J Surg Med. 2018;2(3):253-256.
DOI: 10.28982/josam.435834

Research article
Araştırma makalesi

Journal of Surgery and Medicine
e-ISSN: 2602-2079

Can failure of choledochal cannulation in endoscopic retrograde cholangiopancreatography be prevented?

Endoskopik retrograd kolanjiyopankreatografide kanülasyon başarısızlığı önlenebilir mi?

Yahya Kemal Çalışkan [1], Mustafa Uygar Kalaycı [1]

[1] Department of General Surgery, University of Health Science, Kanuni Sultan Suleyman Education and Research Hospital, Istanbul, Turkey

ORCID ID of the authors
YKÇ: 0000-0003-1999-1601
MUK: 0000-0002-2215-0072

Corresponding author / Sorumlu yazar:
Yahya Kemal Çalışkan
Address / Adres: Sağlık Bilimleri Üniversitesi, Kanuni Sultan Süleyman Eğitim ve Araştırma Hastanesi, Genel Cerrahi kliniği, Küçükçekmece, İstanbul, Türkiye
E-mail: yahyakemalc@yahoo.com

Ethics Committee Approval: Ethics committee approval was not received because the study was performed retrospectively.
Etik Kurul Onayı: Çalışmamız retrospektif olması nedeniyle etik kurul onayı alınmamıştır.

Conflict of Interest: No conflict of interest was declared by the authors.
Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Financial Disclosure: The authors declared that this study has received no financial support.
Finansal Destek: Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

Received / Geliş Tarihi: 23.06.2018
Accepted / Kabul Tarihi: 25.06.2018
Published / Yayın Tarihi: 25.06.2018

Abstract

Aim: Endoscopic retrograde cholangiopancreatography (ERCP) is frequently used in the diagnosis and treatment of hepatic, biliary and pancreatic diseases. Failure during cannulation, however, requires other interventions. The purpose of this work is to create the parameters that can be used to predict failure during ERCP.

Methods: Case control study planned. ERCP procedures between December 2016 and February 2018 were evaluated. Duplicate attempts and causes, cannulation status were recorded and the factors affecting cannulation were examined. Descriptive analyzes were used for statistical evaluation, chi-square test for categorical data and t-test for continuous data. A p value of 0.05 or less was considered statistically significant in the analysis.

Results: A total of 458 ERCP procedures were performed in 288 patients during the study period. 159 of the patients were female, 129 were male, female / male ratio was 1.2, mean age was 59±17.9 and age range was 17-105. When ERCP indications were evaluated, 258 patients (89.6%) were treated due to choledocholithiasis. In the first procedure, selective choledochal cannulation was successful in 257 (89.3%) patients (229 patients with ERCP catheter and 28 patients with assisted methods), and these patients constituted study group. The remaining patients who cannulation was failed included in control group. There were no age and gender differences in the patients who failed cannulation (p: 0.270, 0.256, respectively). In failed cases, the duodenal diverticulum and pancreas head tumor were seen. In the first operation, 264 patients, mainly choledocholithiasis (n: 214), could be diagnosed.

Conclusion: It has been shown that the gender and age of the patient and structural differences such as the duodenal diverticulum do not affect the success of cannulation during ERCP. Upper abdominal operations like Billroth II and Roux-en-Y gastrojejunostomy reduce the success rate of cannulation. It is thought that the correlation between experience level of endoscopist and cannulation success.

Keywords: Endoscopic retrograde cholangiopancreatography, Choledochal cannulation, Prevention

Öz

Amaç: Endoskopik retrograd kolanjiyopankreatografi (ERCP) sıklıkla hepatik, safra yolları ve pankreatik hastalıkların tanı ve tedavisinde kullanılır. Bununla birlikte, kanülasyon sırasında başarısızlık diğer müdahaleleri gerektirir. Bu çalışmanın amacı, ERCP sırasında başarısızlığı öngörmek için kullanılabilecek parametreleri oluşturmaktır.

Yöntemler: Olgu kontrol çalışması planlandı. Aralık 2016 - Şubat 2018 tarihleri arasında gerçekleştirilen ERCP işlemleri değerlendirildi. Hastalarda gerçekleştirilen mükerrer girişimler ve nedenleri, kanülasyon durumları kayıt edildi ve kanülasyonu etkileyen faktörler incelendi. İstatistik değerlendirmede tanımlayıcı analizler, kategorik veriler için Ki-kare testi ve sürekli veriler için t-testi testi kullanıldı. Analizlerde p değerinin 0,05 ve daha düşük olması istatistiksel olarak anlamlı kabul edildi.

Bulgular: Çalışma döneminde 288 hastaya uygulanan toplam 458 ERCP işlemi uygulandı. Hastaların 159'u kadın, 129'u erkek, kadın/erkek oranı 1,2, yaş ortalaması 59±17,9 ve yaş aralığı 17-105'di. ERCP endikasyonu değerlendirildiğinde 258 (%89,6) hastada koledokolityazis nedeniyle işlemin gerçekleştirildiği görüldü. İlk işlemde 229 hastada ERCP kateteri ile ve 28 hastada yardımcı yöntemler ile olmak üzere 257 (%89,3) hastada selektif koledok kanülasyonu başarılı oldu. 236 hastada 15 dakikadan az süre içinde kanülasyon başarılı oldu. 31 (%10,7) hastada kanülasyon ilk işlemde başarısız oldu. Başarısız olan hastalarda yaş ve cinsiyet açısından fark saptanmadı (sırasıyla p: 0,270, 0,256). Başarısızlık sebebi olarak geçirilmiş mide-duodenum ameliyatları, duodenum içi divertikül, pankreas başı tümörü görüldü. İlk işlemde başlıca koledokolityazis (n:214) olmak üzere 264 hastaya tanı konulabildi.

Sonuç: Hastanın cinsiyeti, yaşı ve duodenal divertikülü gibi yapısal farklılıkları ERCP sırasında kanülasyonun başarısını etkilemediği gösterildi. Billroth II ve Roux-en-Y gastrojejunostomi gibi üst karın ameliyatlarının kanülasyon başarı oranını düşürdüğü görüldü. Endoskopistlerin tecrübe seviyeleri ile kanülasyon başarısı arasında korelasyon olduğu düşünülmektedir.

Anahtar kelimeler: Endoskopik retrograd kolanjiyopankreatografi, Koledok kanülasyonu, Önleme

How to cite / Atıf için: Çalışkan YK, Kalaycı MU. Can failure of choledochal cannulation in endoscopic retrograde cholangiopancreatography be prevented? J Surg Med. 2018;2(3):253-256.

Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is a complex endoscopic procedure with complications. It is widely used in the diagnosis and treatment of pancreatic and biliary system diseases. Recently, the use of non-invasive imaging methods such as computerized tomography, magnetic resonance cholangiopancreatography, and the positive contribution they have made to diagnosis, the use of ERCP for diagnostic purposes, and the use of therapeutic procedures, especially endoscopic sphincterotomy (ES), have increased. Diagnostic ERCP related complications are common; complications such as bleeding, perforation and pancreatitis are more due to ES. It has been shown that a large number of parameters originating from the patient, endoscopist, and procedure are effective on ERCP complications [1,2].

The achievement of ERCP includes the cannulation of the biliary tract and acquiring a cholangiogram on the grounds that cannulation is the initial step for both symptomatic and restorative mediations [3]. Disappointment amid cannulation renders the ERCP unsuccessful and offers ascend to different results, including cholangitis and pancreatitis, which may require mediations, for example, percutaneous transhepatic cholangiography (PTC) and medical procedure, with higher morbidities [4].

In this study, we aimed to determine factors associated with cannulation failure of ERCP intervention.

Materials and methods

Case-control study was planned, and Helsinki Declaration principles about study of Human subjects were applied through the study. Between December 2016 and February 2018, 288 consecutive patients scheduled for ERCP were included in the study. All ERCP procedures were performed by the same endoscopist (YKC). All of the patients were informed about the procedure and the risks to be done and the confirmation form was taken. Comprehensive anamnesis was obtained from all patients before the procedure and physical examination was performed. Complete blood count, hemostasis tests, blood urea, electrolyte, glucose, ALT, AST, alkaline phosphatase, gamma glutamic transpeptidase and bilirubin levels were measured. Electrocardiography, pulmonary and direct abdominal graphs were recorded. All of the patients started prophylactic antibiotics. Olympus and Pentax duodenoscopes with a working channel of 2.8 mm were used for ERCP. As the electrosurgical unit, manually operated Erbe 200 S electro-cautery was used. All cases were sedated with pharyngeal anesthesia with lidocaine spray and midazolam as needed. Hypocine N-butyl bromide (Buscopan ampule, Eczacıbaşı İlaç San. ve Tic. AŞ) was used as antiperistaltic drug. The cannulation was started with the standard ERCP catheter and tapered catheter, sphincterotomy and guidewire were used respectively in cases that cannulation could not be done. If the cannulation could not be achieved with these, the precut was applied. The incidence of periampullary diverticulum during perforation, papilline appearance, number of interventions applied to the papilla for cannulation and duration of cannulation, which accession was performed with the accession, precut incision, number of pancreas cannulation, number of pancreas drainage after pancreatic drainage, bleeding occurred, clot development, obstruction state, ERCP diagnosis, therapeutic procedures, complete or partial success or failure of the procedure, buscopan amount used and sedation applied and amount of application were recorded. After the procedure is over, the patients are supine; perforation, drainage of the pancreatic duct, abdominal and mediastinal regions in terms of residual stone and biliary drainage were examined by fluoroscopy. The principle basis for the achievement of ERCP was the cannulation of the biliary tract.

Statistical analysis

Statistics were performed with Statistics Package for Social Sciences (IBM SPSS statistics version 23, IBM Corporation, USA). Variables are expressed as mean ± standard deviations (SD) or as medians (range) depending on distribution. Categorical variables were expressed as frequencies and percentages. The Chi-square and Fisher's exact tests were used for comparison of continuous parametric variables. Normality was assessed by means of the Kolmogorov–Smirnov test. The t-test was used for comparison of parametric variables with normal distribution. The statistical results were presented with a 95% confidence interval (CI). The differences were considered statistically significant if the p-value was less than 0.05.

Results

Of the 288 patients studied, 129 were male and 159 were female (female / male ratio: 1.2). The mean age was 59±17.9 years and ranged from 17 to 105 years. Selective choledochal cannulation was successful at 257 (89.3%) patients in first attempt. 28 of these cannulation were possible by the help of assisted methods, and these patients constituted study group. In the first procedure, the cannulation was failed in 31 (10.7%) patients, and these patients included in control group. There were no age and gender differences between groups (p=0.270, 0.256, respectively).

The mean duration of choledochal cannulation was 7.2 minutes, and the mean total procedure time was 26 minutes. In 236 patients, the cannulation was successful in less than 15 minutes.

In ERCP diagnosis, there were 214 cases of choledocholithiasis, 19 cases of malignant biliary stricture, 6 cases of benign biliary stricture, 8 cases of postoperative bilateral fistula, 7 cases of biliary obstruction, and 7 cases of biliary pancreatitis. Some of the patients had more than one pathology. Therapeutic procedures were ES in 196 patients, stone removal in 140 patients, and biliary stent in 56 patients.

A diverticulum was detected in 34 (11.8%) patients. A precut incision was performed in 54 (18.7%) patients. At the point when the impact of duodenal diverticula on the cannulation achievement rate was assessed, it was discovered that cannulation was effective in 31 (91.2%) of the patients who have a diverticulum. A factual examination demonstrated that duodenal diverticula does not impact the cannulation achievement rate (p=0.356).

A total of 34 (11.8%) patients previously had a history of upper abdominal surgery. Of the 34 patients with an upper abdominal surgery, the ampulla was cannulated in 30 (88.2%)

cases. The cannulation achievement rate in patients with a past upper abdominal surgery was lower (p=0.031).

Discussion

In most prospective studies, the rate of early complication due to ERCP and / or sphincterotomy is 5% -10% [2-4]. ERCP-related death is rare (<0.5%) and is often associated with cardiopulmonary complications [5,6]. Advanced age is generally considered an important factor, but multivariate analyzes do not support it [6]. The underlying disease and operation are the most important factors. In previous studies, ERCP bleeding rate was 20% [7], but in recent studies this rate decreased to 1-2% [8-11]. Bleeding usually results in endoscopic sphincterotomy (ES) and is usually seen early. Bleeding ranges from 0.9% to 2.3% in the literature [4,5], which is 3.1% higher than reported in the literature. ES-linked bleeding is due to precut incision, needle-tipped sphincterotome pre-incision, and pulsed shear flow. Actually precut incision may increase the cannulation but can increase the complications [11].

Accomplishment amid ERCP suggests the cannulation of the biliary tract and acquiring the cholangiogram on the grounds that cannulation is the initial step for both demonstrative and, if vital, remedial mediations [3]. It ought to likewise be noticed that cannulation disappointment renders ERCP unsuccessful and may prompt genuine consequences. These incorporate cholangitis and pancreatitis and may require intercessions with higher morbidities, for example, PTC and medical procedure [4].

There are few examinations in the restorative writing with respect to age and cannulation achievement rates amid ERCP. Lobo et al. [12] demonstrated that the recurrence of periampullary diverticula increments fundamentally in patients more than 75 years old, and they found that cannulation achievement rates diminish altogether because of diverticula that expansion with age. While assessing our information, age was not observed to be a hazard factor for effective cannulation in the single-variable examination. In the numerous variable investigation, the disappointment rate was found to have expanded by 1.01-overlay for every one-year increment in the patient's age.

There is additionally no information with respect to the effect of sex on the cannulation achievement rate. In a Japanese report by Fukatsu et al., the accomplishment of ERCP was accounted for to be bring down in ladies [3]. In spite of the fact that the cannulation achievement rate was observed to be altogether lower in the single-variable examination in our arrangement, sex was not observed to be a factor impacting the disappointment of ERCP in the numerous variable investigation.

The connection between duodenal diverticula and the cannulation achievement rate has been explored in detail. There are distinctive perspectives with respect to the impact of duodenal diverticula on cannulation. Lobo et al. [12] confirmed that the recurrence of duodenal diverticula increments with age and declines the cannulation achievement rate. They found that the accomplishment of treating intradiverticular papillas was essentially lower than that of juxtadiverticular papillas. In an examination directed on 400 patients, Boix et al. [13] recognized periampullary diverticula in 131 (32.8%) patients. Fukatsu et al. [3] found a 15% recurrence of duodenal diverticula in their arrangement, and they didn't view this as a factor affecting the cannulation achievement rate. In our study, duodenal diverticula were distinguished in 11.8% of the patients. Investigation proposed that the nearness of duodenal diverticula does not impact the cannulation achievement rate.

In the arrangement by Choudari et al. [14], Billroth I or II arrangement, Roux-en-Y gastrojejunostomy, gastric outlet block, and narrowing of the duodenum have been recorded as purposes behind ERCP disappointment. In an investigation by Baron et al. [15], Billroth II medical procedure, gastrojejunostomy, hepaticojejunostomy, Whipple procedure, and gastrointestinal impediments or narrowing were accounted for to cause ERCP failure. In our study, previous upper abdominal surgery was found as related with cannulation failure.

The risk factors for failure of ERCP cannulation may vary depending on the parameters used in the studies and the number of patients. It is possible and necessary to know the technical risk factors involved, including the endoscopist's experience, and they should be minimized as possible.

In conclusion, gender and age of the patient do not have any influence on the cannulation success rate during ERCP. Also we detected that anatomical changes like duodenal diverticula does not affect cannulation success. However, previous upper abdominal surgery has a negative effect on the cannulation success rate during ERCP. In addition, experience of endoscopist may effect on cannulation success.

References

1. Cheng CL, Sherman S, Watkins JL, Barnett B, et al. Risk Factors for Post-ERCP Pancreatitis: A Prospective Multicenter Study. Am J Gastroenterol. 2006;101:139-47.
2. Freeman ML, DiSario JA, Nelson DB, Fennerty MB, et al. Risk factors for post-ERCP pancreatitis: a prospective, multicenter study. Gastrointest Endosc. 2001;54:425-34.
3. Fukatsu H, Kawamoto H, Kato H, et al. Evaluation of needleknife precut papillotomy after unsuccessful biliary cannulation, especially with regard to postoperative anatomic factors. Surgical Endoscopy and Other Interventional Techniques. 2008;22(3):717–23.
4. Perdue DG, Freeman ML. ERCOST Study Group. Failed biliary ERCP: a prospective multicenter study of risk factors, complications and resource utilization. Gastrointestinal Endoscopy. 2004;59(5):192.
5. Freeman ML. Adverse outcomes of endoscopic retrograde cholangiopancreatography. Rev Gastroenterol Dis. 2002;2:147-68.
6. Freeman ML. Adverse outcomes of ERCP. Gastrointest Endosc. 2002;56:273-82.
7. Sherman S, Lehman GA. Complications of endoscopic retrograde cholangiopancreatography and endoscopic sphincterotomy. In: Barkin J, O'Phelan CA, eds. Advanced Therapeutic Endoscopy New York: Raven Press 1990:201-10.
8. Masci E, Toti G, Mariani A, et al. Complications of diagnostic and therapeutic ERCP: a prospective multicenter study. Am J Gastroenterol. 2001;96:417-23.
9. Freeman ML, Nelson DB, Sherman S, et al. Complications of endoscopic biliary sphincterotomy. N Engl J Med. 1996;335:909-18.
10. Freeman ML, Nelson DB, Sherman S, et al. Same-day discharge after endoscopic biliary sphincterotomy: observations from a prospective multicenter complications study. Gastrointest Endosc. 1999;49:580-6.
11. Leung JWC, Chan FKL, Sung JJY, Chung S. Endoscopic sphincterotomy-induced hemorrhage: a study of risk factors and the role of epinephrine injection. Gastrointest Endosc. 1995;42:550-4.
12. Lobo DN, Balfour TW, Iftikhar SY. Periampullary diverticula: consequences of failed ERCP. Annals of the Royal College of Surgeons of England. 1998;80(5):326–31.

13. Boix J, Lorenzo-Z´u˜niga V, A˜na˜nos F, Dom`enech E, Morillas RM, Gassull MA. Impact of periampullary duodenal diverticula at endoscopic retrograde cholangiopancreatography: a proposed classification of periampullary duodenal diverticula. Surgical Laparoscopy, Endoscopy and Percutaneous Techniques. 2006;16(4).208–11.
14. Choudari CP, Sherman S, Fogel EL, et al. Success of ERCP at a referral center after a previously unsuccessful attempt. Gastrointestinal Endoscopy. 2000;52(4):478–83.
15. Baron TH, Petersen BT, Mergener K, et al. Quality indicators for endoscopic retrograde cholangiopancreatography. American Journal of Gastroenterology. 2006;101(4): 892–97.