PATIENTS WITH MORTALITY AFTER ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY

MORTALİTY AFTER ENDOSCOPİC RETROGRADE CHOLANGİOPANCREATOGRAPHY

MORTALITY WITH ERCP

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Öz

Amaç: Endoskopik retrograt kolanjiyopankreatografi; safra yolları, pankreatik yollar ve periampüller bölge hastalıklarının tanı ve tedavisi için uygulanan nitelikli ama invazif bir işlemdir. Komplikasyonlar için risk faktörleri bilinen veya şüpheli premorbid durumlar, anksiyete ile ilişkili sorunlar ve yetersiz analjezidir. Bu çalışmada, girişimin komplikasyonları ve girişimle ilişkili mortalite incelendi. Gereç ve Yöntem: 2011 ile 2016 yılları arasında rutin monitorizasyon ve standart sedo-analjezi protokolü ile elektif veya acil endoskopik retrograt kolanjiyopankreatografi uygulanan 1471 hasta geriye dönük şekilde incelendi. Girişim sırasında spesifik (cerrahi) ve non-spesifik (kalp-damar, solunum) komplikasyon gelişen ve yoğun bakım ünitesinde ex olan hastalarda yaş, cinsiyet, vücut kitle indeksi, ASA sınıfı, Charlson Komorbidite İndeksi, APACHE II skoru, girişim süresi, kullanılan ilaçlar, komplikasyonlar ve teröpatik girişimler değerlendirildi. Bulgular: Girişim sırasında komplikasyon gelişen ve yoğunbakım ünitesine yatırılan 10 hastanın 7'si (%0,47) ex oldu ve bu hastalarda ortalama Charlson Komorbidite İndeks skoru 3,00±0,81 iken ortalama APACHE II skoru 38,71±4,07 ve beklenen mortalite 88,22±7.23 idi. Tartışma: Endoskopik retrograt kolanjiyopankreatografide, sedason yönteminden bağımsız olarak mortaliteyi artırabilecek risk faktörlerine karşı standart monitorizasyon uygulanmalı ve hasta seçiminde dikkatli olunmalıdır. ASA skorundan ziyade APACHE II skoru ve Charlson Komorbidite İndeksinin kullanılması mortalitenin öngörülmesi açısından daha etkin olabilir.

Anahtar Kelimeler

Endoskopik Retrograt Kolanjiyopankreatografi; Sedo-Analjezi; Monitorlü Anestezi Bakımı; APACHE; Mortalite

Abstract

Aim: Endoscopic retrograde cholangiopancreatography is a high quality but invasive procedure performed for diagnosis and treatment of biliary tract, pancreatic tract and periampullary region diseases. Risk factors for complications include known or unsuspected premorbid conditions, problems related to anxiety and insufficient analgesia. Material and Method: We retrospectively reviewed 1471 patients who underwent elective or emergent Endoscopic retrograde cholangiopancreatography with routine monitoring and standard sedoanalgesia protocol between 2011 and 2016. Patients who had specific (surgical) and non-specific (cardiovascular, respiratory) complications during procedure and admitted to ICU were selected. Age, gender, body mass index, ASA class, comordities, duration of procedure, drugs used, complication and therapeutic interventions were assessed in remaining patient who died in ICU. Results: 10 patients had complications during procedure and internalize at ICU. 7 of them (0,47%) had died. In mortal patients, mean CCI score was 3.00±0.81, while mean APACHE II score was 38.71±4.07 and mean expected mortality was 88.22±7.23. Discussion: In conclusion, one should be careful in standard monitoring and patient selection in addition to physical conditions against risk factors that may increase mortality regardless of sedation method used in Endoscopic retrograde cholangiopancreatography. Using APACHE II score and CCI rather than ASA score can be more effective for prediction of mortality.

Keywords

Endoskopik Retrograt Kolanjiyopankreatografi; Sedo-Analjezi; Monitorlü Anestezi Bakımı; APACHE; Mortalite

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Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is a high quality but complex procedure in the diagnosis and treatment of biliary tract, pancreatic tract, and periampullary region disorders [1]. ERCP involves combined use of X-ray and a long flexible tube, namely an endoscope. The physician can visualize the lumen of the stomach and duodenum through the endoscope and inject dye into the biliary and pancreatic ducts to enable visualization on X-ray [2].

The Ccomplication rate following ERCP varies from 5% to 10% [3]. The Vvast majority of such complications (>90%) are mild or moderate. Nevertheless, and it is important to classify these complications as specific or non-specific in order to prevent and reduce complications [4]. Non-specific complications include those which that could might occur during all any endoscopic procedure,s such as hemorrhage or perforation due to passage of the endoscope, adverse effects caused by drugs used during the procedure, cardiopulmonary events, and desaturation. Specific complications include pancreatitis, sepsis, cholangitis, and hemorrhage and perforation caused by endoscopic sphincterotomy [5].

It is essential to determine risk factors for ERCP complications, which preferentially requires selection of eligible patients (Table 1). The risks can be detected in a timely way by preoperative assessment and appropriate monitorization monitoring [3,6,7].

Table 1. Risk factors for ERCP and complications

1. Anesthesia outside the operating room (physical conditions, monitorization, equipment)
2. Procedure-related (pancreatitis, bleeding, perforation)
3. Patient characteristics (gender, comorbidities)
4. Disease-related (history of pancreatisis, presence of Oddi sphincter dysfunction requiring canullation of pancreatic duct)
5. Difficulty in access to patient, prone position
6. Hyoscine-N-butylbromide

In the previous studies,Previous studies have focused on specific complications and ERCP failure . have been focused; hHowever, there is are fewlimited number of studies on non-specific complications and outcomes.

In our study, we aimed to overview patients with specific and non-specific complications who were admitted to the intensive care unit following ERCP and had a fatal course in our facility.

Material and Method

We retrospectively reviewed 1471 patients who underwent elective or emergent ERCP at a semi-prone position under pharyngeal anesthesia (lidocaine spray) with routine monitoring (including ECG, non-invasive BP, SpO2) and standard sedoanalgesia protocol (midazolam 0.02 mgkg-1; fentanyl, 1 mgkg-1; propofol 1 mgkg-1) between 2011 and 2016 after approval of the local ethics committeetee of Umraniye Training Hospital. We identified 10 patients who developed specific (surgical) and non-specific (cardiovascular, respiratory) complications during the procedure and were admitted to the ICU. Of these, 3 patients who were discharged to the ward after treatment and follow-up in ICU were excluded. Age, gender, body mass index (BMI), ASA class, comorbidities, indication, duration of procedure, drugs used, complications, and therapeutic interventions were assessed in the remaining patients who died in the ICU.

Results

Of 10 patients with complications during the procedure, it was found that one 1 patient died during the procedure in the at ERCP unit and 6 patients died in theat ICU, while remaining the other 3 patients were discharged to the ward after treatment in the ICU. Table 2 presents demographic characteristics, comorbidities, and procedure-related data of the patients who died.

Table 3 presents potential confounders (APACHE II score, Charlson Comorbidity Index (CCI), emergency status), surgical and medical complications, and cause and time of death. In our patients, the mean CCI score was 3.00±0.81, while the mean APACHE II score was 38.71±4.07. The Mmean expected mortality was 88.22±7.23.

Discussion

Although ERCP is a minimally invasive procedure, it carries a significant risk due to both anesthetic interventions outside the operating room and the presence of comorbidities and advanced age.

The selection of eligible patients is the most important measure for preventingion of complications. History of acute pancreatitis within prior weeks, previous MI, insufficient endoscopic and surgical experience of the endoscopy operator, history of hypersensitivity against contrast material, poor performance score for surgery, severe cardiopulmonary disorders, bleeding disorders, and anticoagulant use are contraindications for ERCP [8]. In these procedures, which are generally performed with sedoanalgesia protocols, one should be careful in monitorization monitoring forregarding potential complications, including mortality, regardless of sedation method used [9]. In ASA guidelines, standard monitoring includes assessment of hemodynamic, oxygenation, pulmonary ventilation, and consciousness. , and ECG, pulse oximetry, non-invasive blood pressure monitorizationmonitoring, BIS, and capnography are recommended for theise purposes. Several analgesic and anesthetic agents can be used based on the procedure and patient characteristics. ETCO2 monitoringrization reduces risks since access to the respiratory tract is limited in ERCP [10].

It was has been shown that BIS monitorization monitoring is

Table 2. Characteristics of fatal cases

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7
Age [year]	58	86	85	52	95	74	41
Gender [F/M]	M	F	M	M	M	F	F
BMI	29	33	30	34	31	19	24
ASA	2	3	3	2	3	3	2
Number of procedure	1	1	3	3	1	1	1
Duration of procedure	15	30	30	25	20	60	45
Comorbidity	DM, HT, CAD, Smoking	DM, HT, CHF	COPD,HT Smoking	SEPSIS Cholecystitis	DM, CHF, CAD Smoking	DM, HT, CHF AF, OSAS	Hyperthyroidism

DM: Diabetes Mellitus, HT: Hypertension, CAD: Coroner Artery Disease, CHF: Congestive Hearth Failure, AF: Atrial Fibrillation, OSAS: Obstructive Sleep Apnea Syndrome

Table 3. APACHE II, CCI, surgical and medical complications, and cause and time of death in fatal cases

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Mean±SD
Apache II	36	42	38	41	41	42	31	38.71±4.07
Predicted mortality	85.1	93.2	88.4	92.2	38.9	93.2	73.3	88.22±7.23
CCI	3 Severe	4 Severe	3 Severe	3 Severe	4 Severe	2 moderate	2 moderate	3.00±0.81
Emergent	+	+	+	+				
Surgical complication [Pneumothorax]		+	+			+	+	
Respiratory arrest	+			+	+			
Severe dysrhythmia				+	+			
Cause of death	AMI	Sepsis	Sepsis	AMI	AMI	Sepsis	Sepsis	
Time of death	During procedure	Day 12	Day 2	Hour 24	Hour 24	Day 2	Day 14	

more appropriate than scoring systems (Aldrete) in cases where communication with patient is required [11].

In our ERCP unit, standard monitoring with ECG, pulse oximetry, and non-invasive blood pressure monitoring is employed in all patients and a laryngoscope, anesthesia device, oxygen source, defibrillator, emergent drugs, aspirator, and BIS monitorization monitoring are readily available during ERCP. Standard monitoring was performed in all fatal cases who underwent ERCP in our unit, where all physical conditions and equipment are available.

It was has been shown that hypoventilation which couldn't be detected by routine monitoring and clinical assessment was detected by capnography in children who underwent GI endoscopy under conscious sedation [12]. Lack of ETCO2 monitoring is one of the limitations of our study.

According to the WHO, chronological age alone isn't a contraindication for ERCP or a risk factor for ERCP-related complications [13]. It has been reported that frequency of failure, hypoxia, and bleeding due to sphincterotomy is increased by advancing age and that clinicians should be more careful foralert to complications in elder individuals [14], although it was shown that ERCP can be safely employed for diagnostic and therapeutic purposes in elder individuals in addition to infants and, children and elder individuals [15-18]. Elder individuals have a greater tendency to hypoxia, hypotension, and arrhythmia [19-21].

In our study, 4 of the non-survivors were at an advanced age according to WHO criteria. Of these, 3 patients died due to sepsis while one patient died due to acute myocardial infarction.

It is well-known that obesity carries risk due to physiopathological (cardiac and respiratory) changes. Although there is no study evaluating the relationship between sedoanalgesia and BMI, it is obvious that obesity comprisesrepresents an additional challenge in the semi-prone position for the anesthesiologist. In our study, presence of BMI>30 in the 4 patients who died suggests that obesity can be an independent risk factor for mortality in ERCP.

Although female gender comprises is a risk factor for surgical complications, it was reported that the results may change in a larger sample size [4]. There are studies reporting that gender is no risk factor [22,23]. In our study, there was no significant difference in gender (3 female and 4 male). We think that our sample size is too small to draw a conclusion.

Another parameter that may influence on mortality is ASA risk scoring. It is widely used in surgical practice in order to identify risk for sedation and anesthesia; however, it is inadequate to determine risk in ERCP procedures and can be misleading. In our study, 4 of 7 patients had ASA III score with expected mortality of 1.8-4.3 % whereas 2 had ASA II score with expected mortality of 0.27-0.40 %. A Ffatal course despite low expected mortality was attributed to the fact that expected risk in ERCP is more loosely related to specific complications which that aren't included in the ASA scoring [24].

The APACHE II (Acute Physiology and Chronic Health Evaluation) scoring system is based on worste or most critical physiological and laboratory parameters within the first 24 hours. It is used in adults and provides information regarding estimated mortality rate. In our study, among the 7 patients who died, the minimum APACHE II scores ranged from 31 to 42. The was 31 whereas maximum score was 42 among 7 patients died. Mmean APACHE II score was 38.71±4.07 and the mean expected mortality was 88.,22±7.23 (Table 3).

The CCI (Charlson Comorbidity Index) is a scale for assessment ofassessing comorbidity. The index (mild, moderate, severe, and very severe) is calculated by adding scores of each comorbid condition plus an additional one point for every 10 years after 40 years of age. In our study, the CCI was moderate in 2 and severe in 5 cases. The Mmean CCI was 3.00±0.81 among patients. APACHE II and CCI were are considered to be more significant than ASA score as a mortality index in elective ERCP procedures. We think that APACHE II and CCI can providebe more-accurate guiding for prediction of mortality in ERCP procedures.

Repeated ERCP procedures due to failure or indication can comprise a risk for post-ERCP pancreatitis and perforation. In adults, endoscopy accounts for 75% of esophagus perforations. The Ddistal esophagus adjacent to the cricopharyngeal muscle is the most commonly involved portion. On a CT scan, pneumomediastinum, mediastinitis, and contrast material extravasation can be seen. Pleural effusion or pneumothorax may develop within 12-24 hours [5]. In our study, 2 patients underwent repeat ERCP (third procedure)] in emergent conditions. Of these, one patient was admitted to the ICCIU due to intraoperative respiratory distress, diffuse subcutaneous emphysema, and pneumothorax and another patient due to severe dysrhyyhthmia and respiratory arrest. The patient with pneumothorax died due to septic shock in on the hour 48 after the procedure while the patient with respiratory arrest died due to acute myocardial infarction inon the hour 24 [25].

In some studies, it has beenSome studies have reported that complications are associated more strongly with the experience of the endoscopy operator is importantthan with the rather than number of procedures for complicationsthey have per-

formed [26]. It has beenwas reported that an endoscopy operator should complete at least 180 procedures in order to perform ERCP safely [(6]]. Our ERCP unit is an academic clinic providing education and ERCP is performed under the supervision of experienced endoscopy operators.

Hyoscine-N-butylbromide is an anti-cholinergic agent that is widely used to achieve duodenal relaxation during ERCP and may comprise a risk for tachyarrhythmia and anaphylaxis. In a study ofn 1177 cases, ChristensenCristian et. al. evaluated complications of ERCP and reported that Hyoscine-N-butylbromide doses >40 mg areis a risk factor for complications in multivariate analysis [27]. Özaslan et .al. observed ventricular tachycardia, severe hypotension, and reversible AMI after 4 doses (20 mg; IV) of Hyoscine-N-butylbromide [28]. In our study, we also observed AMI after intravenous Hyoscine-N-butylbromide administration (>40 mg) and the patient died.

Infections following ERCP are the most important frequent causes of procedure-related morbidity and mortality. Four of the 7 fatal patients (%0.33%) of total ERCP patients) died due to surgical complication and subsequent sepsis in our study. Tachycardia, hypertension and enhanced sympathetic activity may trigger myocardial ischemia or even AMI in patients at risk. The Rremaining 3 patients (%0.20% of total ERCP patients) died due to severe dysrhythmia and dyspnea followed by AMI (non-specific complication) in our study [5]. Of the 7 fatal cases, 4 were emergent cases. Of these, 2 patients died due to AMI including one patient who died during the procedure. We think that this outcome might be attributed to emergent conditions.

In a review including 21 studies (16,685 patients), 6.85% of patients had specific complications with a mortality rate of 0.33%. In another review including 14 prospective studies (12,973 patients), non-specific complications were assessed. It was found that 1.33% of patients had non-specific complications with a mortality rate of 0.87% [29]. In agreementConsistent with the literature, the mortality rate was 0.47% among the 1471 patients in our study.

In conclusion, one should be careful about standard anesthesia monitoring during the ERCP procedure. In selecting patients, physical conditions should be carefully balanced against risk factors that may increase mortality regardless of sedation method used. In conclusion, one should be careful in standard monitoring and patient selection in addition to physical conditions against risk factors that may increase mortality regardless of sedation method used in ERCP which is an out-of-operating room anesthetic procedure. The patients should be informed about the risks ofregarding mortality and potential complications by taking comorbidities into account. We think that using the APACHE II score and CCI rather than the ASA score can be more effective for predictingon of mortality.

Competing interests

The authors declare that they have no competing interests.

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