

# Effect of the size and type of the periampullary diverticulum on Post ERCP pancreatitis



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## Background

Endoscopic retrograde cholangiopancreatography (ERCP) is now the exclusive endoscopic therapeutic modality for biliary as well as pancreatic diseases. The correlation between Post-ERCP pancreatitis (PEP) and periampullary diverticulum was evaluated in many studies. However, the incidence of Post-ERCP pancreatitis, according to the types of diverticulum was not elucidated. The aim of this study was to investigate risk factors for post-ERCP pancreatitis including types of diverticulum.

## Results

Following the ERCP, 62 (31%) patients suffered PEP. In univariate analysis, periampullary diverticulum (especially type 1 and 2), cannulation time and procedure time had correlation with post-ERCP pancreatitis (p-values= 0.016, 0.005, and 0.017, respectively). The other hand, the angle of CBD, EST were not meaning risk factors in this study (p-values= 0.676, and 0.585, respectively). Age-sex adjusted multivariate analysis showed age, periampullary diverticulum, cannulation time, and duration of procedure as independent risk factors for PEP (p-values= 0.032, 0.041 and 0.003, respectively). Type 1 and 2 of periampullary diverticulum were main risk factor for PEP (area under receiver operator characteristic curve (AUROC) 0.698; p=0. 002), followed by procedure time (AUROC 0.670; p=0. 007), cannulation time (AUROC 0.665; p=0. 009).

## Methods

This is a retrospective case-control study, which included a total of 200 ERCPs, performed by four endoscopists in a single center. 62 patients with PEP, and 138 patients without PEP were enrolled. The correlation between PEP and risk factors, including periampullary diverticulum, angle of common bile duct (CBD), endoscopic sphincterotomy (EST), cannulation time, procedure time, and periampullary diverticulum types were investigated by univariate and multivariate analyses. The types of periampullary diverticulum were classified by the location of ampulla of Vater (type 1: inside the diverticulum; type 2: on the margin of the diverticulum, type 3: outside the diverticulum). Diverticulum were classified into three types by the location of ampulla of Vater: 1, inside the diverticulum; 2, on the margin of diverticulum; 3, outside the diverticulum.

## Conclusions

PAD, especially Type 2 PAD, cannulation time and procedure time were risk factor for PEP in univariate analysis. However, only cannulation time was significant related to PEP in multivariate analysis. Although, this study had limitations of retrospective case-control study, prospective randomized control study in multi-center was required.

Factors	PAD Abscent (n=155)	PAD Present (n=128)	P-value
Mean age (year)	59.5 ± 17.1	70.8 ± 12.7	<0.001
Male sex (N,%)	67 (43.2%)	61 (47.7%)	0.456
Cholangitis (N,%)	141 (91%)	121 (94.5%)	0.255
CBD stone (N,%)	74 (86%)	69 (98.6%)	0.005
CBD stone size	4 ± 0.0	9.1 ± 2.4	0.146
Previous Cholecystectomy (N,%)	15 (25.9%)	14 (28.6%)	0.288
GB stone (N,%)	44 (78.6%)	27 (60.0%)	0.042
CBD diameter	4.6 ± 5.1	13.9 ± 2.9	0.04
Total bilirubin	2.8 ± 3.5	2.6 ± 1.7	0.665
AST	172 ± 206	152 ± 161	0.594
ALT	223 ± 258	151 ± 154	0.096
ALP	235 ± 167	296 ± 240	0.151
GGT	339 ± 281	611 ± 1648	0.268
Post ERCP pancreatitis	69 (44.5%)	73 (357%)	0.036
EST	94 (82.5%)	93 (83%)	0.908
ERCP cannulation time	20.5 ± 13.3	19.9 ± 13.1	0.722
ERCP total procedure time	40.5 ± 17.1	40.1 ± 17.2	0.816

Table 1. Baseline characteristics

Factors	PEP Abscent (n=55)	PAD Present (n=74)	P-value
All type PAD (N,%)	55 (43%)	73 (57%)	0.036
Type 1 PAD	3 (50%)	3 (50%)	
Type 2 PAD	26 (32.9%)	53(67.1%)	0.018
Type 3 PAD	26 (59.1%)	18(40.9%)	

Table 2. Post ERCP pancreatitis according to PAD type

Risk Factors	P-value	Odds Ratio	95% CI
All type PAD	0.036	1.654	1.032-2.652
Type 1 PAD	0.732	0.709	0.142-3.772
Type 2 PAD	0.005	2.815	1.354-5.852
Type 3 PAD	0.007	0.359	0.169-0.759
Cannulation time	0.004	2.876	1.423-7.603
Total procedure time	0.009	2.635	1.358-9.378
Angle of CBD	0.373	0.893	2.652-7.053
History of EST	0.405	1.341	0.671-2.679

Table 3. Risk factors in univariate analysis