

Where is the Perforation ? Rare Complication of Endoscopic Retrograde Cholangio Pancreatography

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INTRODUCTION

Endoscopic Retrograde Cholangio Pancreatography (ERCP) related perforations has incidence of 0.3-6% and has mortality as high as 37.5%.¹ Therefore, diagnosing the perforation as early as possible, assessing the extent of injury, and selecting appropriate treatment options are significant concerns.

Four types of perforation complicating ERCP have been recognized by Stapher which is most commonly used classification and is based on the mechanism, anatomical location, and severity of the injury.^{2,3}

Retroperitoneal duodenal perforations are the commonest.⁴ Perforation of the pancreatic or bile duct usually occurs following dilation of strictures, forceful cannulation, guidewire insertion, stent migration, or difficult stone extraction.⁵⁻¹³

Free abdominal perforation of the duodenum or jejunum is rare, usually occurring in patients with a stricture or anomalous anatomy, such as Billroth II gastrectomy.¹⁴⁻¹⁷ Few cases of Gastric and Oesophageal Perforations has been

ABSTRACT

Perforation is one of the most feared complications of Endoscopic Retrograde Cholangio Pancreatography (ERCP). ERCP has become important method for treating biliary-pancreatic diseases. Perforation related with Endoscopic Retrograde Cholangio Pancreatography is an infrequent, but if happens is a severe complication. Reported incidence of Endoscopic Retrograde Cholangio Pancreatography related perforation is 0.3-6%. Its mortality is as high as 37.5%. In our hospital since 2010 AD, There were 6 Perforations related to Endoscopic Retrograde Cholangio Pancreatography done in 4787 cases. This is a case of Endoscopic Retrograde Cholangio Pancreatography related perforation with no site of perforation recognized during surgical management.

KEY WORDS

Endoscopic Retrograde Cholangio Pancreatography, Negative Laparotomy, Perforations, Rare Complication

reported and rare cases of Pneumomediastinum without evidence of perforations has also been reported.^{16,18}

CASE REPORT

A 55 years lady, a diagnosed case of choledocholithiasis; was referred for ERCP from Kathmandu on 26th April, 2017. Patient had on and off symptoms of upper abdominal pain for last 5 months for which she went to a hospital where ultrasound of the Abdomen revealed Single CBD (Common Bile Duct) stone of size 9.5 mm in the Distal CBD. Patient was further evaluated and preoperative investigations were done which revealed to be normal. Written consent was taken and patient was planned for elective ERCP next day. During ERCP, stone was extracted and Common Bile Duct (CBD) was stented. Patient tolerated the procedure well and thus patient was shifted to the observation room. Two hours after the procedure patient developed pain in the epigastric region which was severe enough and thus patient was admitted for observation. Pain was progressive thus radiological evaluation of the patient was planned.

Plain X-Ray showed free gas under diaphragm suggestive of Post ERCP perforation and was planned for exploratory laparotomy. During Surgery, no perforation site could be located despite of all intra operative efforts. Stomach, duodenum, small intestine and large bowel were checked and confirmed to not have any perforation. Thus we decided to put an intra-abdominal free Silicon drain and close the abdomen. Patient was kept nil per oral for next two days, Drain was removed on 3rd day; Contrast study was done on 5th day which showed no leakage of contrast. Patient was discharged on 5th Post-operative Day. On regular followup till 6 months, the patient is not having any major complaints.



Figure 1. Showing Fragmented big CBD stone

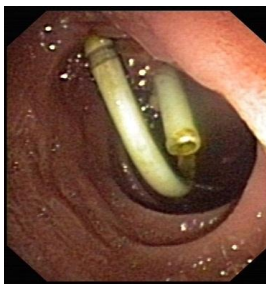


Figure 2. Showing CBD stent in Situ



Figure 3. Showing Free Gas under Diaphragm

DISCUSSION

ERCP has become important method for treating biliary-pancreatic diseases. Since the procedure is very commonly used thus the complication related to this has to be understood well and dealt scientifically. Recognizing the site of perforation and the cause of perforation is the key to success in management of ERCP related perforations.²¹

The incidence of perforation has appeared to decrease to less than 0.5 percent probably due to improvement in experience and skills of endoscopists.²² However, severe

and fatal cases continue to occur.^{23,24} In summary of 21 prospective studies involving 16,855 patients undergoing ERCP between 1987 and 2003, Post-ERCP perforations totaled 101 (0.6 percent) with 10 deaths (0.06 percents).²⁵ In the most commonly used Stapher classification system, type I is free bowel wall perforation, type II is retroperitoneal duodenal perforation secondary to periampullary injury, type III is perforation of the pancreatic or bile duct and type IV is retroperitoneal air alone.³

On the basis of Type of perforation Type I perforations account for 25 percent of perforations, type II for 46 percents, type III for 22 percent and type IV for 3%.²⁶

Literature suggests duodenal perforation being the most common site of ERCP related perforation irrespective of mechanism of injury. One of the studies done to review the recent literature in English language from the year 2000 onwards, containing major studies of nine or more cases on duodenal perforation post ERCP were analyzed which suggests duodenal perforations being most common.¹⁹ Among 251 perforations, there were 20 cases where no perforation site was found during radiological investigations in the same study. Among patients requiring surgical management, six patients were found to have negative laparotomy where no perforation site was found.¹⁹ Similar study was conducted in China during 2003-2011, where they included 8504 ERCPs. In their study series, they found 16 Perforations and out of those 16, Three Cases had duodenal perforations, nine had periampullary Perforations, one Gastric perforation and three perforations of afferent limb of Billroth II anastomosis. This study has not mentioned any cases of negative laparotomy out of 16 perforations related to ERCPs.²⁰

In our hospital, since 2010 to 2017, there were 4787 ERCP. Among those there were six perforations (0.12%); duodenal perforation being the most common site of ERCP related perforation. Out of 6 perforations, we operated over four cases but one case reported here was found to have no perforation site though investigations suggested free gas under diaphragm, sequel of viscous perforations.

A meta analysis included studies from 2000-2011, consisting of 251 perforations related to ERCP; found Papillotomy related perforations (65 cases, 25.8%) as the most common mechanism of perforation following ERCP followed by Guide Wire Related perforation (54 cases, 21.5%) and Scope related perforations (36 Cases, 14.3%).¹⁹ Other larger studies of 8504 cases of ERCP and 16 cases of perforation has listed scope related perforation (7 Cases, 43%) being the most common mechanism of perforation following ERCPs.²⁰ In our experience of 4787 ERCP from 2010-2017, we also found out similar mechanism of scope related perforations following ERCP being the most common mechanism of perforations (4 cases, 66.6%).

Older age, abnormal anatomy, Post Billroth II gastrectomy are the patient related factors that a surgeon should be

aware of as these makes procedure complicated. Other technical factors like inexperienced Endoscopist, Difficult cannulation, Precut, Sphincterotomy, Balloon sphincter dilatation, Longer duration of procedure are also the cause of perforation during the procedure.¹⁹

The diagnosis of ERCP-related perforations had been reported during the ERCP procedure or several days after the ERCP procedure. During procedure: Direct endoscopic visualization of perforation and Fluoroscopy are the easy means of diagnosing the case. Late diagnosis is supported by Epigastric and back pain, tenderness with or without peritonitis, surgical emphysema and Sepsis.¹⁹

Till date there are many guidelines and recommendation regarding ERCP related perforations. However Principle guidelines remain as stated by Stapfer in 2000 after studying over thousand of ERCP cases.³ Type I Perforation; Lateral Duodenal Wall, Endoscope related, requires immediate surgery. Type II (Peri-Ampullary, Sphincterotomy Related) and Type III (Bile Duct Injury Due to Endoscopic Instruments) can be managed medically and conservatively unless there is large free or retroperitoneal collection and patient is asymptomatic. Patients with Type IV Perforations (Free air in an otherwise asymptomatic patients; Guide wire Perforations) are advised for conservative management.

The location of the perforation in cases of endoscopic retrograde cholangio-pancreatography (ERCP) Associated injury may not be identified at laparotomy.¹² In 29 studies performed between 1987 and 2013, surgery was required in 270 out of 730 patients with perforations (37%) with an overall mortality rate of 6.8 percent.²⁷

All patients should be kept fasting while receiving hydration, nasogastric or nasoduodenal suction, and intravenous antibiotics. If immediately diagnosed, type I perforations (free bowel wall perforations) can sometimes

be successfully treated endoscopically.²⁸ However, patients with esophageal and free abdominal gastric, jejunal, or duodenal perforation usually require surgery.²⁹ However, early surgical consultation and careful observation is mandatory since the outcome may be poor in patients who do not receive prompt and appropriate treatment.³⁰

In the era where laparoscopic minimally invasive surgery is the choice, suspicious cases of ERCP related perforation should undergo diagnostic laparoscopy. Even in this case, we could have considered diagnostic laparoscopy to avoid negative laparotomy. Many studies suggests conservative management for the conditions where minimal intra peritoneal free air or lack of free fluid in the abdomen.³ With increasing number of ERCP related perforation and our experience we have to be selective in the approach to the treatment method.

Endoscopic retrograde cholangiopancreatography (ERCP) is currently the first choice for the clinical diagnosis and treatment of biliary and pancreatic diseases. Perforation is one of the most feared complications of endoscopic retrograde cholangiopancreatography (ERCP). Duodenal perforation being the most common site of ERCP related perforation irrespective of mechanism of injury. Patients with esophageal and free abdominal gastric, jejunal, or duodenal perforation usually require surgery. There are reported cases of ERCP related perforation where free gas under diaphragm is seen but site of perforation is not visible on surgical management. The location of the perforation in cases of ERCP associated injury may not be identified at laparotomy. Though rare but negative laparotomy post ERCP perforation do exists. However, early surgical consultation and careful observation is mandatory since the outcome may be poor in patients who do not receive prompt and appropriate treatment.

REFERENCES

1. Ercan M, Bostanci EB, Dalgic T, Karaman K, Ozogul YB, Ozer I, Ulas M, Parlak E, Akoglu M. Surgical outcome of patients with perforation after endoscopic retrograde cholangiopancreatography. *Journal of Laparoendoscopic & Advanced Surgical Techniques*. 2012 May 1;22(4):371-7.
2. Howard TJ, Tan T, Lehman GA, Sherman S, Madura JA, Fogel E, Swack ML, Kopecky KK. Classification and management of perforations complicating endoscopic sphincterotomy. *Surgery*. 1999 Oct 1;126(4):658-65.
3. Stapfer M, Selby RR, Stain SC, Katkhouda N, Parekh D, Jabbour N, Garry D. Management of duodenal perforation after endoscopic retrograde cholangiopancreatography and sphincterotomy. *Annals of surgery*. 2000 Aug;232(2):191.
4. Polydorou A, Vezakis A, Fragulidis G, Katsarelis D, Vagianos C, Polymeneas G. A tailored approach to the management of perforations following endoscopic retrograde cholangiopancreatography and sphincterotomy. *Journal of Gastrointestinal Surgery*. 2011 Dec 1;15(12):2211-7.
5. Enns R, Eloubeidi MA, Mergener K, Jowell PS, Branch MS, Pappas TM, Baillie J. ERCP-related perforations: risk factors and management. *Endoscopy*. 2002 Apr;34(04):293-8.
6. Jayaprakash B, Wright R. Common bile duct perforation-an unusual complication of ERCP. *Gastrointestinal endoscopy*. 1986 Jun 1;32(3):246-7.
7. Lambiase RE, Cronan JJ, Ridlen M. Perforation of the common bile duct during endoscopic sphincterotomy: recognition on computed tomography and successful percutaneous treatment. *Gastrointestinal radiology*. 1989 Dec 1;14(1):133-6.
8. Coelho JC, Campos AC, Pisani JC, Salles PM, Moss AA. Common hepatic duct perforation: a rare complication associated with ERCP. *Gastrointestinal endoscopy*. 1990 Jul 1;36(4):427.
9. Martin DF, Tweedle DE. Retroperitoneal perforation during ERCP and endoscopic sphincterotomy: causes, clinical features and management. *Endoscopy*. 1990 Jul;22(04):174-5.
10. Siragusa G, Gelarda E, Epifanio E, Geraci F, Geraci G. Video laparoscopy in abdominal emergencies. *Minerva chirurgica*. 1999 Apr;54(4):199-204.
11. Freeman ML. Adverse outcomes of ERCP. *Gastrointest Endosc* 2002; 56:S273.
12. Wu HM, Dixon E, May GR, Sutherland FR. Management of perforation after endoscopic retrograde cholangiopancreatography (ERCP): a population-based review. *HPB*. 2006 Oct;8(5):393-9.

13. Fatima J, Baron TH, Topazian MD, Houghton SG, Iqbal CW, Ott BJ, et al. Pancreaticobiliary and duodenal perforations after periampullary endoscopic procedures: diagnosis and management. *Archives of Surgery*. 2007 May 1;142(5):448-55.
14. Rabie ME, Al Faris S, Nasser A, Shahir AA, Al Mahdi Y, Youssef Al Asmari M. Parenchymal guidewire perforation during ERCP: an unappreciated injury. *Case reports in surgery*. 2015;2015.
15. Wilkinson ML, Engelman JL, Hanson PJ. Intestinal perforation after ERCP in Billroth II partial gastrectomy. *Gastrointestinal endoscopy*. 1994 May 1;40(3):389-90.
16. Lin LF, Siau CP, Ho KS, Tung JC. ERCP in post-Billroth II gastrectomy patients: emphasis on technique. *The American journal of gastroenterology*. 1999 Jan 1;94(1):144-8.
17. Feitoza AB, Baron TH. Endoscopy and ERCP in the setting of previous upper GI tract surgery. Part I: reconstruction without alteration of pancreaticobiliary anatomy. *Gastrointestinal endoscopy*. 2001 Dec 1;54(6):743-9.
18. Ciaccia D, Branch MS, Baillie J. Pneumomediastinum after endoscopic sphincterotomy. *American Journal of Gastroenterology*. 1995 Mar 1;90(3).
19. Machado NO. Management of duodenal perforation post-endoscopic retrograde cholangiopancreatography. When and whom to operate and what factors determine the outcome? A review article. *Journal of the Pancreas*. 2012 Jan 10;13(1):18-25.
20. Li G, Chen Y, Zhou X, Lv N. Early management experience of perforation after ERCP. *Gastroenterology research and practice*. 2012;2012.
21. Kodali S, Mönkemüller K, Kim H, Ramesh J, Trevino J, Varadarajulu S, Wilcox CM. ERCP-related perforations in the new millennium: A large tertiary referral center 10-year experience. *United European gastroenterology journal*. 2015 Feb;3(1):25-30.
22. Rabenstein T, Schneider HT, Hahn EG, Ell C. 25 years of endoscopic sphincterotomy in Erlangen: assessment of the experience in 3498 patients. *Endoscopy*. 1998 Nov;30(S 2):A-194.
23. Pierie JP, van Vroonhoven TJ. Obstructive cholangiopathy: are endoscopic retrograde cholangiopancreatography and papillotomy always really necessary? *Ned Tijdschr Geneesk*. 1999; 143:1497.
24. Vandervoort J, Soetikno RM, Tham TC, Wong RC, Ferrari Jr AP, Montes H et al. Risk factors for complications after performance of ERCP. *Gastrointestinal endoscopy*. 2002 Nov 1;56(5):652-6.
25. Andriulli A, Loperfido S, Napolitano G, Niro G, Valvano MR, Spirito F et al. Incidence rates of post-ERCP complications: a systematic survey of prospective studies. *The American journal of gastroenterology*. 2007 Aug;102(8):1781.
26. Vezakis A, Fragulidis G, Polydorou A. Endoscopic retrograde cholangiopancreatography-related perforations: diagnosis and management. *World journal of gastrointestinal endoscopy*. 2015 Oct 10;7(14):1135.
27. Paspatis GA, Dumonceau JM, Barthet M, Meisner S, Repici A, Saunders BP, Vezakis A, Gonzalez JM, Turino SY, Tsiamoulos ZP, Fockens P. Diagnosis and management of iatrogenic endoscopic perforations: European Society of Gastrointestinal Endoscopy (ESGE) Position Statement. *Endoscopy*. 2014 Aug;46(08):693-711.
28. Masci E, Toti G, Mariani A, Curioni S, Lomazzi A, Dinelli M et al. Complications of diagnostic and therapeutic ERCP: a prospective multicenter study. *The American journal of gastroenterology*. 2001 Feb;96(2):417.
29. Chaudhary A, Aranya RC. Surgery in perforation after endoscopic sphincterotomy: sooner, later or not at all? *Annals of the Royal College of Surgeons of England*. 1996 May;78(3 Pt 1):206.
30. Chung RS, Sivak MV, Ferguson DR. Surgical decisions in the management of duodenal perforation complicating endoscopic sphincterotomy. *The American journal of surgery*. 1993 Jun 1;165(6):700-3.