



Surgical and Non-Surgical Management of Endoscopic Retrograde Cholangiopancreatography Complications

Endoskopik Retrograd Kolanjiopankreatografi Komplikasyonların Cerrahi ve Cerrahidışı Yönetimi

ERCP Komplikasyonları / ERCP Complications

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Özet

Amaç: Teşhis ve pankreatik hastalıkların tedavisi için önemli bir araç olarak endoskopik retrograd kolanjiopankreatografi (ERCP), mortalite ve cerrahi ve konservatif olarak tedavi edilebilir morbidite nispeten yüksek bir oranı ile birçok potansiyel komplikasyonları vardır. Bu çalışmada post-ERCP komplikasyonları ve yönetim değerlendirilmiştir. **Gereç ve Yöntem:** Bu prospektif tek merkezli bir çalışmada, 708 tanı ve tedavi ERCPs 630 hasta (59.73 yaş ortalaması ile erkek % 41.7 ± 17.78 yıl) devam Nisan 2011 tarih ve Eylül 2012 tarihleri arasında İmam Rıza hastane, Tebriz, İran çalışıldı. Hastaların demografik, klinik ve laboratuvar bulguları yanı sıra ERCP komplikasyonları, klinik, yönetim ve sonuçlar kaydedildi. **Bulgular:** ERCP % 87 başarılı oldu ve % 6.8 4.58 % olarak pankreatit, 0.84 % duodenal perforasyon, 0.42 % sepet yakalama, kanama ve 0.14 % olarak kolanjit her dahil olmak üzere komplikasyon vardı. Komplikasyonların yüzde yirmibeş cerrahi girişim gerekli. Cholecystectomy ve başarılı ERCP öyküsü ile komplike hastaların çoğunlukla konservatif olarak tedavi edildi. **Tartışma:** ERCP komplikasyonları düşük ve birkaç cerrahi tedavi gerekir. Komplikasyonların tanısı ve tedavisi daha iyi sonuç hazırlamak ve istenmeyen morbidite ve mortalite azaltacaktır.

Anahtar Kelimeler

Endoskopik Retrograd Kolanjiopankreatografi; Komplikasyon; Risk Faktörleri Yönetimi

Abstract

Aim: Endoscopic retrograde cholangiopancreatography (ERCP), as a major tool for diagnosing and treatment of pancreatobiliary diseases has many potential complications with a relatively high rate of mortality and morbidity which could be managed surgically and conservatively. In this study we evaluated post-ERCP complications and their management. **Material and Method:** In this prospective single center study, 708 diagnostic and therapeutic ERCPs carried on 630 patients (41.7% male with mean age of 59.73±17.78 years) in Imam Reza hospital, Tabriz, Iran between April 2011 and September 2012 were studied. Patients' demographic, clinical and laboratory findings as well as ERCP complications, clinical presentation, management, and outcomes were recorded. **Results:** ERCP was successful in 87% and 6.8% had complications including pancreatitis in 4.58%, duodenal perforation in 0.84%, basket trapping in 0.42%, bleeding and cholangitis each in 0.14%. Twenty-five percent of complications needed surgical intervention. Complicated patients with previous history of cholecystectomy and successful ERCP were mainly managed conservatively. **Discussion:** ERCP complications are low and few need surgical treatment. Prompt identification and treatment of the complications would prepare better outcome and reduce undesirable morbidity and mortalities.

Keywords

Endoscopic Retrograde Cholangiopancreatography; Complication; Risk Factors Management

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Introduction

Diagnostic and therapeutic endoscopic retrograde cholangiopancreatography (ERCP) has been done for almost half a century. ERCP is valuable in diagnosis and treatment of pancreatic and biliary disease with fewer complications than surgery [1]. In cases chosen properly, therapeutic ERCP prevents other aggressive procedures in these patients. There are various indications for ERCP including evaluation of pancreatobiliary tract anatomy before and after surgical interventions, diagnosis and treatment of the cause of various types of obstructive jaundice and cholestatic liver diseases and also any types of pancreatic diseases. Sphincterotomy, common bile duct stones extraction, lithotripsy, bile drainage and dilation of stenosis, treatment of bile duct injuries, and biopsy of suspicious lesions and sampling of biliary tract excretions are among the main therapeutic interventions which could be done by ERCP [2].

However, ERCP is an operator dependent procedure with many potential complications [3]. Reported complications rate are 1.38% and 5.4% for diagnostic and therapeutic ERCP with a mortality rate of 0.2% and 0.4%, respectively. Acute pancreatitis (1-7%) [4,5], duodenal perforation (1.3%), duodenal hemorrhage (2.5-5%) [6], cholangitis and associated sepsis (1%) and acute cholecystitis (0.2-0.5%) [4], are among the most reported complications of ERCP. These complications may be treated conservatively in many cases such as mild acute pancreatitis, but may be fatal if unmanaged surgically in some cases such as free intraperitoneal perforations [7,8]. In this prospective study we evaluated our experience with complicated ERCP patients with emphasis on their surgical and non-surgical management.

Material and Method

In this prospective single center study, 708 ERCPs were performed in Imam Reza hospital, Tabriz, Iran, between April 2011 and September 2012. Among performed ERCPs, 48 cases had complications and were admitted to gastroenterology and surgery wards. The informed, written consent had been obtained prior to the procedure from all patients. The study was approved by the Ethic committee of Tabriz University of Medical Sciences.

Patients' demographic, clinical and laboratory findings as well as ERCP complications, clinical presentation, management, and outcomes were recorded. Exclusion criteria were history of abdominal surgery or previous sphincterotomy (biliary or precut), pregnancy, acute diseases and severe illnesses like pancreatitis and hypertension and mental disability were excluded.

The management of post-ERCP complications was as followed; Conservative management of complications were included if there were no sign of severe disease including absence of sepsis and no retroperitoneal fluid collections, normal examination findings with minimal leak on upper gastrointestinal study. Conservative therapy consisted of fasting, nasogastric tube for gastric decompression, non-per oral, parenteral nutritional support, ECG monitoring, acid suppression (omeprazole), protease secretion inhibition (octreotide and somatostatin), antibiotic treatment (cephalosporins), rehydration, close surgical monitoring of abdominal status and daily laboratory tests. Abdominal computed tomography (CT) was performed in patients with elevated inflammatory parameters or fever. Oral nutriti-

on was resumed at normalization of laboratory parameters and bowel movements. Patients were discharged when asymptomatic at oral food intake.

All patients consenting to eventual surgical treatment were transferred to the surgical department. Patients with diffuse abdominal tenderness and guarding regardless of mechanism and place of injury, extensive contrast extravasation on ERCP/UGI, extra- or intraperitoneal fluid collection on computed tomography, retained hardware, documented perforation with retained stones, or massive subcutaneous emphysema. Fever and leukocytosis alone were not criteria for surgery.

Statistical analysis

Statistical analyses were performed using the Statistical Package for Social Sciences, version 16.0 (SPSS, Chicago, Illinois). Quantitative data were presented as mean $\pm$ standard deviation (SD), while qualitative data were demonstrated as frequency and percent (%). The categorical parameters were compared by χ^2 tests or Fisher's exact test, and the continuous variables were compared by Student's t-tests. A p value <0.05 was considered significant.

Results

In 630 patients (41.7% male, 58.3% female, mean age of 59.73 ± 17.78 years), 708 ERCP procedures were done. ERCP indications were mostly common bile duct (CBD) stone, obstructive jaundice and abdominal pain (with unidentified cause) (figure 1). ERCP was diagnostic in 195 (27.5%) cases and thera-

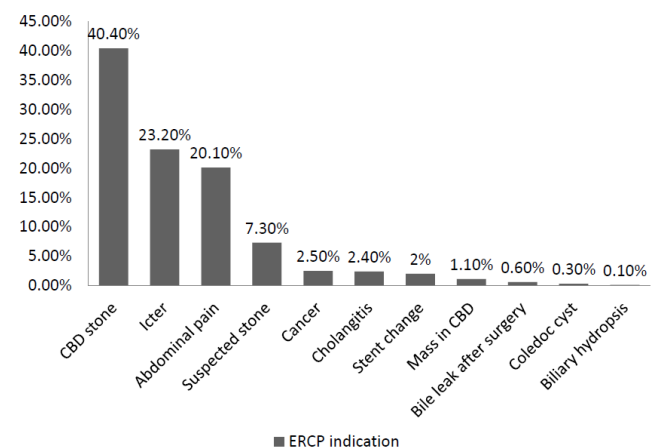


Figure 1. ERCP indications in all patients.

peutic in 513 (72.5%) cases and was successful in 616 cases (87%). ERCP complications occurred in 48 (6.8%) cases including pancreatitis in 37 cases (4.58%), duodenal perforation in 6 cases (0.84%), basket trapping in 3 cases (0.42%) and bleeding and cholangitis each in 1 case (0.14%). The complications were diagnosed during or immediately after ERCP in 7 cases (14.6%), in the first 24 hours of the procedure in 35 cases (72.9%) and after 24 hours in 6 cases (12.5%). Common clinical manifestations of post-ERCP complications were abdominal pain (97.9%), nausea (35.4%), vomiting (35.4%), fever (6.2%), bleeding (2.1%) and peritonitis (2.1%).

Among complicated patients, 12 (25%) underwent surgery including one case of pancreatitis and all cases of basket trap-

ping, duodenal perforation, bleeding and cholangitis. The other 36 patients with pancreatitis were managed conservatively. Table 1 shows demographic and ERCP findings among different complication management groups. Complicated patients with previous history of cholecystectomy and successful ERCP were mainly managed conservatively. Complications that occur earlier after procedure were more severe and in need of surgery. Complicated patients were followed for three months; 10 patients (20.8%) died during the follow-up period. Cause of death was underlying disease in 7 cases and the post-ERCP complication in 3 cases.

Table 1. Complicated patients' findings among those managed surgically and conservatively.

		surgery	conservative	P value
Age		53.08±19.90	60.61±15.72	0.18
Gender (male)		4 (33.3%)	15 (41.7%)	0.73
Body mass index		25.92±5.96	23.50±3.07	0.09
Coronary artery disease		2 (16.7%)	7 (19.4%)	0.82
Diabetes mellitus		1 (8.3%)	7 (19.4%)	0.65
Cirrhosis		0	1 (2.8%)	0.56
Renal failure		0	1 (2.8%)	0.56
History of cholecystectomy		1 (8.3%)	16 (44.4%)	0.03*
History of abdominal surgery		4 (33.3%)	4 (11.1%)	0.09
Aspirin use		1 (8.3%)	6 (16.7%)	0.66
Warfarin use		1 (8.3%)	1 (2.8%)	0.44
First time ERCP		9 (75%)	25 (69.4%)	0.71
Symptomatic period (months)		8.54±4.44	4.11±0.70	0.11
Coledoc diameter		12.94±4.05	12.28±5.85	0.75
ERCP	Successful	3 (25%)	26 (72.2%)	0.006*
	unsuccessful	9 (75%)	10 (27.8%)	
ERCP	Diagnostic	4 (33.3%)	8 (22.2%)	0.46
	Therapeutic	8 (66.7%)	28 (77.8%)	
Complication diagnosis	Immediately	7 (58.3%)	0	P<0.001
	Before 24 hours	4 (33.3%)	31 (86.1%)	
	After 24 hours	1 (8.3%)	5 (13.9%)	

Discussion

In this prospective single center study, we investigated ERCP complications and their surgical and non surgical management among 708 diagnostic and therapeutic ERCPs. The most complaints of patients with complications were abdominal pain, nausea and vomiting. The complication rate was 6.8%, with pancreatitis as the most prevalent complication with incidence rate of 4.58%, others were rare. These findings are in consistence with other studies reporting overall complication rate between 3-7% [8-10]. The rate of pancreatitis was also within the range of other similar studies (4.0%-10.0%) [9-13]. However, in two other studies by Masci et al. [9] and Loperfido et al. [14] reported rate of pancreatitis was 1.8% and 1.3%. This could be due to different type of procedures done during ERCP, methods of data collection, patient populations, and the difference in definition of complications between studies; Masci et al. [9] and Loperfido et al. [14] had only considered major complications. In our study, other complications were duodenal perforation in 0.84%, duodenal bleeding in 0.14%, basket trapping in 0.42%

and cholangitis in 0.14%. Several studies have reported higher rate of bleeding than perforation [9,12,15]; including perforation rate of 0.4%-0.57% and bleeding rate of 0.9%-1.34%; however, in two other study of Iranian population [16,17] perforation rate was higher than bleeding. In these two studies, cholangitis rate was also higher than bleeding, while in our study it was the least prevalent complication. Post-ERCP complications could be managed surgically or conservatively. In some cases re-ERCP and in some other surgery is recommended [7,8]. In our study, 25% of complications needed surgery including one case of pancreatitis and all cases of basket trapping, duodenal perforation, bleeding and cholangitis. The other was managed conservatively. Management of post-ERCP perforation varies due to the characteristics of the leak and its clinical manifestations. Previous studies has mentioned that some ERCP-related perforations can be successfully managed conservatively with no need of surgery [18,19]; however, defining patients in no need of surgery is difficult. The typical perforation that should be managed surgically is bowel wall perforations. As if conservative therapy fails, the outcome of the patients is poor [8]. However, Masci et al. [9] reported conservative treatment in all cases of pancreatitis, cholangitis, and almost more than 70% of duodenal perforation and cholecyctitis. Bhatia and coworkers20 reported 95% recovery from post-ERCP pancreatitis following conservative management. We observed that patients with history of cholecystectomy and successful ERCP were mainly managed conservatively as the probability of severe conditions is low in these patients. Most mortality cases were observed in cases with late diagnosis of complication.

Conclusion

In conclusion we observed that ERCP complications are low and few need surgical treatment. Pancreatitis is the most common post-ERCP complication. If the complication is pancreatitis, there is a low probability to need surgical management. It is necessary to identify high risk patients in order to reduce the rate of ERCP complications. Prompt identification and treatment of the complications would prepare better outcome and reduce undesirable morbidity and mortalities.

Competing interests

The authors declare that they have no competing interests.

References

1. Raine AEG, Dumot JA. ERCP: current uses and less-invasive options. *Cleve Clin J Med* 2006;73(5):418-25.

2. NIH state-of-the-science statement on endoscopic retrograde cholangiopancreatography (ERCP) for diagnosis and therapy. *NIH Consens State Sci Statements* 2002;19(1):1-23.

3. Lieb JG, Draganov PV. Early successes and late failures in the prevention of post endoscopic retrograde cholangiopancreatography. *World J Gastroenterol* 2007;13(26):3567-74.

4. Silviera ML, Seamon MJ, Porshinsky B, Prosciak MP, Doraiswamy VA, Wang CF et al. Complications related to endoscopic retrograde cholangiopancreatography: a comprehensive clinical review. *J Gastrointestin Liver Dis* 2009;18(1):73-82.

5. Abdel Aziz AM, Lehman GA. Pancreatitis after endoscopic retrograde cholangiopancreatography. *World J Gastroenterol* 2007;13(19):2655-68.

6. Cotton PB, Lehman G, Vennes J, Geenen JE, Russell RCG, Meyers WC et al. Endoscopic Sphincterotomy complications and their management: an attempt at consensus. *Gastrointest Endosc* 1991;37:383-93.

7. Wu HM, Dixon E, May GR, Sutherland FR. Management of perforation after endoscopic retrograde cholangiopancreatography (ERCP): a population-based review. *HPB* 2006;8:393-9.

8. Stapfer M, Selby RR, Stain SC, Katkhouda N, Parekh D. Management of duodenal perforation after endoscopic retrograde cholangiopancreatography and sphincterotomy. *Ann Surg* 2000;232(2):191-8.
9. Masci E, Toti G, Mariani A, Curioni S, Lomazzi A, Dinelli M et al. Complications of diagnostic and therapeutic ERCP: a prospective multicenter study. *Am J Gastroenterol* 2001;96:417-23.
10. Farrell RJ, Mahmud N, Noonan N, Kelleher D, Keeling PW. Diagnostic and therapeutic ERCP: a large single centre's experience. *Ir J Med Sci* 2001;170:176-80.
11. Güitrón-Cantú A, Adalid-Martínez R, Gutiérrez-Bermúdez JA, Nieves-Rentería A, Alvarez-Valdés G. Complications in diagnostic and therapeutic endoscopic cholangiopancreatography. Prospective study. *Rev Gastroenterol Mex* 2007;72(3):227-35.
12. 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. *Am J Gastroenterol* 2007;102:1781-8.
13. Feeman ML. Adverse outcomes of ERCP. *Gastrointest Endosc* 2002;56:273-82.
14. 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.
15. Williams EJ, Taylor S, Fairclough P, Hamlyn A, Logan RF, Martin D et al. Risk factors for complications following ERCP: results of a large-scale, prospective multicenter study. *Endoscopy* 2007;39:793-801.
16. Mohammad Alizadeh AH, Afzali ES, Mousavi M, Moaddab Y, Zali MR. Endoscopic retrograde cholangiopancreatography outcome from a single referral center in Iran. *Hepatobiliary Pancreat Dis Int* 2010;9(4):428-32.
17. Mohammad Alizadeh AH, Afzali ES, Shahnazi A, Sanati A, Mirsattari D, Zali MR. Utility and safety of ERCP in the elderly: a comparative study in Iran. *Diagn Ther Endosc* 2012;2012:439320.
18. Scarlett PY, Falk GL. The management of perforation of the duodenum following endoscopic sphincterotomy: a proposal for selective therapy. *Aust N Z J Surg* 1994;64:843-6.
19. Chung RS, Sivak MV, Ferguson DR. Surgical decisions in the management of duodenal perforation complicating endoscopic sphincterotomy. *Am J Surg* 1993;165:700-3.
20. Bhatia V, Garg PK, Tandon RK, Madan K. Endoscopic retrograde cholangiopancreatography-induced acute pancreatitis often has a benign outcome. *J Clin Gastroenterol* 2006;40(8):726-31.

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