

ROLE OF PANCREATIC STENT PLACEMENT IN PREVENTION OF POST ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY PANCREATITIS: EXPERIENCE AT A TERTIARY CARE HOSPITAL IN PAKISTAN

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ABSTRACT

Objective: To determine the frequency of Post Endoscopic Retrograde Cholangiopancreatography Pancreatitis (PEP) in patients who underwent prophylactic pancreatic duct stenting.

Study Design: Descriptive case series.

Place and Duration of Study: This descriptive case series was conducted at the department of Gastroenterology, Pak Emirates Military Hospital Rawalpindi, from Jul 2017 to Feb 2018.

Material and Methods: One hundred and twenty consecutive patients were enrolled after they met inclusion and exclusion criteria. Endoscopic Retrograde Cholangiopancreatography Pancreatitis (ERCP) was performed by Olympus duodeno scope (TJF Q180V) by an endoscopist having at least 3 years experience of performing independent ERCs. An additional 4, 6, or 7cm long 5FrGreen® pancreatic plastic stent (Cook Medical) was placed in all cases where pancreatic duct was accidentally cannulated. Primary outcome variable was post ERCP pancreatitis. Data was recorded on a pre-designed proforma and analyzed by SPSS version 21.0.

Results: Out of total 120 cases, PEP was found in 4 (3.3%) patients. All the 4 patients had mild pancreatitis.

Conclusion: PEP is not an uncommon complication following ERCP. The rate of PEP appears to be lower with prophylactic pancreatic duct stenting.

Keywords: Endoscopic retrograde cholangiopancreatography (ERCP), Pancreatic duct, Pancreatitis.

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INTRODUCTION

Endoscopic retrograde cholangiopancreatography (ERCP) is a routine procedure nowadays used in the diagnosis and treatment of various biliary tract pathologies¹. Therapeutic ERCP poses a significant challenge for the endoscopist. Therefore, it needs rigorous focused training and experience to maximize efficacy and safety². ERCP can cause multiple complications with the most common one being post ERCP pancreatitis (PEP). Other complications include hemorrhage, perforation, cholangitis, cholecystitis, stent related complications, and cardiopulmonary complications³. Post ERCP pancreatitis is defined according to the following criteria: 1: Epigastric pain with radiation to the back, 2: Elevation of amylase and/or lipase at least 3 times higher than normal³. Radiological imaging that suggests

pancreatitis⁴. At least two of the above mentioned criteria are required to establish the diagnosis. It can be graded as mild, moderate, or severe based upon cotton's criteria according to length of hospital stay⁵. Various risk factors have been identified including difficult cannulation, pancreatic duct cannulation, pancreatic duct contrast injection, balloon sphincteroplasty, young age and female gender⁶. According to estimates, frequency of PEP ranges from 1 to 40 percent⁶. A recent local study by Leghari *et al*⁷ reported a complication rate of 3.6% for PEP. Another local study by Zubair *et al*⁸ reported an incidence rate of 4.78% for PEP. This complication rate is quite high and keeping in view the increased mortality and morbidity associated with pancreatitis, there is a need to reduce the occurrence of PEP. Numerous methods exist for this purpose including administration of rectal NSAIDs, prophylactic pancreatic stent placement and other drugs such as glyceryltrinitrate, indomethacin and N-acetyl cysteine⁴. To date, multiple studies have

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evaluated the role of prophylactic pancreatic stent placement in reducing incidence of PEP. A recent study by Ajdarkosh *et al*⁹ showed that overall post ERCP pancreatitis rates were 4.0% and 16.6% in stent and non-stent groups, respectively. A metaanalysis by Choudhary *et al*¹⁰ concluded that pancreatic stent placement decreased the risk of post-ERCP pancreatitis. Despite all this, there is not even a single local study which investigated the role of pancreatic stenting in reducing PEP. So we decided to conduct this study with the aim of determining the efficacy of prophylactic pancreatic stenting in decreasing the frequency of post ERCP pancreatitis.

PATIENTS AND METHODS

This descriptive case series was conducted from July 2017 to February 2018 at department of Gastroenterology, Pak Emirates Military Hospital, Rawalpindi. The sample size was calculated using Open Epi calculator with the statistical assumptions of 5% alpha error and 95% confidence interval taking anticipated frequency of post ERCP pancreatitis to be 4% and came out to be minimum 60 patients for the study⁸. One hundred and twenty consecutive patients fulfilling the inclusion criteria were enrolled in the study. Inclusion criteria was patients with age greater than 18 years; patients in whom pancreatic duct was cannulated accidentally; confirmed benign or malignant bile duct disorders diagnosed radio-logically and normal baseline serum amylase levels. Exclusion criteria were as follows: 1 inability to pass a guidewire beyond the genu of pancreatic duct (2) previous endoscopic sphincterotomy (EST) or endoscopic papillary balloon dilation (EPBD), (3) pancreas divisum or any primary pancreatic pathology and (4) previous history of surgery on the biliary or pancreatic systems. Written informed consent was taken from all the patients and the data regarding patient's demographics was entered on a predesigned proforma. Ethical approval of the study was obtained from institutional review board (IRB). Procedure was done under conscious sedation with midazolam and propofol. In all patients, adequate hydration was

ensured before and during the procedure. Rectal NSAIDs were not given. The ERCP was performed by Olympus duodenoscope (TJF Q180V) by an endoscopist having at least 3 years experience of performing independent ERCs. The duodenal papilla was identified using a duodenal endoscope followed by sequential insertion of the guidewire, cholangiography with balloon sweeping and/or biliary stent placement depending on each case. An additional 4, 6, or 7cm long 5 Fr Geenen® pancreatic plastic stent (Cook Medical) was placed in all cases where pancreatic duct was accidentally cannulated. All patients were clinically evaluated at 4 hours and 24 hours after the procedure. Primary outcome

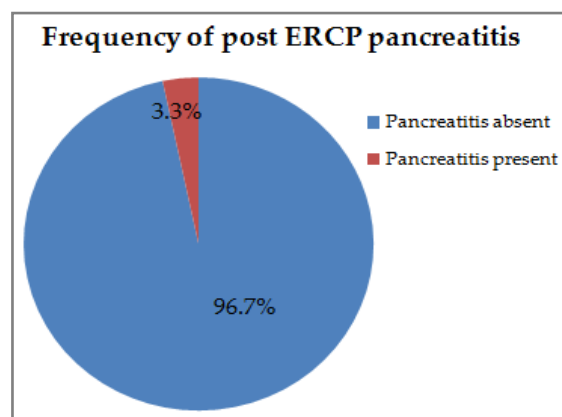


Figure: Frequency of Post ERCP Pancreatitis.

variable was post ERCP pancreatitis defined as abdominal pain lasting for 24 hours or more after ERCP with serum amylase level ≥ 3 times the normal. Pancreatitis was graded into mild, moderate and severe according to Cotton's criteria¹⁰ Secondary outcomes included frequency of hyperamylasemia, stent displacement, perforation, hemorrhage and infection. SPSS software (SPSS version 21.0) was used for data analysis. Descriptive statistics were calculated for both qualitative and quantitative variables. Gender, PEP and degree of pancreatitis were expressed as frequencies & percentages. Mean \pm SD was calculated for age and serum amylase levels.

RESULTS

Overall 120 patients participated in the study including 50 men and 70 women with a mean age of 45 ± 10.86 years (table-I). Only 4 (3.3%) patients

developed post ERCP pancreatitis (figure). All the 4 patients had mild pancreatitis (table-II). Table-III depicts the indications for ERCP in all patients. The most common indication was choledocholithiasis accounting for 50 out of 120 cases. Mean amylase level at 4 hours and 24

Difficult cannulation was observed in 104 patients (86.7%) (table-IV).

DISCUSSION

Post ERCP pancreatitis (PEP) is a well known complication of ERCP. Although the

Table-I: Baseline demographic and clinical characteristics of patients.

Characteristics		N=120	
Mean age (years)		45 ± 10.86	
Gender	Females	70 (58.3%)	
	Males	50 (41.7%)	
Indications for ERCP			
Cholangiocarcinoma	Perihilar	14 (11.7%)	20 (16.7%)
	Distal	6 (5%)	
Stricture CBD		10 (8.3%)	
CA head of pancreas		18 (18%)	
Periampullary Carcinoma		18 (15%)	
Bile leak		4 (3.3%)	

Table-II: Frequency according to severity of pancreatitis.

Severity of Pancreatitis	N=120
No pancreatitis	116 (96.7%)
Mild pancreatitis	4 (3.3%)
Moderate pancreatitis	0 (0%)
Severe pancreatitis	0 (0%)

Table-III: PEP and other ERCP-associated morbidities.

Complications	N=120
Post ERCP pancreatitis (%)	4 (3.3%)
Hyperamylasemia	90 (75%)
Postoperative bleeding (%)	1 (0.8%)
Postoperative perforation (%)	0 (0%)
Postoperative infection (%)	0 (0%)
PDS displacement (%)	1 (0.8%)
Mortality (%)	0 (0%)

Table-IV: Operative data of ERCP.

Operative techniques	N=120
Mean cannulation time (min)	4.93 ± 3.51 min
Pre-cut sphincterotomy	12 (10%)
Pancreatic duct contrast injection	12 (10%)
Pancreatic sphincterotomy	100 (83.3%)
Difficult cannulation	104 (86.7%)
Sphincterotomy followed by balloon sphincteroplasty	13 (10.8%)

hours was 276.47 ± 509.23 and 188.27 ± 298.67 respectively. After procedure, hyperamylasemia was observed in 75% of the patients. Other post ERCP complications are enlisted in table-III. Pancreatic stent displacement occurred in only 1 case and just 1 patient developed hemorrhage. Mean cannulation time was 4.93 ± 3.51 min.

mechanism of PEP is still unknown, pancreatic duct pressure and damage to the pancreatic duct could possibly play a role¹¹. Various risk factors play a role in development and progression of pancreatitis after ERCP. These include certain patient related risk factors such as age <60 years and female gender etc. and various procedure

related factors including difficult cannulation, precut sphincterotomy, pancreatic duct contrast injection, balloon sphincteroplasty and many more⁴. It is crucial to address these controllable risk factors in order to reduce the occurrence of PEP. One such method is the use of prophylactic pancreatic duct (PD) stenting. An exact mechanism of prevention of PEP with pancreatic stent is unknown but it is proposed that it preserves the flow of pancreatic secretions across any flow disruptions caused by injury or edema¹². We conducted this study with the primary objective of determining the frequency of PEP in patients who underwent prophylactic PD stenting after unintended pancreatic cannulation and to compare it with data from other studies without PD stenting. Our study showed PEP was present in about 3.3% of the patients. This was comparable to findings of Ito *et al*¹³ who reported PEP frequency to be 2.9% in those who underwent PD stenting. However, it was lower compared to PEP rate reported by Yin *et al*¹⁴ (7.7%). The PEP rate was considerably higher in those who did not undergo stenting (23% in Ito *et al* study and 17.7% in Yin *et al* study). We found out that all the 4(3.3%) patients had mild pancreatitis. This was consistent with the findings of Leghari *et al*⁷ and Ito *et al*¹² who reported 3.6% and 2.9% patients were having mild pancreatitis respectively. We found that about 86.7% of the patients had difficulty in cannulation which was close enough to that reported by Yin *et al*¹³ i.e 89.4%. Since difficult cannulation is an independent risk factor for PEP, this could account for the higher rate of PEP in Yin *et al* study¹³ (7.7% vs 3.3% in our study). The most common indication for performing ERCP in our study was choledocholithiasis as in other studies^{7,12-13}. Our study reported 75% of the patients developed hyperamylasemia which was more than double the percentage reported by Leghari *et al* (32.4%)⁶. This could be attributed to the much lower percentage of people who underwent pancreatic sphincterotomy, pancreatic duct cannulation and difficult in cannulation. There were certain limitations to our study. Perhaps the single most important draw-

back was the fact that we did not have a control group; rather we went for a descriptive study design and compared our results with those from previous studies in order to fulfill our objective. Secondly, ERCPs were done by multiple endoscopists rather than a single person. The skill can vary from person to person. In order to minimize this bias we made sure that only those endoscopists performed ERCP who had at least 3 years experience of performing independent endoscopies

CONCLUSION

PEP is not an uncommon complication following ERCP. The rate of PEP appears to be lower with prophylactic pancreatic duct stenting.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

REFERENCES

1. Yachinski PS, Ross A. The future of endoscopic retrograde cholangiopancreatography. *Gastroenterology* 2017; 153(2): 338-44.
2. Wani S. Training in advanced endoscopy. *Gastroenterology & hepatology* 2017; 13(11): 685.
3. Mallery JS, Baron TH, Dominitz JA, Goldstein JL, Hirota WK, Jacobson BC, et al. Complications of ERCP: A prospective study. *Gastrointest Endosc* 2003; 57: 633-8.
4. Hoseini SM, Esmaeelzadeh A, Salari M, Dadpour B, Yekta Roudi K, Yekta Roudi M, et al. Prevention of post-endoscopic retrograde cholangiopancreatography pancreatitis. *Reviews in Clinical Medicine* 2014; 1(3): 149-53.
5. Cotton PB, Lehman G, Vennes J, Geenen JE, Russell RC, Meyers WC, et al. Endoscopic sphincterotomy complications and their management: an attempt at consensus. *Gastrointestinal endoscopy* 1991; 37(3): 383-93.
6. Chen B, Fan T, Wang CH. A meta-analysis for the effect of prophylactic GTN on the incidence of post-ERCP pancreatitis and on the successful rate of cannulation of bile ducts. *Boston Med Cent Gastroenterol* 2010; 10: 85.
7. Leghari A, Ghazanfar S, Qureshi S, Taj MA, Niaz SK, Quraishy MS. Frequency and risk factors in the post-ERCP pancreatitis in a tertiary care centre. *J Coll Physicians Surg Pak* 2013; 23(9): 620-4.
8. Zubair M, Hyder A, Zaidi AR. Frequency and contributing factors for acute pancreatitis after endoscopic retrograde cholangiopancreatography in patients with obstructive jaundice. *Pak Armed Forces Med J* 2017; 67 (5): 783-87.
9. Ajdarkosh H, Hemasi G, Zamani F, Sohrabi M, Zamani MM, Khoonsari M. Prophylactic Pancreatic Stents in High-Risk Population and Post-Endoscopic Retrograde Cholangio-pancreatography Pancreatitis. *GMJ* 2015; 4(2): 67-71.
10. Choudhary A, Bechtold ML, Arif M, Szary NM, Puli SR, Othman MO et al. Pancreatic stents for prophylaxis against post-

- ERCP pancreatitis: A meta-analysis and systematic review. *Gastrointestinal endoscopy* 2011; 73(2): 275-82.
11. Ishikawa-Kakiya Y, Shiba M, Maruyama H, Kato K, Fukunaga S, Sugimori S, et al. Risk of pancreatitis after pancreatic duct guidewire placement during endoscopic retrograde cholangiopancreatography. *PloS one* 2018; 13(1): e0190379.
 12. Thaker AM, Mosko JD, Berzin TM2. Post-endoscopic retrograde cholangiopancreatography pancreatitis. *Gastroenterol Rep (Oxf)* 2015; 3(1): 32-40.
 13. Ito K, Fujita N, Noda Y, Kobayashi G, Obana T. Can pancreatic duct stenting prevent post-ERCP pancreatitis in patients who undergo pancreatic duct guidewire placement for achieving selective biliary cannulation? A prospective randomized controlled trial. *J Gastroenterol* 2010; 45(11): 1183-91.
 14. Yin HK, Wu HE, Li QX, Wang W, Ou WL, Xia HH. Pancreatic stenting reduces post-ERCP Pancreatitis and biliary sepsis in high-risk patients: A randomized, Controlled Study. *Gastroenterol Res Pract* 2016; 9687052: 10.
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