

Compare the Efficacy of Prophylactic Placement of Pancreatic Duct Stenting versus No Stenting during ERCP to Prevent Post ERCP Pancreatitis

INAYATULLAH KHAN¹, ASMATULLAH², MIRWAIS KAKAR³, SADIA JABBAR⁴, BILAL AHMED⁵

¹FCPS Gastroenterology Registrar Shaikh Zayed Hospital Lahore.

²FCPS Gastroenterology Registrar Shaikh Zayed Hospital Lahore.

³Registrar Gastroenterology PIMS Islamabad.

⁴FCPS Gastroenterology Registrar Shaikh Zayed Hospital Lahore.

⁵MS General Surgery Senior Registrar Gambat Institute of Medical Sciences,

Correspondence to: Dr Inayatullah Khan, Email: dr_inayat29@yahoo.com, Cell No: +923337821229

ABSTRACT

Objective: To compare the efficacy of prophylactic placement of pancreatic duct stenting versus no stenting during ERCP to prevent post ERCP pancreatitis.

Study Design: Randomized controlled Trial

Place and Duration: Conducted in Gastroenterology department at Shaikh Zayed Hospital Lahore, for duration of 6 months from November 2019 to April 2020.

Methodology: Two hundred patients of both genders with ages 18 to 60 years underwent ERCP were enrolled in this study. Patients were randomized into two groups. Group A (100) were those patients who had prophylactic stent and group B (100) was the cases who did not have prophylactic stent during ERCP. Serum amylase was sent within 24 hours. Efficacy was evaluated if patient did not develop pancreatitis after ERCP assessed at 24 hour after ERCP. All data was entered into SPSS version 20 and analyzed.

Results: Mean age of 34.67±9.08 years (range=2-0-59). Majority of the patients were male 77.5% while female cases were 22.5%. The efficacy in terms of absence of pancreatitis because of the procedure was noted in 164(82%) overall ERCP cases. Patients in group A who had prophylactic stenting did not develop pancreatitis after ERCP within 24 hour while no pancreatitis after 24 hour of ERCP was noted in 74(74%) of cases in group B in which no stenting was carried out (p-value=0.003) and this difference was statistically significant.

Conclusion: It is concluded that stent placement can result in the reduction of frequency of patients who develop acute pancreatitis after ERCP.

Keywords: ERCP, Pancreatitis, Stent

INTRODUCTION

Endoscopic retrograde cholangiopancreatography (ERCP) plays a vital role in not only the diagnosis but also the treatment of various bile duct and pancreatic diseases. Along its diagnostic and therapeutic benefits, it also carries the risk of some life threatening complications. Post-ERCP pancreatitis (PEP) is a common and serious complication of ERCP, and the incidence of Post-ERCP pancreatitis ranges from 1% to 30%¹.

Post ERCP pancreatitis can be classified on the basis of severity into mild, moderate and severe. Severity is assessed on the basis of post procedure length of hospital admission and upon the need of any intervention. Risk factors for post ERCP pancreatitis can be divided into patient-related risk factors, endoscopist-related risk factors and procedure-related risk factors. Patient-related risk factors for post ERCP- pancreatitis include younger age, female sex, normal serum bilirubin, recurrent pancreatitis, prior ERCP-induced pancreatitis and sphincter of Oddi dysfunction. Endoscopist-related risk factors include difficult cannulation, pancreatic duct injection, sphincter of Oddi manometry, precut sphincterotomy, pancreatic sphincterotomy and minor papilla sphincterotomy. Procedure-related factors may include trainee involvement in procedure².

Several measures can be taken to prevent this life threatening complication of ERCP. These measures

include pancreatic duct stenting and rectal indomethacin, amongst others.³

A study compared two groups of patients undergoing ERCP with or without pancreatic duct stent placement and found that the incidence of post ERCP pancreatitis was 12% in patients with prophylactic pancreatic duct stent placement whereas its incidence was 29.4% in patients without pancreatic duct stenting⁴.

In another study Ito K et al found the frequency prophylactic efficacy present in the stent group i-e 97.1% as compared to the non stent group which was 77%⁵.

Similar results were reported in two separate Meta analysis conducted by Choudhary and colleagues in 2011 and by Mazaki T et al in 2014⁶⁻⁷.

While in another study that was conducted earlier the prophylactic efficacy of stent without was 33.3% while with stent was 85.6%⁸.

In our population studies have been carried out to see the incidence of post ERCP pancreatitis however no literature is available regarding the prophylactic pancreatic duct stent placement to prevent the post ERCP pancreatitis. Aftab Leghari and colleagues in one study evaluated the frequency and associated risk factors in the development of post ERCP pancreatitis and reported the incidence of post ERCP pancreatitis to be 3.6%⁹. Mild pancreatitis was found in 3%, moderate pancreatitis in 0.2% and severe pancreatitis in 0.4% of patients. Hyperamylasemia was found in 32.4% patients.⁹

This study not only clarify the efficacy of stent placement in international literature but also produce data for our local population. If efficacy was found high of stent that it could be adopted as common practice in patients undergoing ERCP.

MATERIALS AND METHODS

This randomized controlled trial was conducted in Gastroenterology department at Shaikh Zayed Hospital Lahore, for duration of 6 months from November 2019 to April 2020. Total 200 patients of both genders with ages 18 to 60 years underwent ERCP were enrolled in this study. After taking informed written consent, detailed demographics including age, sex, stone size and complete blood count were recorded. Patients with previous history of pancreatitis, history of sphincterotomy, biliary malignancy and those with no consent were excluded.

Patients were randomized into two groups. Group A (100) was consist of those patients who had been implant stent preoperatively and group B (100) was the cases who were not have preoperative stent during ERCP. Pancreatic duct stent was provided by department of gastroenterology Shaikh Zayed Hospital Lahore. Serum amylase was sent at 24 hours. Efficacy was evaluated if patient did not develop pancreatitis after ERCP assessed at 24 hour after ERCP.

All data was entered into SPSS version 20 and analyzed. The quantitative data like age was presented as means and standard deviation. Qualitative variables like gender and prophylactic efficacy were presented as frequency and percentage. Stratification was done with respect to age, gender and size of stent between groups to compare efficacy and chi-square test was applied post stratification with P value ≤0.05 considered as significant.

RESULTS

There were 70% males and 30% females with mean age 32.54±8.91 years while in group B 60% males and 40%

females with mean age 33.32±8.01 years. In group A and B 42 (42%) and 47 (47%) patients had stone size 1-5mm while 58% and 53% patients had stone size >5mm. No significant difference was observed between both groups regarding age, sex and size of stone (p=>0.05). (Table 1)

Table No 1: Baseline details of all the patients

Variables	Group A (Stent)	Group B (No stent)
Mean Age (yrs)	32.54±8.91	33.32±8.01
Gender		
Male	70 (70%)	60 (60%)
Female	30 (30%)	40 (40%)
Stone Size (mm)		
1 to 5	42 (42%)	47 (47%)
>5	58 (58%)	53 (53%)

We found prophylactic efficacy was present in 90(90%) of cases who have be inserted with stent while the prophylactic efficacy was noted in 74(74%) of cases in which no stenting was carried out (p-value=0.003) and this difference was statistically significant. (Table 2)

Table 2: Comparison of Prophylactic Efficacy of procedure with and without Stent

Variables	Group A (Stent)	Group B (No stent)	P-value
Efficacy			0.003
Yes	90 (90%)	74 (74%)	
No	10 (10%)	26 (26%)	

Male gender showed more prophylactic efficacy in terms of absence of pancreatitis to whom stent was placed irrespective of those who were not placed stents. (88.5% vs 74%, p-value=0.024) but the female gender irrespective of the frequency difference did not showed significant difference with respect to different of prophylactic activity in those who are placed stent to those who were not placed stent. (95% vs 73%, p-value=0.096). (Table 3)

Table No 3: Stratification with respect to Gender

		Group of treatment			P-value
Male		With Stent	No Stent	Total	0.024
Efficacy of procedure	Yes	69	57	126	
		88.5%	74.0%	81.3%	
No	9	20	29		
		11.5%	26.0%	18.7%	
		Group of treatment			P-value
Female		With Stent	No Stent	Total	0.096
Efficacy of procedure	Yes	21	17	38	
		95.5%	73.9%	84.4%	
No	1	6	7		
		4.5%	26.1%	15.6%	

DISCUSSION

The use of prophylactic stenting varies among practicing endoscopists, but prophylactic stents are almost universally used by advanced endoscopists in high-risk patients, such as those with suspected sphincter of Oddi dysfunction, those with difficult cannulation, those undergoing ampullectomy, and those undergoing pancreatic endotherapy. Recently, there has been an increase in the

number of standard indications for using prophylactic stents to reduce the risk of post—endoscopic retrograde cholangiopancreatography (ERCP) pancreatitis; however, penetration of these indications into practice remains variable.¹⁰

Several questions surrounding prophylactic stenting remain. First, the true magnitude of benefit of prophylactic stenting remains unclear as none of the randomized controlled trials evaluating this intervention were blinded in

nature. Studies without treatment allocation blinding are often biased in favor of the intervention and exaggerate perceived effects. Second, there is limited consensus regarding the optimal stent length and caliber.¹¹ An early study suggested improved outcomes with 3 or 4-French stents,¹² a subsequent trial showed no difference in PEP rates but a higher insertion success rate with the 5-Fr stents,¹³ and a recent network meta-analysis comprising the broader prophylaxis literature suggests that 5-Fr stent are most effective.¹⁴ Similarly, there is little consensus regarding optimal stent length. Most experts agree that the intra-pancreatic tip of the stent should not rest at the pancreatic genu or in a side-branch,¹⁵ however whether short stents (ending in the pancreatic head) or longer stents (ending in the body or tail) are preferable is unknown, and comparative effectiveness studies in this area are needed.

The evidence that pancreatic stent placement reduces rates of prophylactic stenting in high risk patients is substantial. Five prospective randomized controlled trials (three published in final form) and at least seven case-control studies have compared rates of pancreatitis after ERCP with and without a pancreatic stent.^{16, 17}

Eleven of 12 studies, and all with more than 30 patients have shown either trends towards reduced rates or statistically significantly lower rates of post-ERCP pancreatitis in patients receiving pancreatic stents (range 0-20%) compared to those without pancreatic stents (range 6-67%); statistical significance was reached in three of five randomized controlled trials.¹⁸ A meta-analysis of five prospective studies involving 483 patients showed that odds ratio of post-ERCP pancreatitis without stents was three-fold higher than for with pancreatic stents (15.5% vs. 5.8%; OR: 3.2, 95% CI: 1.6 to 6.4); 21 numbers needed-to-treat analysis showed that one in every ten patients would benefit from pancreatic duct stent placement. The major limitation of the available studies is a lack of analysis by intention-to-treat, in that patients with failed pancreatic stent placement were excluded, a group in whom pancreatitis rates have been found to be high.¹⁶ Overall, the effectiveness of pancreatic stenting in reducing pancreatitis rates after high-risk ERCP has been corroborated by accumulating experience at advanced centers.

One retrospective study using historical controls showed that in 436 patients treated with biliary ± pancreatic sphincterotomy for sphincter of Oddi dysfunction, pancreatitis rates were typically high at 28.2% (5.4% severe) in those undergoing simple pull-type biliary sphincterotomy without a pancreatic stent, compared with 13.5% (0.4% severe) in those receiving biliary ± pancreatic sphincterotomy with a pancreatic stent.¹⁹

CONCLUSION

Prophylactic pancreatic stent placement is a safe and effective technique to prevent post-ERCP pancreatitis. PD stents induced a significant risk reduction of PEP, which was more enhanced in the prevention of moderate and severe complications. Therefore we recommend prophylactic PD stent placement during ERCP to prevent severe PEP in all high risk patients.

REFERENCES

1. Shi Q, Ning X, Zhan L, Tang G, Lv X. Placement of prophylactic pancreatic stents to prevent post-endoscopic retrograde cholangiopancreatography pancreatitis in high-risk patients: A meta-analysis. *World J Gastroenterol* 2014; 20(22): 7040-7048.
2. Wong L, Tsai H. Prevention of post-ERCP pancreatitis. *World J Gastrointestinal Pathophysiol* 2014; 5(1): 1-10.
3. Tenner S, Baillie J, DeWitt J, Vege SS. American College of Gastroenterology Guideline: Management of Acute Pancreatitis. *Am J Gastroenterol* 2013; 108(9): 1400-1415.
4. Lee TH, Moon JH, Choi HJ, Han SH, Cheon YK, Cho YD, et al. Prophylactic temporary 3F pancreatic duct stent to prevent post-ERCP pancreatitis in patients with a difficult biliary cannulation: a multicenter, prospective, randomized study. *Gastrointestinal Endoscopy* 2012; 76(3): 578-585.
5. Ito K, Fujita N, Noda Y, Kobayashi G, Obana T, Horaguchi J, et al. 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): 1183-1191.
6. 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): 275-282.
7. Mazaki T, Mado K, Masuda H, Shiono M. Prophylactic pancreatic stent placement and post-ERCP pancreatitis: an updated meta-analysis. *J Gastroenterol* 2014; 49(2): 343-355.
8. Freeman ML, Overby C, Qi D. Pancreatic stent insertion: consequences of failure and results of modified technique to maximize success. *Gastrointest Endosc* 2004; 59:8-14.
9. 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 Physic and Surg Pak* 2013; 23(9): 620-624.
10. Medwatch ED-530XT Duodenoscopes by FUJIFILM Medical Systems, U.S.A.: Safety Communication - FUJIFILM Medical Systems Validates Revised Reprocessing Instructions Safety alerts for Human Medical Products. U.S. FDA, 23 December 2015, retrieved 5 January 2016
11. Freeman ML. Use of Prophylactic Pancreatic Stents for the Prevention of Post-ERCP Pancreatitis. *Gastroenterol Hepatol (N Y)*. 2015;11(6):420-422.
12. Phillip V, Pukitis A, Epstein A, et al. Pancreatic stenting to prevent post-ERCP pancreatitis: a randomized multicenter trial. *Endosc Int Open*. 2019;7(7):E860-E868. doi:10.1055/a-0886-6384
13. Madácsy L, Kurucsai G, Joó I, Gódi S, Fejes R, Székely A. Rescue ERCP and insertion of a small-caliber pancreatic stent to prevent the evolution of severe post-ERCP pancreatitis: a case-controlled series. *Surgical endoscopy*. 2009;23(8):1887-93.
14. Sotoudehmanesh, Rasoul & Ali-Asgari, Ali & Khatibian, Morteza & Mohamadnejad, Mehdi & Merat, Shahin & Sadeghi, Anahita & Keshkar, Abbas & Bagheri, Mohammad & Delavari, Alireza & Amani, Mohammad & Vahedi, Homayoon & Nasserli-Moghaddam, Siavosh & Sima, Ali reza & Eloubeidi, Mohamad & Malekzadeh, Reza. (2019). Pharmacological prophylaxis versus pancreatic duct stenting plus pharmacological prophylaxis for prevention of post-ERCP pancreatitis in high risk patients: a randomized trial. *Endoscopy*. 51. 10.1055/a-0977-3119.
15. Kerdairchairat T, Attam R, Arain M, Bakman Y, Radosevich D, Freeman M. Urgent ERCP with pancreatic stent placement or replacement for salvage of post-ERCP pancreatitis. *Endoscopy*. 2014;46(12):1085-94.
16. Afghani E, Akshintala VS, Khashab MA, Law JK, Hutfless SM, Kim KJ, et al. 5-Fr vs. 3-Fr pancreatic stents for the prevention of post-ERCP pancreatitis in high-risk patients: a systematic review and network meta-analysis. *Endoscopy*. 2014;46(7):573-80.
17. Freeman ML, Overby C, Qi D. Pancreatic stent insertion: consequences of failure and results of a modified technique to maximize success. *Gastrointestinal endoscopy*. 2004;59(1):8-14
18. Wang AY. Medications and methods for the prevention of post-ERCP pancreatitis. *Gastroenterol Hepatol (N Y)*. 2017;13(3):188-91.
19. Madácsy L, Dubravcsik Z, Hritz I, Szepes A. Prophylactic pancreatic-stent placement for the prevention of post-ERCP pancreatitis in patients with high risk of complications: Prospective, multicenter, controlled study. *Zeitschrift für Gastroenterologie*. 2013;51(05):43.