was a significant independent risk factor of post-ERCP pancreatitis which could increase 1.5 times the risk of this complication. Similarly, Döbrönte and colleagues (18) observed that post-ERCP pancreatitis was higher in patients with BMI lower than 25 kg/m². Xu et al. (19) also indicated that BMI might be a risk factor for post-ERCP pancreatitis, but they measured the risk to be higher in BMI ≥ 24 kg/m². Unlike these reports, Deenadayalu et al. (20) reported that obesity did not accompany an increased risk for ERCP-induced pancreatitis. Due to the discrepancies among these studies, more studies should be performed to yield a better understanding of this risk factor.

Conclusion

Pancreatitis is the most common post-ERCP complication, and low body mass index is an independent risk factor of its occurrence. It is crucial to identify high risk patients to reduce complications of the procedures. Prompt identification and treatment of the complications would prepare better outcome and reduce undesirable morbidity and mortality.

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