

ORIGINAL RESEARCH

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The relationship between sphincterotomy methods and post ercp pancreatitis**Yahya Atayan***Malatya Education and Researches Hospital Department of Gastroenterology, Malatya, Turkey*

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Post (ERCP) pancreatitis (PEP) is the most commonly seen complication after endoscopic retrograde cholangio-pancreaticography (ERCP). It is associated with pancreatic hyperamylasemia and persistent abdominal pain. It can be classified as mild, moderate and severe. During ERCP, bile ducts or pancreatic duct can be cannulated using standard sphincterotomy or needle-tipped sphincterotomy methods and contrast material is injected in order to view these ducts. In this study, we aimed to examine whether the use of sphincterotomy methods and pancreatic canal interventions poses a risk in the development of PEP, which is the most common complication after ERCP. Of the 445 patients who underwent ERCP, 270 had standard sphincterotomy and 175 had Needle-knife sphincterotomy (NKS). Patients who were cannulated with pancreatic duct and injected with contrast agent during the procedure and patients who were diagnosed with PEP according to the revised Atlanta criteria, were included in the study. Of 445 patients, 187 were male (39.7%) and 258 were female (60.3%). After successful sphincterotomy, stone extraction basket and / or balloon procedure was applied to all patients. Of the 270 patients, 13(2.9%) patients developed PEP and 9 of these patients had pancreatic duct cannulation and contrast agent injection during the procedure. PEP development was statistically significant in patients with pancreatic duct cannulation ($p < 0.01$). Of 175 patients who underwent NKS, procedure was successful in 168 (96%) patients but 27(6.1%) patients developed PEP. 18 of the patients who developed PEP had pancreatic duct cannulation and contrast material injection. PEP development was statistically significant in patients with pancreatic duct cannulation ($p < 0.01$). We concluded that the factors increasing the incidence of PEP, which is the most common complication after ERCP are repeated unsuccessful attempts, pancreatic canal entry and contrast agent injection during the procedure. And NKS was found to have higher PEP development compared to standard sphincterotomy.

Keywords: Sphincterotomy, ERCP, Pancreatitis**Introduction**

Post-ERCP pancreatitis (PEP) is the most commonly seen complication after endoscopic retrograde cholangiopancreaticography (ERCP) which is used in diagnosis and treatment. It is associated with pancreatic hyperamylasemia and persistent abdominal pain. It can be classified as mild, moderate and severe. Although 75% of cases with PEP are benign self-limiting, 25% are moderate / severe and may even result in death [1]. In many large studies, the rate of PEP is found to be between 1.6-15.1% [2]. In some studies, the frequency ranging up to 24.4% has been reported [3]. The pathogenesis of PEP is not exactly known. The most frequently discussed theory is; the trauma developed during difficult cannulation of papillae causes edema. As a result, the papillae become narrower, preventing the passage of the pancreas into the intestine, resulting in pancreatitis attack and the activation of inflammatory pathways. Needle-knife

sphincterotomy (NKS) refers to a technique in which electrocautery is used to enter the biliary and pancreatic duct in ERCP cases where standard sphincterotomy fails or is not preferred during ERCP. Which case will be evaluated as difficult ERCP, varies from study to study, The most common way of evaluation is the inability to perform choledochal cannulation without pre-incision papillotomy. In this study, we aimed to investigate the relationship between interventions during ERCP and PEP development.

Material and Methods

445 patients who underwent ERCP between January 2016 and October 2018, were included in the study. The ERCP indications of the patients were determined after confirming cholangitis by USG or MRCP in patients who were considered to have cholestasis under clinical and laboratory conditions. The decision to perform NKS during the ERCP procedure was made because the bile duct could not be cannulated with the ERCP catheter or standard sphincterotomy within 10 minutes or after repeated pancreatic duct cannulation. After cannulation of the bile duct, all patients underwent stone extraction basket and / or balloon

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after sphincterotomy. PEP was diagnosed using revised Atlanta criteria. The patients were divided into two groups as standard sphincterotomy with direct cannulation and patients who underwent NKS as they couldn't be cannulated. Furthermore, the patients were divided into subgroups as pancreatic duct cannulated patients and non-cannulated patients.

Results

Of 445 patients, 187 were male (39.7%) and 258 were female (60.3%). 270 (60.6%) patients underwent standard sphincterotomy while 175 (39.4%) patients underwent NKS. Hyperamylasemia was developed in 23 of 270 patients who underwent standard sphincterotomy after direct cannulation. 10 patients developed mild hyperamylasemia and 13 (2.9%) patients developed PEP. In 9 of the patients who developed PEP, pancreatic duct cannulation and contrast agent injection were present during the procedure. In the other 4 patients, PEP developed although there was no pancreatic duct cannulation. PEP development was statistically significant in patients with pancreatic duct cannulation ($p < 0.01$, table 1). Of 175 patients who underwent NKS, 168 (96%) patients had successful cannulation. 52 of 175 patients developed hyperamylasemia, while 25 patients had mild hyperamylasemia and 27 (6.1%) patients developed PEP. PEP development was statistically significant in patients with NKS ($p < 0.01$). Pancreatic duct cannulation and contrast agent injection was present in 18 of the patients who had developed PEP in the NKS group. 2 of these patients had moderate pancreatitis while one patient had severe pancreatitis. PEP developed in 9 patients, although they didn't have pancreatic duct cannulation. PEP development was statistically significant in patients with pancreatic duct cannulation ($p < 0.01$, table 1). It was determined that basket and / or balloon procedures performed in order to remove stones after bile duct cannulation did not increase the risk of PEP. Of 63 male patients who underwent NKS, 24 patients developed hyperamylasemia while 39 patients didn't. Of 105 female patients, 28 patients developed hyperamylasemia while 77 patients didn't. There was no significant difference in the risk of developing PEP between genders.

Table 1. Patients who developed PEP and the applied procedures.

Parameters	Patients	NKS 175(39.4)	Standard sphincterotomy 270(60.6)
PEP not developed	405 (91)	148	257
Pancreatic duct cannulation and PEP	27 (6.1)	18	9
Without pancreatic duct cannulation and PEP	13 (2.9)	9	4
P value		<0.01*	<0.01**

Results are expressed as number of patients and percent
*P < 0.05 versus group II; **P < 0.05 versus group

Discussion

In order to diagnose PEP, two of the three criteria should be met according to the revised Atlanta criteria: pain which is compatible with acute pancreatitis within the first 24 hours after ERCP, 3 fold increase in normal upper value of amylase or lipase and specific findings in abdominal imaging (MR, BT, USG) [4]. This

classification is also grouped as mild, moderate and severe as acute pancreatitis. The risk of PEP in patients who undergo ERCP, varies depending on various factors. These factors may be related to the operator, associated with the patient or associated with the procedures [5,6]. Process related factors include difficult biliary cannulation, pancreatic duct injection, manometric procedure for oddi sphincter, needle knife sphincterotomy, pancreatic sphincterotomy, minor papilla sphincterotomy, biliary balloon sphincteroplasty and ampullectomy [7,8]. After ERCP, 35-70% of patients develop asymptomatic hyperamylasemia (without abdominal pain). Many maneuvers performed during ERCP can lead to the development of pancreatitis and other complications. In the pathogenesis of PEP, repeated cannulation attempts of papillae and repeated contrast agent injections into the pancreatic duct can cause damage to the canal epithelium and acinar cells [9]. Even though there are studies suggesting that standard sphincterotomy increases the risk of PEP development, the mechanism can not be described properly and cannulation efforts during the procedure are thought to be related to interventions before or after sphincterotomy [10]. In cases where the standard cannulation is insufficient, NKS is applied. NKS is difficult to administer, but has been shown to be a safe procedure when performed by an experienced endoscopist at appropriate indication [11]. In order to reduce the risk of repeated traumatic intervention in difficult cannulation, NKS may increase the success rate and reduce the risk of complications.

In the study of Zhou PH et al., of 91 difficult cannulation patients NKS was applied in 43 patients. The success rate was 91% and average time was 5,6 minutes with a complication rate of 9%. The success rate of patients who were included in cannulation studies with standard sphincterotomy was 75%, time duration of the procedure was 20,2 minutes, and the complication rate was 15% [12]. Similarly, in our study, the success rate was 60.6% (270 of 445 patients) in patients who underwent direct cannulation and then standard sphincterotomy. We performed NKS to 175 patients because of difficult cannulation or multiple pancreatic cannulations, and the success rate was 96% (168 patients).

In a retrospective study by Ahmadi et al., 79 ERCP patients underwent standard sphincterectomy, 67 patients in the first attempt and 5 patients on the second attempt, Operation failed in 7 patients. The success rate was 91%, complication rate was 10% in 8 patients, bleeding was observed in 5 (6%) patients and PEP was developed in 3 (4%) patients [13]. In the retrospective study of Siddiqui AR et al., NKS was applied in 59 of 515 ERCP patients and the success rate was 95% (56 patients). The complications developed related to the procedure were PEP in 3 patients (5%) and bleeding in 3 patients [14]. In a retrospective study by Lawrence C et al., 510 patients had undergone ERCP and 25 (6.4%) of 395 (77.5%) cases who had NKS, developed PEP [15]. In the study of Bailey AA et al., 94 of 732 ERCP patients underwent NKS due to difficult cannulation. Cannulation was performed successfully in 80 patients. 14 patients (14.9%) developed PEP and after standard sphincterotomy, 38 (6.1%) of 638 patients developed PEP and it was concluded that there was an increasing number of interventions in the papillary cannulation of the PEP incidence-increasing factor [16]. Similarly, in our study, in 270 of 445 patients with ERCP, successful sphincterotomy was performed after direct cannulation and PEP was developed in 13 patients as a complication. 9 of these patients had pancreatic duct intervention

and contrast agent injection. NKS was performed in 175 of the patients due to difficult cannulation and procedure was successful in 168 patients. PEP clinic was developed in 27 patients and 18 of these patients had pancreatic duct intervention and contrast agent injection.

Conclusion

As a result, in our study; In accordance the studies conducted in the literature, NKS, was found to have higher PEP development compared to standard sphincterotomy but the main risk factors are repeated unsuccessful attempts, frequent pancreatic with cannulation and contrast agent injection during the procedure. Therefore, in case of extension of the ERCP procedure, we think that NKS may decrease the risk of developing PEP without increasing the number of failed procedures.

Competing interests

The authors declare that they have no competing interest.

Financial Disclosure

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Ethical approval

Ethics committee approval was not taken due to retrospective study.

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