ORIGINAL ARTICLE

Is endoscopic retrograde cholangiopancreatography a reliable procedure in advanced age? A single tertiary center experience

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ABSTRACT

BACKGROUND: This study aimed to determine the reliability and efficacy of endoscopic retrograde cholangiopancreatography (ERCP) in elderly patients compared with younger patients.

METHODS: In this retrospective study, ERCP procedures performed in our endoscopy unit between December 2020 and October 2024 were reviewed. Elderly patients aged ≥80 years (AA group) and younger patients aged <65 years (control group) were included. Their demographics, comorbidities, American Society of Anesthesiologists (ASA) scores, ERCP indications, procedural success, and complications were compared.

RESULTS: There were significant differences in ASA scores, comorbidities, and the use of anticoagulant or antiplatelet drugs between the groups ($p<0.05$, $p<0.01$, and $p<0.05$, respectively). Juxtapapillary diverticula were more common in the AA group than in the control group (21% vs. 5.1%, $p<0.01$). Regarding indications, choledocholithiasis and obstructive jaundice were the most common in both groups ($p=0.456$ and $p=0.064$, respectively). The rate of cannulation success was not significantly different between the groups ($p=0.956$). Sphincterotomy and stone extraction with balloon or basket were the most frequent interventions in both groups ($p=0.22$ and $p=0.563$, respectively). Postprocedural pancreatitis was significantly more common in the control group than in the AA group ($p=0.041$). No significant differences were found in other complications, including bleeding, perforation, infection, basket impaction, and cardiopulmonary events between the groups ($p=0.436$, $p=0.354$, $p=0.958$, $p=0.254$, and $p=0.289$, respectively).

CONCLUSION: Therapeutic ERCP procedures can be performed safely and efficiently in elderly patients, as their outcomes are comparable to those observed in younger patients.

Keywords: Advanced age; safety; endoscopic retrograde cholangiopancreatography; complications; indications.

INTRODUCTION

According to data from the Turkish Statistical Institute, the population aged 65 years and older, which is considered the elderly population, was 7,550,727 in 2019, and increased by 20.7% over the last five years to 9,112,298 in 2024. The proportion of the elderly population in the total population rose from 9.1% in 2019 to 10.6% in 2024.[1] Life expectancy is in-

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creasing worldwide due to improvements in public health and advances in medical care. In parallel with this rise, the terminology of aging has also evolved. In the past, advanced-age (AA) patients were defined as those aged ≥65 years. Today, however, individuals aged 65-74 are considered "early elderly," while those aged ≥80 years are referred to as "advanced age."[2,3] As the geriatric population grows, hepatobiliary diseases, such as bile duct stones and tumors, and postoperative complications following various pancreatic surgeries[4,5] are becoming more prevalent in AA individuals.[6,7] For instance, biliary surgery in patients over 82 years of age carries a mortality rate of 9.7% and a complication rate of 62%.[6]

Endoscopic retrograde cholangiopancreatography is primarily a therapeutic technique that provides a safer alternative to surgery for AA patients and, in some circumstances, allows for direct treatment of many pancreaticobiliary diseases.[6] Consequently, endoscopic procedures, particularly ERCP, are increasingly being performed in AA patients as the size of this population grows, and as equipment, operator experience, and interventional modalities develop to address the challenges in this patient group.[8]

In the literature, ERCP has a reported complication rate of 4%-11%,[9,10] while the mortality rate has been reported as 0.3%-0.5%.[9,11] However, in AA patients, complications and mortality rates may be higher and less predictable due to several factors. To provide precise information to elderly patients and to balance risks and benefits in geriatrics, it is crucial to better understand the success and safety of ERCP in this population.

Therefore, we aimed to evaluate the reliability and performance of ERCP in AA patients compared with younger control patients (<65 years), focusing on cannulation success, indications, procedure details, and complication rates between the groups.

MATERIALS AND METHODS

Following approval from the Kanuni Sultan Süleyman Health Application and Research Center Ethics Committee (protocol no: KAEK 2023.05.71), patients aged ≥80 years or <65 years who underwent ERCP in our general surgery endoscopy unit between December 2020 and October 2024 were reviewed using patient files, outpatient clinic records, and the hospital's electronic archives. Patients with incomplete data, those under 18 years of age, patients aged 65-79 years, pregnant individuals, patients with major psychiatric disorders, those with recurrent ERCPs, cases with prior gastrectomy, and patients with active pancreatitis were excluded from the study.

While evaluating the reliability and effectiveness of ERCP in AA patients, we divided the patients into two groups: the AA group, aged ≥80 years (n=105), and the control group aged <65 years (n=350). Demographics (age, sex), comorbid diseases, ASA scores, indications for ERCP, details of interventions, and complications, if any, were compared between the two groups.

All ERCPs were performed by five experienced endoscopists at our single center, each conducting at least 250 cases per year. After the intervention, patients were monitored for one day for any adverse events. Written informed consent was obtained from all patients, and the research was conducted in accordance with the principles of the Declaration of Helsinki.

ERCP Procedure

Patients were placed in the prone or left lateral decubitus position according to the standardized technique. Procedures were performed under deep sedation using propofol (1-1.5 mg/kg), ketamine (1-4.5 mg/kg intravenously [IV]), and midazolam (10-20 mg IV). Vital signs, including oxygen saturation, arterial pressure, and heart rate, were measured and monitored with a digital pulse oximeter. Standard side-viewing duodenoscopes (Fujinon ED-450XT5) were used for all procedures. Endoscopic sphincterotomy was performed when necessary using either a standard sphincterotome or a precut sphincterotome. For the precut technique, either suprapapillary fistulotomy or precut papillatomy was applied. For bile duct stone removal, standard techniques such as dormia basket, extraction balloon, or both were employed. For bile duct drainage or other indications, plastic (10F, 8.5F, 10 cm, double-pigtail) and metallic self-expandable metal stents (SEMS) biliary stents were used as appropriate.

The British Society of Gastroenterology (BSG) and European Society of Gastrointestinal Endoscopy (ESGE) guideline recommendations for the management of patients on antiplatelet therapy or anticoagulants were applied to the study population.[12] Low-thrombosis-risk conditions were defined as ischemic heart disease without coronary stents, cerebrovascular accidents, and peripheral vascular disease, whereas high-thrombosis-risk conditions were defined as the presence of coronary artery stents. ERCP with sphincterotomy is classified as a high-risk procedure for bleeding in the guidelines.

1. Low-thrombosis-risk patients: P2Y12 inhibitors (clopidogrel, ticagrelor, prasugrel) were discontinued seven days before the procedure and restarted 1–2 days after ERCP if there was no bleeding. In patients on dual antiplatelet therapy, acetylsalicylic acid was continued. Warfarin was discontinued five days before the procedure, International Normalized Ratio (INR) was checked prior to ERCP and confirmed to be <1.5, and warfarin was restarted on the evening of the procedure. INR was rechecked one week later to ensure adequate anticoagulation. For patients on direct oral anticoagulants (DOACs: dabigatran, rivaroxaban, apixaban, edoxaban), the last dose was taken three days before the procedure, and therapy was resumed 2-3 days after ERCP.

2. High-trombosis-risk patients: Acetylsalicylic acid was continued, and the risk/benefit of discontinuing P2Y12 receptor antagonists was evaluated in consultation with an interventional cardiologist. For patients on warfarin, treatment was stopped five days before ERCP, and low-molecular-weight heparin (LMWH; enoxaparin sodium 4000 IU/day) was initiated two days after stopping warfarin. LMWH was omitted on the day of ERCP. Warfarin was restarted on the evening of ERCP at the usual daily dose, and LMWH was continued until the INR target was achieved. As acetylsalicylic acid is considered safe with respect to bleeding risk, it was continued without interruption. These recommendations were applied to all patients included in the study.

Bleeding related to intervention was classified as follows: mild bleeding was defined as a hemoglobin drop of <3 g/dL without the need for transfusion; moderate bleeding required transfusion (≤4 units) but not an interventional procedure; and severe bleeding required transfusion of >5 units of erythrocyte suspension or an interventional procedure (surgical or angiographic) to control the bleeding.[13]

Basket impaction was defined as the entrapment of a stone by a dormia or lithotripsy basket that could not be retrieved from the common bile duct.

Cholangitis was diagnosed when the body temperature exceeded 38°C within 24-48 hours after ERCP, and no other focus was identified, suggesting a biliary source.[13]

Cardiopulmonary complications included hypoxemia (oxygen saturation <90%), myocardial infarction, congestive heart failure, cerebrovascular accident, cardiac or respiratory arrest, arrhythmia, and hypotension (systolic blood pressure <90 mmHg).[13]

Mortality, whether directly related to the procedure or not, was considered intervention-related when death occurred within 48 hours due to complications or incomplete endoscopic treatment (e.g., failure to relieve bile duct obstruction).[13]

Postprocedural pancreatitis (PPP)** was defined as the onset or worsening of abdominal pain after ERCP, serum amylase levels ≥3 times the upper limit of normal, or hospitalization prolonged by at least three days.[7]

Perforations occurring during ERCP were classified into four types according to the Stapfer classification: Type 1, duodenal wall perforation; Type 2, perforation around the ampulla; Type 3, choledochus wall perforation; and Type 4, retroperitoneal free air. Emergency surgery was required for Type 1 perforations, while conservative management was appropriate for the other types of perforations depending on the patient's clinical condition.[7]

Statistical Analysis

All analyses were performed using the Statistical Package for the Social Sciences, Version 24.0. (Armonk, New York, United States). Continuous variables were expressed as mean ± SD, and categorical variables were presented as percentages and frequencies. The student's t-test and the Chi-square test were used for comparisons between groups for continuous and categorical variables, respectively. A p value <0.05 was considered statistically significant.

RESULTS

Between December 2020 and October 2024, a total of 2,865 therapeutic ERCP procedures were performed in our general surgery endoscopy-ERCP unit. Of these, 117 patients aged ≥80 years with a naïve papilla who underwent 165 ERCP procedures were identified, accounting for 4% of all cases (117/2,865). Twelve patients (two with previous gastrectomy and 10 with incomplete data) were excluded from the study. Thus, 105 patients aged ≥80 years (mean age: 85.8 years, range: 80-92 years) who underwent 135 ERCP procedures were included in group AA. After applying the selection criteria, the control group consisted of 350 consecutive patients with a naïve papilla, with a mean age of 44.3 years (range: 22-64 years) (Fig. 1).

Of the 105 patients in group AA, 65 (62%) were female and 40 (38%) were male (F/M=1.6). In the control group, 200 (57%) patients were female and 150 (43%) were male. The difference was not statistically significant (p=0.857). Compared with the control group, the group AA had higher ASA scores, higher rates of anticoagulant or antiplatelet usage, and more comorbidities, all of which were statistically significant (p<0.05, p<0.05, and p<0.01, respectively). The mean hospital stay was 4.1±1.8 days in group AA and 4.3±1.2 days

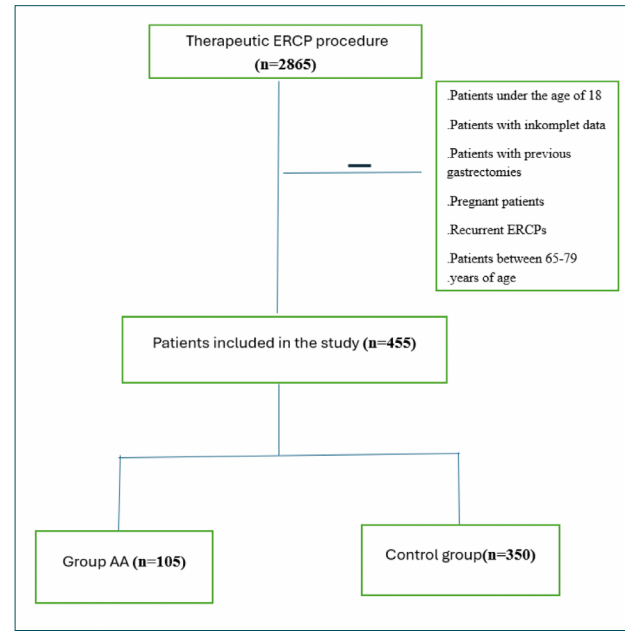

Figure 1. Study design.

Table 1. Demographic characteristics and hospitalization periods of the patients

	AA Group n=105 (%)	Control Group n=350 (%)	p value
ASA score			
I	–	95 (27)	
II	55 (52)	222 (64)	<0.05
III	44 (42)	33 (7)	
IV	6 (6)	7 (2)	
V			
Mean age, years (range)	85.8 (80-92)	44.3 (22-64)	
Drugs	61 (58)	57 (16)	<0.05
Anticoagulant	41(39)	41 (11)	
Antiaggregant	8 (8)	10 (3)	
Both	12 (11)	6 (2)	
Comorbidity	92 (88)	135 (39)	<0.01
DM	13 (12)	25 (7)	
HT	8 (7.6)	21 (6)	
COPD	11(10)	17 (4.8)	
Dementia	6 (6)	3 (0.9)	
CAD	15 (14)	15 (4)	
CHF	11 (10)	3 (0.9)	
Cancer	5 (4.7)	2 (0.6)	
At least two	23 (22)	49 (14)	
Hospital stay (days)	4.1±1.8	4.3±1.2	0.254
Sex			
Male	40	150	0.857
Female	65	200	

Data are given as mean ± standard deviation (SD) or n (%). ASA: American Society of Anaesthesiologists; DM: Diabetes Mellitus; COPD: Chronic Obstructive Pulmonary Disease; CAD: Coronary Artery Disease; CHF: Congestive Heart Failure; BMI: Body Mass Index; AA: Advanced age.

Table 2. Endoscopic retrograde cholangiopancreatography (ERCP) indications in the two groups

	AA Group n=105 (%)	Control Group n=350 (%)	p value
Choledocholithiasis	55 (52)	190 (54)	0.456
Obstructive jaundice	32 (30)	56 (16)	0.064
Cholangitis	6 (5.7)	26 (7.4)	0.258
Dilated bile duct	11 (10)	36 (10)	0.479
Acute pancreatitis	0	12 (3.4)	
Papillary adenoma	2 (1.9)	5 (1.4)	0.368
Biliary/pancreatic leak	0	20 (19)	
Primary sclerosing cholangitis	0	5 (1.4)	

Data are given as n (%). AA: Advanced age.

In terms of indications, the most common ERCP indication in both groups was choledocholithiasis (52% in group AA and 54% in the control group) (p=0.456). Although obstructive jaundice was more common in group AA (30%) than in the control group (16%), the difference was not statistically significant. Acute pancreatitis, pancreatic or biliary leak, and primary sclerosing cholangitis were not indications in group AA compared with the control group (Table 2).

Diverticulum in the second part of the duodenum and juxtapapillary diverticulum were more common in group AA, occurring in 22 (21%) patients, compared with 18 (5.1%) in the control group, which was a statistically significant difference (p<0.01).

Common bile duct cannulation was successful in 98 (94%) patients in group AA and 336 (96%) patients in the control group, with no statistically significant difference (p=0.956). In group AA, the indications for failed cannulation were obstructive jaundice in four cases, dilated bile duct in two cases, and cholangitis due to choledocholithiasis in the remaining two patients. In three cases of failed cannulation, the papilla was located inside a large diverticulum and could not be detected. In two of these failed cannulation cases, a rendezvous technique was used for cannulation, while in the remaining six patients, external drainage with percutaneous transhepatic cholangiography was performed to drain the bile duct (Table 3).

Sphincterotomy and stone extraction with balloon or basket were the most frequently performed interventions in both groups (p=0.22 and p=0.563, respectively), and although more common in group AA, the differences were not statistically significant. For bile duct stenting, plastic stents were used in 33.3% of patients in group AA and 31.4% in the control group (p=0.548). The indications for plastic stent use in group AA were impacted stones, cholangitis, and pancreatic malignancy, while in the control group, the most common indications were residual stone or sludge, cholangitis, and postoperative bile fistula. Self-expandable metal stents (SEMS) were used in both groups: 2 (1.9%) in group AA and 5 (1.42%) n the control group (p=0.445). In group AA, SEMS was preferred as a permanent stent in two patients with inoperable pancreatic

Table 3. Endoscopic retrograde cholangiopancreatography (ERCP) intervention details and complications

	AA Group n=105 (%)	Control Group n=350 (%)	p value
Sphincterotomy	88 (84)	248 (71)	0.22
Stone extraction with balloon or basket	71 (67)	193 (55)	0.563
Bile duct stenting	37 (35.2)	110 (31.4)	
Biliary plastic	35 (33.3)	105 (30)	0.548
Biliary SEMS	2 (1.9)	5 (1.42)	0.445
Ampullectomy	1 (0.95)	3 (0.85)	0.468
Mechanic lithotripsy	7 (6.6)	16 (4.57)	0.356
Success rate	98 (94.1)	337 (96.4)	0.956
Complications	12 (11.4)	44 (12.5)	0.432
Pancreatitis	4 (3.8)	21 (6)	0.041
Bleeding	4 (3.8)	9 (2.6)	0.436
Mild	3 (2.8)	7 (2)	0.417
Moderate	1 (1)	1 (0.3)	0.423
Severe	-	1 (0.3)	
Perforation	1 (0.95)	2 (0.6)	0.354
Basket impaction	2 (1.9)	6 (1.7)	0.254
Infection (cholangitis, cholecystitis)	3 (2.9)	10 (2.85)	0.958
Cardiopulmonary events	2 (1.9)	3 (0.9)	0.289
Juxtapapillary diverticula	22 (21)	18 (5.1)	<0.01
ERCP-related death			0.654
During procedure	1 (1)	1 (0.3)	0.551
After the procedure	1 (1)	1 (0.3)	0.728

Data are given as mean ± SD or n (%). AA: Advanced age; SEMS: Self-expendable metallic stent; ERCP: Endoscopic retrograde cholangiopancreatography.

cancer, while in the control group, it was used in one case to control moderate bleeding after precut sphincterotomy, in two cases due to suspected Stapfer type II and III perforations after sphincterotomy, and in the remaining three cases for drainage of a locally advanced pancreatic head tumor before neoadjuvant therapy (Table 3).

A mass in the papilla was identified in two (1.9%) cases in group AA and five (1.4%) cases in the control group (p=0.368). Ampullectomy was performed in one (0.95%) case in group AA and three (0.85%) cases in the control group (p=0.468). The histopathological diagnosis was adenoma with high-grade dysplasia and clear margins, which was accepted as a cure in geriatric patients. In the control group, one patient had papillary adenoma with benign hyperplasia and clear margins, whereas the remaining two patients had invasive adenocarcinoma and underwent pancreaticoduodenectomy, as decided by the multidisciplinary oncology council (Table 3).

Mechanic lithotripsy was performed in seven (6.6%) cases in group AA and 16 (4.57%) cases in the control group (p=0.356).

The most common complication in the control group was PPP, detected in 21 (6%) cases, whereas it was detected in four (3.8%) cases in group AA. The rate of PPP was higher in the control group than in group AA (6% vs. 3.8%, respectively), and the difference was statistically significant (p=0.041). The ages of group AA patients with PPP ranged from 82 to 88 years. Of these, three were female and one was male. The indications were choledocholithiasis in three cases and obstructive jaundice in one case. In the control group, 74% of PPP patients were female and 26% were male. The indications for ERCP were choledocholithiasis in 17 (80%) patients, cholangitis in two (10%), papillary adenoma in one (5%), and bile leakage after liver hydatid surgery in one (5%). In group AA, one of the four PPP patients had a juxtapapillary diverticulum; however, diverticulum was not present in any of the control group PPP cases.

Bleeding complications occurred in four (3.8%) cases in group AA and nine (2.6%) cases in the control group (p=0.436). In group AA, three cases had minor and one case moderate bleeding, whereas in the control group, seven cases had minor, one case moderate, and one case major bleeding. A major bleeding case occurred in a patient receiving anticoagulant therapy, with the indication being obstructive jaundice. Our treatment modality was the application of a fully covered self-expendable metallic stent, through which the bleeding was gradually controlled. The stent was withdrawn after three weeks (Table 3).

Perforations were detected in one (0.95%) case in group AA and two (0.6%) cases in the control group (p=0.354).

Basket impaction was another complication observed in both groups: two (1.9%) cases in group AA and six (1.7%) cases in the control group (p=0.254). In group AA, one patient underwent open surgery with an upper midline incision, cholecystectomy, choledochotomy, stone extraction, basket wire removal, and choledochal T-tube drainage. The t-tube was removed in the third postoperative week following a patent T-tube cholangiography. In another patient in group AA, the basket was successfully removed after endoscopic withdrawal attempts, and a plastic biliary stent was placed. In the control group, two patients underwent surgery due to basket impaction. Both underwent upper midline incision, cholecystectomy, choledochotomy, stone and basket wire extraction, and choledochal T-tube placement, after which they were discharged uneventfully. In the remaining four patients, recurrent endoscopic withdrawal attempts were successful, and plastic stents application were subsequently placed.

Infectious complications (cholecystitis, cholangitis) were observed in three (2.9%) cases in group AA and 10 (2.9%) cases in the control group (p=0.958).

Cardiopulmonary side effects (hypoxia, aspiration, cardiac arrhythmia, or angina pectoris) occurred in two (1.9%) patients in group AA and three (0.9%) patients in the control group (p=0.289), with no statistically significant difference.

Endoscopic retrograde cholangiopacreatography-related death was observed in two patients (2%) in group AA and two patients (2%) in the control group. In both groups, one patient died during the procedure and another died during the hospitalization follow-up period.

DISCUSSION

With the increase in average life expectancy, the frequency of endoscopic examinations in elderly patients has also risen. Differences in disease prevalence, concomitant systemic diseases, and the risk of complications that may occur highlight the need for more careful evaluation of endoscopic procedures in the elderly.[14] In the present study, we evaluated the outcomes of ERCP procedures performed in our clinic on AA patients and compared them with younger patients.

In two large meta-analyses, the incidence of PPP was reported to be 4.8%-11.9%, while mortality among patients who developed PPP was reported as 0.1%-0.7%.[15] A meta-analysis of 15 prospective and 52 retrospective cohort studies examining the risk factors of PPP found that young age, female sex, sphincter of Oddi dysfunction, a history of pancreatitis, absence of bile duct dilation (bile duct diameter <1 cm), normal bilirubin levels, and difficult cannulation were the main risk factors.[16] Conversely, Sökmen et al.,[17] in a retrospective study, reported that periampullary diverticulum was more common in elderly and female patients and was associated with an increased risk of PPP. They suggested that difficult cannulation due to periampullary diverticulum might be the leading cause of PPP. However, Jayaraj et al.,[18] in their meta-analysis, concluded that ERCP was both successful and feasible, with comparable complication rates in patients with and without periampullary diverticulum. Finkelmeier et al.,[19]

in a retrospective study including 758 patients, reported that PPP occurred less frequently in patients aged ≥80 years compared to younger patients (0.9% vs. 5.3%; p<0.05). Similarly, in another retrospective study of 624 cases, both the frequency and severity of PPP were lower in patients aged ≥80 years compared to the younger control group (1.3% vs. 2.9%, p=0.262).[20] In studies investigating the feasibility of ERCP in elderly patients, Rodriguez-Gonzalez et al.[21] and Ergin et al.[22] reported no cases of PPP among patients aged ≥90 years. In line with the literature, in the present study, the rate of PPP was lower in elderly patients compared to the control group (3.8% vs. 6%). The difference was statistically significant (p=0.041). The ages of group AA patients suffering from PPP ranged from 82 to 88 years. No mortality related to PPP was detected, and the majority of patients with PPP were female in both groups. In group AA, one of the four patients with PPP had a juxtapapillary diverticulum, whereas none of the PPP patients in the control group had a diverticulum. Although cannulation time was longer, the complication rate was not different from those without diverticulum. We suggest that, as a result of aging, decreased secretory capacity, fibrosis, and atrophy of the pancreatic tissue might reduce the response to trauma, as seen in ERCP.

Post-interventional bleeding might be a fatal complication after ERCP. In the literature, although some authors[20,22] have reported no significant difference in post-ERCP bleeding in patients over 80 years old compared to younger ones, despite higher antiaggregant and anticoagulant use in the 80-year-old group, Elmi et al.[23] and Chong et al.[24] reported that nonagenarians had twice the risk of bleeding compared with younger patients. They pointed out that the increased prevalence of coagulopathy, the use of medications that could increase bleeding risk, and the need for larger sphincterotomies to extract large stones require more therapeutic maneuvers. In our series, there was no severe bleeding in either groups, but three minor and one moderate bleeding events occurred in group AA. Although a higher rate of bleeding is expected in elderly patients due to the frequent use of nonsteroidal anti-inflammatory drug (NSAIDs) and antithrombotic drugs, there was no statistically significant difference between the two groups (3.8% vs. 2.6%, p=0.417). In our daily practice, for patients using two antiaggregant drugs, one is discontinued if the patient is at high cardiac risk. Low-molecular-weight heparin was initiated in patients using warfarin or new-generation anticoagulants as bridging therapy before the procedure.

Considering ERCP-related perforations, it is an uncommon but very serious complication, with an incidence of 0.2% to 1.6%.[25,26] In the literature, factors such as prolonged intervention duration, precut sphincterotomy, advanced age, and sphincter of Oddi dysfunction have been found to increase the risk of ERCP-related perforations.[27,28] In our study, there was no statistically significant difference between the AA and control groups in terms of post-ERCP perforations (0.95 vs. 0.6, p=0.354). In group AA, one patient had a Stapfer type 2 perforation, which was detected during the procedure. The defect was closed with endoclip application, and after 10 days of follow-up, the patient was discharged. In the control group, two patients had Stapfer type 2 and type 3 perforations detected during the procedure, and SEMS placement was the treatment modality. Both patients had uneventful follow-up periods and were discharged on days 10 and 12, respectively.

Obstructive cholangitis is a clinical entity that requires urgent drainage to prevent cholangiosepsis. Bodger et al.,[29] in their study analyzing 20,246 ERCPs nationwide in England, reported that the mortality risk of cholangitis is not related to patient age but mainly depends on the timing of drainage. Cholangitis was the indication in six (5.7%) cases in group AA and 26 (7.4%) cases in the control group, and the difference was not statistically significant (p=0.258). In the presence of cholangitis, the application of early (<24 hours) ERCP in our patients prevented an increased risk of complications in the elderly of the study group.

Lemmel's syndrome was first described by Dr. Gerhard Lemmel in 1934 and is a rare cause of biliary obstruction.[30] Its pathophysiology is nonspecific, but reported mechanisms include three leading causes: chronic fibrosis of the papilla, periampullary diverticulitis, and chronic inflammation of the ampulla. In addition, the location of the duodenal diverticulum may cause malfunction of the sphincter of Oddi, leading to functional obstruction. Alternatively, obstructive jaundice may result from external compression of the common bile duct or ampulla of Vater.[31] In group AA, we detected two cases of Lemmel's syndrome causing obstructive jaundice without choledocholithiasis or malignancy but with a large juxtapapillary diverticulum causing obstruction in the pancreatic part of the bile duct. Our treatment modality was sphincterotomy and biliary stenting.

In our study, comorbidities and ASA physical status scores were significantly higher in group AA (p<0.01, p<0.05), but differences in post-ERCP complication rates were not statistically significant (p=0.432). In a retrospective study, the authors, finding the same results, explained that the ASA physical status score was not a quantitative index but a qualitative one, which is not sufficient to measure the health status of the AA population. Instead, a comprehensive elderly assessment (CEA) was suggested for use in geriatric patients.[32]

Studies evaluating the safety and effectiveness of ERCP in AA patients are very limited. Fritz et al.,[33] in their retrospective study with 502 cases, reported that in patients ≥80 years of age, the success rate was 88%, compared with 86% in patients <80 years of age, while the complication rate was 6.8% versus 5.1%, with no statistically significant difference detected. In another study conducted by Katsinelos et al.,[34] patients over 90 years of age and patients between 70-90 years were compared, and the early complication rate was 6.3% in patients ≥90 years and 8.4% in patients between 70-90 years. The mortality rate due to ERCP was 1.6% in patients ≥90

years of age and 0.6% in patients between 70-90 years of age. In our study, in line with the literature, there was no statistically significant difference between the two groups in terms of success rate and postprocedural complications (complication and success rates were 11.4% and 94.1% in group AA vs. 12.5% and 96.4% in the control group). ERCP-related mortality was 1.9% and 0.57% in groups AA and control, respectively, in line with previous reports.[35,36]

Tyagi et al.,[37] in their prospective study, reported that the incidence of periampullary diverticulum was 7.5% and showed that the size of the diverticulum and the location of the papilla had no effect on cannulation success or post-ERCP complications. Jayaraj et al.,[18] in their meta-analysis, reported that ERCP was successful and feasible with comparable complication rates in patients with and without periampullary diverticulum. In our study, periampullary diverticulum was more commonly seen in group AA at 22 (21%) compared with the control group at 18 (5.1%), which was statistically significant ($p<0.01$). Cannulation time was longer, but the complication rate was not different from those without diverticulum. We think that as the experience and number of cases performed by the endoscopist increase, failure of selective cannulation and complications due to periampullary diverticulum will proportionally decrease.

Many studies have shown that lower complication rates and higher success rates in terms of selective biliary cannulation are achieved in high-volume centers and by highly experienced endoscopists.[38,39] This study was conducted in a high-volume center with at least 1,000 cases per year. Therefore, our results may not be generalizable to centers with lower ERCP volume or less operator experience.

The retrospective design and being a single-center study were the main limitations of this study. Additionally, the study period was extended and had a relatively small sample size. Further multicenter prospective studies with larger case series are needed to confirm and support these results.

CONCLUSION

Endoscopic retrograde cholangiopancreatography is increasingly being used in the diagnosis and treatment of elderly patients, since the incidence of bile duct and pancreatic cancer increases with age and surgical intervention in these patients carries high mortality and morbidity. We think that ERCP is a reliable, applicable, and feasible method in AA patients, but clinicians should be alert to potential adverse events.

Ethics Committee Approval: This study was approved by the Kanuni Sultan Süleyman Health Application and Research Center Ethics Committee (Date: 01.05.2023, Decision No: KAEK 2023.05.71).

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ORİJİNAL ÇALIŞMA - *ÖZ*

Endoskopik retrograd kolanjiyopankreatografi ileri yaşlarda güvenilir bir işlem midir? Üçüncü basamak tek merkez deneyimi

AMAÇ: Bu çalışmanın amacı ileri yaşlı hastalarda endoskopik retrograd kolanjiyopankreatografinin (ERCP) güvenilirliğini, daha genç kontrol grubuyla karşılaştırarak belirlemektir.
GEREÇ VE YÖNTEM: Bu retrospektif çalışmada, Aralık 2020 ile Ekim 2024 tarihleri arasında endoskopi ünitemizde gerçekleştirilen ERCP prosedürleri incelenerek, ileri yaş hastalar (≥80 yaş) (Grup AA) ve daha genç hastalar (<65 yaş) (Kontrol grubu) dahil edilerek demografik özellikler, eşlik eden hastalıklar, Amerikan Anestezistler Derneği (ASA) skorları, ERCP endikasyonları, işlem başarısı ve komplikasyonlar açısından birbirleriyle karşılaştırıldı.
BULGULAR: İki grup arasında ASA skorları, komorbiditeler ve antikoagülan ve antiplatelet ilaç kullanımı açısından anlamlı fark vardı ($p<0.05$, $p<0.01$ ve $p<0.05$). Juxtapapiller divertikül grup AA'da kontrol grubuna göre daha yaygındı (%21'e karşı 5,1, $p<0.01$). Endikasyonlar açısından her iki grupta da en sık koledokolitiyazis ve obstrüktif sarılık görüldü ($p=0.456$, $p=0.064$). Kanülasyon başarısı açısından iki grup arasında anlamlı fark yoktu ($p=0.956$). Her iki grupta da en çok yapılan girişimler sfinkterotomi ve balon ve basket ile taş ekstraksiyonu idi (sırasıyla $p=0.22$ ve $p=0.563$). İşlem sonrası pankreatit oranı genç grupta istatistiksel anlamlı olarak daha yüksekti ($p=0.041$). Kanama, perforasyon, enfeksiyon, basket sıkışması ve kardiyopulmoner komplikasyon oranları açısından iki grup arasında anlamlı fark saptanmadı ($p=0.436$; $p=0.354$; $p=0.958$; $p=0.254$; $p=0.289$).
SONUÇ: Terapötik ERCP işlemleri ileri yaş hastalarda da uygun endikasyonlarla, genç yaş grubu ile karşılaştırılabilir komplikasyon ve sonuçlarla güvenli ve etkin bir şekilde uygulanabilir.

Anahtar sözcükler: Endoskopik retrograd kolanjiyopankreatografi; endikasyonlar; güvenlik; ileri yaş; komplikasyonlar.

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