

Evaluation of Repeat ERCP: Analysis of a Four-Year Experience

Ahmet Burak TOROS^{1*}, Besir KESİCİ¹, Ferit ARGUN², Serkan GOKCAY², Feyzullah ERSOZ³, Hasan BEKTAS³, Abdulkemim OZAKAY³ and Yavuz Selim Sari³

¹Istanbul Education and Research Hospital, Department of Gastroenterology, Istanbul, Turkey

²Istanbul Education and Research Hospital, Department of Internal Diseases, Istanbul, Turkey

³Istanbul Education and Research Hospital, Department of General Surgery, Istanbul, Turkey

Abstract

In this trial, a total of 1010 ERCP procedures performed in 410 patients at the endoscopy department of our hospital between 2006 and 2010, were retrospectively evaluated. The age, gender, complaints, pre-procedure diagnosis, the radiologic and clinical results, number of procedure repetitions and the final diagnosis were assessed. The local Ethics Committee approved this retrospective study protocol. All of the procedures were performed by the same team of endoscopists with compatible levels of ERCP experience (Mean 5 years). At our department, pethidine HCl (0.3-0.5 mg/kg), midazolam (0.03-0.07 mg/kg) and hyoscine-N-butylbromide (0.3-0.6 mg/kg) are used in the ERCP procedures for premedication and additionally, cefazolin 1 gram intravenous is routinely administered for prophylaxis one hour before the examination. During the procedure, oxygen saturation and heart rate are monitored by pulse-oximeter. The patients were those admitted to our hospital or referred from other healthcare centers. Statistical assessment was performed by evaluating the first ERCP procedures and the repeat procedure records. Chi-square test was used to statistically analyze the results. The level of significance was set at $p < 0.05$.

Keywords: Repeat ERCP; Cannulation; ERCP diagnosis

Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is an important diagnostic and therapeutic modality in patients with suspected biliary and pancreatic diseases. The diagnostic and therapeutic success of ERCP depends on a number of factors including the disease entities being treated, availability of the multiple endoscopic accessories, well trained support staff and the endoscopist's skill and experience [1].

Successful cannulation of the choledochus represents the most significant step of the diagnostic and therapeutic procedures [2-4]. Cannulation procedure is reported to achieve a success rate of 80-95% when performed by experienced endoscopists [5-8]. In cases where selective cannulation is not feasible, generally precut papillotomy techniques are performed. However, various complications including pancreatitis, perforation and bleeding are more common upon the use of precut techniques [5,9,10]. To reduce the ERCP-associated complication risk, it's important to have an experienced endoscopist, avoid unnecessary procedures, make adequate preparation before the procedure and operate cautiously [11].

The failure rate for cannulation of the duct of interest at ERCP ranges from 5% to 15% [12,13]. Depending on clinical indications, a failed first attempt may lead to a repeat examination, an alternative diagnostic test, or follow-up clinical evaluation. Options for a repeat attempt include the same endoscopist or a more experienced endoscopist at a tertiary referral center.

The objective of this retrospective study was to define the main lines of repeat ERCPs performed at our institution's endoscopy unit between the years 2006-2010; assess the reasons for repeat examination and present the results.

Material and Methods

In this trial, a total of 1010 ERCP procedures performed in 410 patients at the endoscopy department of our hospital between 2006 and 2010, were retrospectively evaluated. The age, gender, complaints, pre-procedure diagnosis, the radiologic and clinical results, number of procedure repetitions and the final diagnosis were assessed. The local Ethics Committee approved this retrospective study protocol. All of

the procedures were performed by the same team of endoscopists with compatible levels of ERCP experience (Mean 5 years).

At our department, pethidine HCl (0.3-0.5 mg/kg), midazolam (0.03-0.07 mg/kg) and hyoscine-N-butylbromide (0.3-0.6 mg/kg) are used in the ERCP procedures for premedication and additionally, cefazolin 1 gram intravenous is routinely administered for prophylaxis one hour before the examination. During the procedure, oxygen saturation and heart rate are monitored by pulse-oximeter. The patients were those admitted to our hospital or referred from other healthcare centers. Statistical assessment was performed by evaluating the first ERCP procedures and the repeat procedure records. Chi-square test was used to statistically analyze the results. The level of significance was set at $p < 0.05$.

Results

In this trial, a total of 1010 ERCP procedures performed in 410 patients who required repetition among a total of 2180 ERCP procedures, at the endoscopy department of our hospital between years 2006 and 2010, were evaluated. The age range was 18 to 91 years old and the mean age was 60.97 ± 15.98 . 47.2% of the cases were males ($n=195$) while 52.8% were females ($n=215$). Among all the cases, 5.4% was performed in 2006 ($n=21$), 22.4% ($n=95$) in 2007, 24.8% ($n=101$) in 2008, 25.8% in 2009 ($n=105$) and 21.6% ($n=88$) in 2010 (Table 1).

The review of the preliminary diagnosis of 410 cases revealed 323 patients with choledocholithiasis (78.9%), 52 patients with Biliary malignancy (12.7%) (20 patients with Klatskin tumor, 19 patients with Papillary tumor, 13 patients with cholangiosarcoma), 13 patients with post-operational bile leakage (3.1%), 12 patients (2.9%) with Hydatid

***Corresponding author:** Ahmet Burak Toros, MD, Mecidiye mah, M. Sadettin sok, No: 3, D: 4, Ortakoy, 34347, Istanbul, Turkey, Tel: 90-535 783 58 29; Fax: 90-212 327 33 84; E-mail: aburaktoros@yahoo.com

Received February 03, 2012; **Accepted** June 28, 2012; **Published** June 30, 2012

Citation: TOROS AB, KESİCİ B, ARGUN F, GOKCAY S, ERSOZ F, et al. (2012) Evaluation of Repeat ERCP: Analysis of a Four-Year Experience. J Gastroint Dig Syst 2:116. doi:10.4172/2161-069X.1000116

Copyright: © 2012 TOROS AB, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

		Min-Max	Mean ± SD
Age		18-91	60.97 ± 15.98
		n	%
Gender	Male	195	47.2
	Female	215	52.8
Year of record	2006	21	5.4
	2007	95	22.4
	2008	101	24.8
	2009	105	25.8
	2010	88	21.6

Table 1: Distribution of patient characteristics.

Pre-ERCP diagnosis (n=410)	n	%
Cholelithiasis	323	78.9
Biliary Malignancy	52	12.7
Postoperative bile leak	13	3.1
Hydatid cyst-Bile fistula	12	2.9
Pancreatic head cancer	7	1.7
Stent obstruction	3	0.7

Table 2: Distribution of the Pre-ERCP diagnosis.

ERCP diagnosis (n=1010)	n	%
Cholelithiasis with dilated choledochus and IHBC	542	53.7
Incomplete ERCP	246	24.4
Normal ERCP	88	8.7
Biliary malignancy	70	6.9
IHBC - Intracystic fistula	19	1.9
Pancreatic head cancer	22	2.2
Injury of choledochus (surgical complication)	12	1.2
Cystic canal leak	7	0.7
Parasite in choledochus	3	0.3
Choledochal cyst (type 1)	1	0.1

Table 3: Distribution of the ERCP diagnosis.

cyst-Bile fistula, 7 patients with pancreatic head cancer (1.7%) and 3 patients with stent obstruction (0.7%) (Table 2).

The cases were diagnosed as follows: 542 as cholelithiasis with dilated choledochus and IHBC (53.7%), 246 with incomplete ERCP (24.4%), 88 with normal ERCP (8.7%), 70 with biliary malignancy (6.9%) (34 with cholangiocarcinoma, 31 with papillary tm and 5 with Klatskin tm), 88 with (8.7%) normal ERCP, 19 with IHBC-intracystic fistula (1.9%), 22 with pancreatic head cancer (2.2%), 12 with (1.2%) injury of choledochus (As a complication of laparoscopic cholecystectomy), 7 with (0.7%) cystic canal leak, 3 with parasite in choledochus (0.3%), 1 with (0.1%) choledochal cyst (type 1) (Table 3).

While papillotomy, balloon and/or basket catheter, pre-cut papillotomy, biliary stent application, biopsy, mechanical lithotripsy and sclerotherapy were performed respectively in 428 (42.4%), 476 (47.1%), 132 (13.1%), 104 (10.3%), 21 (2.1%), 26 (2.6%) and 7 (0.7%) ERCP examinations, no invasive procedure was performed in 205 examinations (20.3%) (Table 4).

Note: Generally more than one invasive procedure is applied on the same patient (for example: papillotomy + balloon and basket catheter application), so the numbers and percentages may be a bit confusing.

There are 176 cases (42.9%) who had repeated procedure due to infeasibility of cannulation. Among these 176 cases, the reasons for repeat procedure were as follows: 133 had a normal papilla, 22 had duodenal diverticula, 12 had protrusion of papilla due to enclaved stone,

3 had duodenal ulcer and 6 had other problems concerning papilla (2 with indistinct papilla, 2 with papillary ulcer and 2 with mobile papilla).

There are 220 cases, which underwent cannulation and repeat procedure (53.7%). Among these 220 patients, the procedure was repeated for inadequate stone extraction in 179 patients, due to problems about the stent in 25 patients, tumor in 8 patients, inadequate biopsy in 6 patients, for cleansing the germinative membrane in 2 patients.

14 cases underwent repeat ERCP for other reasons (3.4%): patient agitation in 6 cases, inadequate preparation in 7 patients and impaired patient hemodynamics in one patient (Table 5).

Discussion

Successful cannulation of the pancreatic and bile ducts can be achieved in greater than 90% of cases in experienced hands. Failed cannulation happens even in experienced hands [12,13]. The reasons for failed ERCP include anatomic variation (eg Billroth II anastomosis), obstructive processes that preclude access to the duodenum and major papilla, complete obstruction of the duct of interest, inadequate patient sedation, poor patient tolerance of endoscopy, and lack of endoscopic expertise [14]. When cannulation fails, patient management alternatives include; 1-omit ductography in management decisions, 2-obtain ductography via percutaneous route, 3-perform precut sphincterotomy, 4-surgical exploration with intraoperative ductography, 5-repeat ERCP [15].

The procedures of ERCP have been put into practice in 2005 at our institution and the number of cases undergoing these procedures is progressively increasing. Approximately 2600 ERCP procedures have

Invasive procedures performed (n=1010)	n	%
Application of balloon and/or basket catheter	476	47.1
Papillotomy	428	42.4
No invasive procedure performed	205	20.3
Pre-cut papillotomy	132	13.1
Application of biliary stent	104	10.3
Mechanical lithotripsy	26	2.6
Taking biopsies	21	2.1
Sclerotherapy	7	0.7

Table 4: Distribution of invasive procedures.

Reasons for repeat ERCP (n=410)	n	%
Repeated for cannulation	176	42.9
Normal papilla	133	32.4
Duodenal diverticula	22	5.4
Protrusion of papilla due to enclaved stone	12	2.9
Duodenal ulcer	3	0.7
Other problems concerning papilla	6	1.2
Cannulated but still repeated	220	53.7
Inadequate stone extraction	179	43.6
Problems about stent	25	5.1
Tumor	8	2.0
Inadequate biopsy	6	1.5
Cleansing germinative membrane	2	0.5
Other reasons	14	3.4
Inadequate preparation	7	1.7
Agitated patient	6	1.5
Disturbed patient hemodynamics	1	0.2

Table 5: Distribution of the indications for repeat ERCP.

been performed between January 2006 and the end of 2010. A highly busy work schedule has been achieved with a mean weekly ERCP procedure of 13.1, rendering our hospital a reference center in Istanbul.

In this trial, a total of 1010 ERCP procedures performed in 410 patients who required repetition among 2180 ERCP procedures at the endoscopy department of our hospital between years 2006 and 2010, were retrospectively evaluated.

We investigated the procedures that were performed ≥ 2 times for the same patient. The main objective of the trial was to investigate the factors that caused the repetition of ERCP procedure. The cases that required repeated procedure were retrospectively evaluated. We evaluated the pre-procedure preliminary diagnosis, the endoscopic diagnosis and the reason for repetition.

The investigation revealed that 52.8% and 47.2% of the cases requiring repeated procedure between 2006 and 2010 were females and males, respectively. There was no marked difference between these cases in gender.

The review of the pre-procedure preliminary diagnoses of the cases revealed that 78.9% of the procedures were performed due to choledocholithiasis. This is followed by biliary malignancy at a rate of 12.7%. These malignancies were; 20 patients with Klatskin tumor, 19 patients with papillary tumor and 13 patients with cholangiocarcinoma.

The review of the cases requiring repeated procedure with respect to endoscopic diagnosis revealed choledocholithiasis with dilated choledochus and IHBC, incomplete ERCP and a normal ERCP in 53.7%, 24.4%, 8.7% of the cases respectively.

The investigation of the interventional procedures performed revealed that 80% of the cases underwent these procedures. Balloon and/or basket catheter, papillotomy were performed respectively in 47.1% and 42.4% of the patients.

Considering the reasons for repetition, the rate of repetition due to infeasibility of cannulation was 42.9% and the rate of repetition despite cannulation was 53.7%.

The rate of cases where cannulation could not be performed despite the presence of a normal papilla, was detected to be 32.4% among the cases requiring repetition. During the procedure, cannulation may not be feasible due to reasons related to duodenum or papilla.

Duodenal diverticula is the most common cause among the cases requiring repetition with a rate of 5.4%, followed by protrusion of papilla due to enclaved stone at a rate of 2.9%.

The review of the cases requiring repetition following the cannulation procedure revealed a rate of 43.6% for inadequate stone extraction. In cases where drainage is blocked due to various reasons during cannulation, a biliary stent may be inserted. Drainage may be impaired due to obstruction or the displacement of the stents leading to requirement for repeated procedure. In our trial, the rate of repetition for stent-associated problems was detected to be 5.1%.

ERCP is an invasive procedure with a quite low mortality and morbidity relative to the surgical procedures, which is used for the diagnosis and treatment of the pancreaticobiliary pathologies. Various complications may develop during or after the ERCP procedure. Pancreatitis is a common complication occurring after ERCP. Hemorrhage, perforation, cholangitis, cholecystitis and cardiopulmonary complications may occur [16]. Even if rare, mortality may occur. The experience that the endoscopist and his/her team have, is of great significance. At our medical center, all of the procedures were

performed by the same team of endoscopists with compatible levels of ERCP experience (Mean 5 years).

Being a referral center itself, we did not have the option of sending patients to another ERCP-performing center, so we performed repeat ERCPs with the same crew resulting in satisfactory outcomes. In conclusion, it is neither mandatory nor practical to refer patients for other centers if the first attempt fails; if you have a team of expert endoscopists, you can as well attempt repeat ERCPs at the same institution with excellent outcomes. Our study encourages this option on a retrospective data basis.

The other main objective of the trial was to investigate the factors that caused the repetition of ERCP procedure, which we also fulfilled.

References

1. Choudari CP, Sherman S, Fogel EL, Phillips S, Kochell A, et al. (2000) Success of ERCP at a referral center after a previously unsuccessful attempt. *Gastrointest Endosc* 52: 478-483.
2. Zhou PH, Yao LQ, Xu MD, Zhong YS, Gao WD, et al. (2006) Application of needle-knife in difficult biliary cannulation for endoscopic retrograde cholangiopancreatography. *Hepatobiliary Pancreat Dis Int* 5: 590-594.
3. Tsujino T, Isayama H, Komatsu Y, Ito Y, Tada M, et al. (2005) Risk factors for pancreatitis in patients with common bile duct stones managed by endoscopic papillary balloon dilatation. *Am J Gastroenterol* 100: 38-42.
4. Goldberg E, Titus M, Haluszka O, Darwin P (2005) Pancreatic-duct stent placement facilitates difficult common bile duct cannulation. *Gastrointest Endosc* 62: 592-596.
5. Harewood GC, Baron TH (2002) An assessment of the learning curve for precut biliary sphincterotomy. *Am J Gastroenterol* 97: 1708-1712.
6. Wojtun S, Gil J, Gietka W, Gil M (1997) Endoscopic sphincterotomy for choledocholithiasis: a prospective single-center study on the short-term and long-term treatment results in 483 patients. *Endoscopy* 29: 258-265.
7. Kasmin FE, Cohen D, Batra S, Cohen SA, Siegel JH (1996) Needle-knife sphincterotomy in a tertiary referral center: efficacy and complications. *Gastrointest Endosc* 44: 48-53.
8. Binmoeller KF, Seifert H, Gerke H, Seitz U, Portis M, et al. (1996) Papillary roof incision using the Erlangen-type pre-cut papillotomy to achieve selective bile duct cannulation. *Gastrointest Endosc* 44: 689-695.
9. Rabenstein T, Ruppert T, Schneider HT, Hahn EG, Ell C (1997) Benefits and risks of needle-knife papillotomy. *Gastrointest Endosc* 46: 207-211.
10. Freeman ML, Nelson DB, Sherman S, Haber GB, Fennerty MB, et al. (1999) Same-day discharge after endoscopic biliary sphincterotomy: observations from a prospective multicenter complication study. The Multicenter Endoscopic Sphincterotomy (MESH) Study Group. *Gastrointest Endosc* 49: 580-586.
11. Koçkar MC, Şenol A, Cüre E, Baştürk A, Aydın B (2009) Endoscopic retrograde cholangiopancreatography experience: Prospective study. *Nobel Med* 5: 10-13.
12. Geenen JE, Vennes JA, Silvis SE (1981) Resume of a seminar on endoscopic retrograde sphincterotomy (ERS). *Gastrointest Endosc* 27: 31-38.
13. Vaira D, D'Anna L, Ainley C, Dowsett J, Williams S, et al. (1989) Endoscopic sphincterotomy in 1000 consecutive patients. *Lancet* 2: 431-434.
14. Ramirez FC, Dennert B, Sanowski RA (1999) Success of repeat ERCP by the same endoscopist. *Gastrointest Endosc* 49: 58-61.
15. Sarı YS, Bektaş H, Özakay K, Tunalı V, Erkan E (2007) ERCP procedures in general surgery practice: Our experience in 305 cases. *Endoskopik Laparoskopik & Minimal İnvaziv Cerrahi Dergisi* 14: 112-118.
16. Ertuğrul İ, Yüksel İ, Parlak E, Çiçek B, Ataseven H, et al. (2009) Risk factors for endoscopic retrograde cholangiopancreatography-related cholangitis: A prospective study. *Turk J Gastroenterol* 20: 116-121.