UNUSUAL PERFORATIONS FOLLOWING ERCP PROCEDURE: AN EXPLORATORY LITERATURE SEARCH AND THE LESSONS LEARNED FROM THREE CASE STUDIES

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ABSTRACT

Introduction*: ERCP procedure has severe risk of related complications that is about 5%-10%. The most feared complication of ERCP is perforation since it has highest mortality rate. The most common localization of perforation after ERCP is peripapillary area. However unusual anatomical localizations of perforations can also be seen. While most of the juxtapapillary perforations can be managed by non-operative measures, unusual perforations usually require early surgical interventions.*

Patients and methods

Case 1*: An 86 year-old woman was referred to our centre with cholelithiasis and choledocholithiasis. During ERCP procedure, supracrural gastric perforation was detected in huge type III hiatal hernia by visualizing intraperitoneal cavity.*

Case 2*: A 53 year-old woman was interned for stent removal. ERCP was performed for removing the stent, however the patient had developed severe peritonitis 36 hours after the procedure. An urgent operation performed and a perforation around the Trietz ligament was detected.*

Case 3*: A 77 year-old woman was referred for choledocholithiasis. During ERCP there were large stones in biliary system that can not be removed endoscopically, so a temporary plastic biliary stent was inserted. Despite the stent placement, clinical condition of the patients has not improved and septic condition was developed due to extensive peritonitis.*

Conclusion*: Although the clinical presentaions are similar to each other, it seems that the mortality rate of unusual perforations are quite higher than that of juxtapapillary perforations. The delay of surgical treatment in unusual perforations results in doubling the mortality rate. So every effort should be delineated to determine the perforation site and surgical treatment should be considered preferentially especially in first 24 hour.*

Keywords*: Unusual perforations, ERCP, stent, trietz, duodenum.*

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Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) has a fundamental role in various hepatobiliary and pancreatic diseases. The incidence of ERCP-related complications is 5% -10%. The complications mentioned are; perforation, hemorrhage, pancreatitis, cholangitis, and rarely basket impaction[1-5]. Most feared complication of ERCP is perforation and incidence range from 0.14% to 1,16% and mortality rates range from 4.2% to 29.6%[5-6]. The most common localization of perforation after ERCP is juxtapapillary area. ERCP-related perforations are divided into four types by Stapfer[7]. But there may be unrelevant perforations in distant anatomical areas that can't be included into Stapfer classification. The unusual localization of perforation during ERCP can be seen in all parts of the gastrointestinal tract. Juxtapapillary area perforations are mostly related-with sphincterotomy, guide wire manipulation, stent migration and endoscopy induced duodenal

lacerations[8]. These etiological factors have a role in remote unusual site perforations. They are very rare in literature and mostly in case report types. For example, Lee et al. reported a case of gastric perforation by visualizing the peritoneal cavity during ERCP. Unfortunately, that patient died three days after the surgery[9]. On the other site, Kochar et al. reported a case of esophageal perforation detected during the procedure, fortunately, this patient didn't require surgery and discharged after meticulous supportive treatment[10]. Enns et al. presented two cases of esophageal one case of gastric perforation that had been identified during the procedure. They had a favorable outcome for that patients only with immediate surgery[11]. Salminen et al. reported a cardia perforation attributable to carcinoma metastasis. The perforation was sutured, and the patient had favourable outcome[12]. Huang et al. Demonstrated successful clip application by endoscopic methods in their four patients with esophageal perforation[13].

The clinical findings, laboratory parameters,and radiological imagings resemble juxtapapillary area perforations. Therefore patients are mostly considered as juxtapapillary perforation,and conservative methods are initially tried. Thus, the timing of the surgery is delayed,and morbidity and mortality are increased. Although there are many studies in the literature emphasizing the treatment of juxtapapillary perforations, there are no large series on unusual (remote) perforations. Nevertheless, the mortality and morbidity of unusual perforations seem to be quite higher than the peripapillary perforation. So a vigorous and fast diagnostic approach and immediate surgery play a tremendous role in preventing fatal results.

In the current study, we presented three unusual perforations out of over 6000 ERCP procedures. Therefore we searched the literature extensively and tried to discuss the surgical approach, morbidity and mortality rates in such complications.

Patients and methods

Case 1: An 86 year-old woman was referred to our center with cholelithiasis and choledocholithiasis. Physical examination revealed mild abdominal pain and slight epigastric tenderness. In biochemical tests increased bilirubin values and transaminase values were found. Ultrasound (USG) and computed tomography (CT) of the abdomenrevealedcholelithiasis, choledocholithiasis,and dilatation of the biliary system. An ERCP was performed. In the first attempt of ERCP, it seemed to be visualized a part of the great curvature of stomach and a peritoneal cavity. We suspected the perforation of the stomach and took the duodenoscopy back and resumed the procedure. However, in the second attempt, we arrived at papilla without any problem and didn't see a perforation area. Cholangiogram demonstrated the dilatation of choledochus (nearly 20 mm in diameter) and three stones in bile ducts. 20 mm sphincterotomy was performed by using a round-tipped sphincterotomy and guide wire. Since the size of the stones was not suitable for endoscopic removal, open surgery was decided. The last check for perforation was done by using formal gastroscopy. That time endoscopic view revealed that there was a huge type III hiatal hernia. The supracrural part of the stomach had been perforated (Fig. 1). An urgent laparotomy was performed. Cruroplasty, primer repair of perforation were performed for the gastric stage of the operation. Cholecystectomy, choledochotomy-stone extraction and primer closure of biliary duct were performed for the biliary stage. The postoperative course of the patient was uneventful and she was discharged at 7th postoperative day.

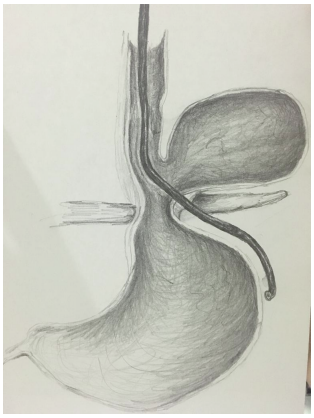

Fig 1: Supracrural gastric perforation in a large hiatal hernia during ERCP procedure.

Case 2: An 53 year-old woman was internedforstent removal. The patient had been performed a previously ERCP for choledocholithiasis and placed temporary biliary stent for stone in the current procedure. During another ERCP session, the stent was removed. At the follow-upperiod, the patient had developed severe peritonitis after 18 hours from procedure. Control contrast-enhanced CT showed pneumobilia, intra abdominal fluid. Patients with peritonitis findings after ERCP were taken to urgent operation 24 hours after the procedure. Perforation of the Trietz was detected (Fig. 2)

and primary repair and bogota bag were performed. After 36 hours of operation patient died for sepsis and multi organ failure.

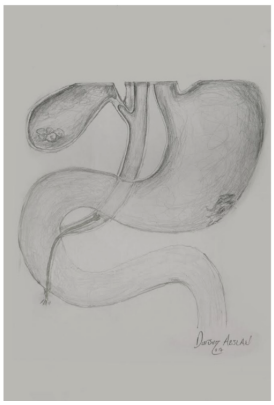

Fig 2: The perforation of retroperitoneal transverse duodenum caused by migrated plastic biliary stent.

Case 3: An 77 year-old woman was interned for choledocholithiasis. The patient was taken to ERCP and the stone and mud were removed, for the large stones unavailable to remove endoscopically, a temporary stent was inserted. Despite the placement of the stent, the patient's cholangitis has not improvedandseptic clinic was flared up. Intra-abdominal perforation was detected in abdominal CT and urgent laparotomy was performed. In the operationtransduodenally migrated stent and retroperitoneal perforation were detected (Fig. 3).

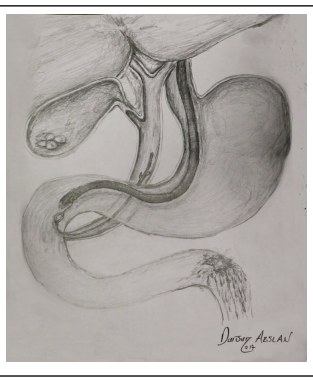

Fig 3: The perforation of jejunum at Trietz ligament after stent removal with ERCP (the mechanism couldn't be revealed).

The transvers portion of duodenum was perforated, extensive bilious and purulent material was presented at the retroperitoneal area. Following the meticulous dissection of the duodenum, perforation area was repaired by primary suturing. Although there was no duodenal leakage after operation, she was lost at 48 hours after the operation due to intens sepsis and multıple organ failure.

Discussion

In parallel with the developments in technology, minimally invasive methods took the priority in all aspects of surgery. However, there is not yet a less invasive method for ERCP procedure. Despite the increased experience of endoscopists and early diagnosis methods, perforation is still the most feared complication of ERCP[3-5]. Since Stapfer classification is mainly used for juxtapapillary perforations and/or perforations nearby to paillae, it doesn't cover the distant perforations and insufficient to categorize that kind of remote perforations. The management and treatment of unusual, remote perforations are completely different than that of juxtapapillary area. Delayed diagnosis and surgical intervention result in significant morbidity and mortality due to sepsis and multiple organ failure. More than 24 hours after perforation results in a dubling mortality[5-6]. So the diagnosis of remote perforations in first 24 hour has a vital importance to prevent the fatal outcome. Every efforts should be paid to make the diagnosis in that vulnerable period. In our study two patients can be diagnosed after 24 hours and since the surgical tratment was delayed both of them were lost. The only patient survived was operated immediately after the ERCP procedure once the perforation was detected.

The review of the literature also emphasizes that the patient with remote perforations should have intervention whether surgically or endoscopically especially in first 24 hours after the procedure[9-13]. So clinician should direct all effort to make the diagnosis as early as possible with every kinds of diagnostic methods. The delay in treatment can be prevented by applying certain strict rules when performing ERCP. 1. A detailed history should be obtained from patient before procedure including the presence reflux and other large hiatal hernia-related problems[2]. The instrument should be advanced gently by identifying the luminal structures as much as possible. If there is an any suspect about any kind of organ perforation, a formal gastroscopic evaluation should be added to ERCP procedure[3]. After the ERCP if the patient develops peritoneal irritation signs, it should be remembered that the peritonitis may not result only from juxtapapillary perforation as often seen. The perforation may occcur not only at juxtapapillary area but also almost every where from esophagus to Trietz ligament during ERCP procedure.

The differentiation between the juxtapapillary and remote perforations can be made by using computed tomography, repeating the gastroscopy and sometimes water soluble contrast graphies[10]. Although supportive treatment has a place in treating the patients with juxtapapillary perforations (especially patients with Stapfer III, IV), once the diagnosis of remote perforation was made, it should be intervened with any kind of surgical or endoscopic modality. If the clinician and the unit are available to perform endoscopic procedures (i.e.clip application in suitable cases) it should be tried first[13]. In other cases surgery will be inevitable.

As a conclusion endoscopists should be aware ofthatthere may be unusual perforations during ERCP and related procedures (sphincterotomy, stent placement or removal, balloon dilatationetc). Patients should be carefully monitored for at least 24 hours with frequent repeat abdominal examinations for early detection of peritonitis. If peritonitis is encountered, differential diagnosis between juxtapapillary and remote perforation should be made by using every available diagnostic tool.

References

1) Yilmaz S, Ersen O, Ozkececi T, Turel KS, Kokulu S, Kacar E, Akici M, Cilekar M, Kavak O, Arikan Y. Results of the open surgery after endoscopic basket impaction during ERCP procedure.World J Gastrointest Surg. 2015 Feb 27; 7(2): 15-20.
2) Yilmaz S, Akici M, Simsek M, Okur N. Ersen O. Tuncer AA. Endoscopic retrograde cholangiopanvreatography for biliary system parasites. Turk J Surg. 2017 DOI:10.5152/turksurg.2017.3808 (ahead of print)
3) Loperfido S, Angelini G, Benedetti G, Chilovi F, Costan F, De Berardinis F, et al. Major early complications from diagnostic and therapeutic ERCP: a prospective multicenter study. Gastrointest Endosc 1998; 48: 1-10.
4) Wu HM, Dixon E, May GR, Sutherland FR. Management of perforation after endoscopic retrograde cholangiopancreatography (ERCP): a population-based review. HPB (Oxford) 2006; 8: 393-9.
5) Miller R, Zbar A, Klein Y, Buyeviz V, Melzer E, Mosenkis BN, Mavor E. Perforations following endoscopic retrograde cholangiopancreatography: a single institution experience and surgical recommendations. Am J Surg 2013; 206: 180-186
6) Alfieri S, Rosa F, Cina C, Tortorelli AP, Tringali A, Perri V, Bellantone C, Costamagna G, Doglietto GB. Management of duodeno-pancreato-biliary perforations after ERCP: outcomes from an Italian tertiary referral center. Surg Endosc 2013; 27: 2005-2012.
7) Stapfer M, Selby RR, Stain SC, Katkhouda N, Parekh D, Jabbour N, Garry D. Management of duodenal perforation after endoscopic retrograde cholangiopancreatography and sphincterotomy. Ann Surg 2000; 232: 191-198
8) Kwon CI, Song SH, Hahm KB, Ko KH. Unusual complications related to endoscopic retrograde cholangiopancreatography and its endoscopic treatment. Clin Endosc. 2013 May; 46(3): 251-9
9) Lee.DW, Chan AC. Visualisation of the peritonum during endoscopic retrograde cholangiopancretography. Hong KongMed J. 2001;Dec; 7(4): 445-6
10) Kochar R, Pandey R, Mileski W, Lick SD, Schreiber MH, Parupudi SV. Endoscopic retrograde cholangiopancreatography (ERCP)-related esophageal perforation in osteogenesis imperfecta. Endoscopy. 2012; 44: 238-9
11) 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(4): 293-98.
12) Salminen P, Laine S, Gullichsen R. Severe and fatal complications after ERCP: Analysis of 2555 procedures in a single experiencedcenter. Surg Endosc.2008, Sep; 22(9): 1965-70
13) Huang J, Wen W, Tang X, Fan Z, Song H, Wang K. Cap-assisted clip closure of large esophageal perforations caused by a duodenoscope during endoscopic retrograde cholangiopancreatography. Surg Laparosc Endosc Percutan Tech. 2014 Jun; 24(3): 101-5
14) Mickisch O, Manegold BC. Esophageal perforation in attempted ERCP. Z Gastroenterol 1992; 30: 428-430

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