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ORIGINAL ARTICLE

Challenges and safety of endoscopic retrograde cholangio pancreatography (ERCP) among elderly patients.

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ABSTRACT… Objective: To determine the challenges and safety of endoscopic retrograde cholangio pancreatography (ERCP) between patients of <60 years and ≥ 60 years. **Study Design:** Cross-sectional study. **Setting:** Department of Gastroenterology, Liaquat National Hospital, Karachi, Pakistan. **Period:** November 2022 to October 2023. **Methods:** All clinically suspected patients of hepatobiliary and pancreatic diseases underwent endoscopic retrograde cholangiopancreatography and followed inclusion criteria were included. Patient's age was categorized into two age group as Group A i.e. <60 years and Group B i.e. ≥ 60 years. Patient's data were compiled and analyzed through SPSS. P-value ≤0.05 was considered as significant. **Results:** In this study, ERCP was successful in 95.1% patients under 60 years however it had 96.6% success in elderly patients with age 60 or more. Malignant biliary strictures were 7.21% in group A while 11.21% in group B with P-value of 0.021. Periampullary diverticulum was 1.45% in group A while 1.74% in group B with P-value of 0.021.Post ERCP pancreatitis was 44.2% in group A and 22.2% in group B with P-value of 0.343. Preprocedure ICU admissions were 1.4% in group A and 2.9% in group B with P-value of 0.005 while postprocedure shifting of patients to ICU were 0.8% in group A and 2.9% in group B with P-value of 0.084.Length of hospital stay between two groups with p-value was 0.540. **Conclusion:** ERCP can be used safely and effectively in the elderly to diagnose and treat hepatobiliary and pancreatic disorders by skilled endoscopits.

Key words: Elderly, ERCP, Hepatobiliary Disorders, Obstructive Jaundice.

INTRODUCTION

Pancreatic and biliary disorders are frequently observed in the elderly population.[1,2] Compared to the younger population, the frequency of bile duct stones rises by approximately four times.[1] A common diagnostic and treatment method for hepatobiliary and pancreatic disorders is endoscopic retrograde cholangio pancreatography (ERCP).[3] However, endoscopic retrograde cholangiopancreatography is one of the riskiest and most technically difficult procedures that gastrointestinal endoscopists undertake.[4,5] ERCP offers the added benefit of therapeutic intervention.[6-8] In the elderly age, therapeutic ERCP frequently eliminates the need for emergency biliary tract surgery, which is better tolerated, linked to much lower risk, and has a reduced death rate.[9]

A previous study compared the endoscopic retrograde cholangiopancreatography findings among age group as Group A i.e. <65 years and Group B i.e. ≥ 65 years. The challenges of ERCP that are assessed by following findings was noted as 44% had choledocholithiasis, 50% had malignancy and 28.5% had biliary fistula in Group A while 55% had choledocholithiasis, 50% had malignancy and 71.4% had biliary fistula in Group B. The safety that is assessed by complications noted in patients after ERCP was found as 6.6% had infection, 3.3% had pancreatitis and 3.3% death in Group A while 10% had infection, 6.6% had pancreatitis and 0% death in Group B. The overall complication rate was 13.3% in Group A and 16.6% in Group B.[10]

The main purpose of our study is to identify and compare indications and endoscopic findings,

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challenges, difficulties and complications. Furthermore this study will potentially and ultimately help to contain the incidence of post-ERCP complications of the patient when the procedure is performed at an advanced age. The better results of our study will acknowledge the professionals for the diagnosis and treatment of hepatobiliary and pancreatic disorders.

METHODS

This cross sectional study was conducted at Department of Gastroenterology, Liaquat National Medical College and Hospital, Karachi. The research proposal was approved by the Research and Ethics Committee of Liaquat National Hospital prior to conduct this study with Ref:App#0840-2022 LNH-ERC (dated: October 26th, 2022). All the clinically suspected patients of hepatobiliary and pancreatic diseases who visited to the Department of Gastroenterology, Liaquat National Hospital, Karachi, underwent Endoscopic retrograde cholangiopancreatography and followed inclusion criteria were included in our study from 1st November 2022 till 31 October 2023.

We included 690 patients in our study due to high turnover of patients in our institute.

In Pakistan, the elderly patients were defined as the patient with age of 60 years and more.[11] So, we divided data into two groups i.e. <60 years and ≥ 60 years. The challenges of endoscopic retrograde cholangiopancreatography were assessed by the endoscopic findings which are Choledocholithiasis, Biliary stricture, periampullary Diverticulum, Biliary leak and Pancreatic Duct Obstruction. The safety of endoscopic retrograde cholangiopancreatography was assessed by the number of complications. One of the both group i.e. <60 years versus ≥60 years group was consider safest who had less number of complications than the other group. The possible complications are Pancreatitis, Cholangitis, Bleeding, and Perforation.

The procedures were performed by skilled endoscopists. For endoscopic retrograde cholangiopancreatography procedures, standard video duodenoscopes with side view (Olympus, Tokyo, Japan) were utilized. Data were collected on a predesigned proforma.

Patient's data were compiled and analyzed through statistical package for Social Sciences (SPSS) Version 25. Frequency and percentage were computed between two groups for qualitative variables like gender, age group, diabetes, hypertension, smoker, pain, jaundice, vomiting, choledocholithiasis, malignancy, pancreatitis, cholangitis and mortality. Normality of the data was checked by Shapiro wilk test. Endoscopic findings of ERCP were compared between two age groups by using chi square test. P-value ≤0.05 was considered as significant.

RESULTS

Total 690 patients were included in current study. Mean age, body mass index, symptoms duration, hospital days and procedure time was 51.10±16.44 years, 22.34±0.92 Kg/m2, 17.16 ±28.07 days, 2.22±1.71 days and 29.51±20.33 minutes. We had 485(70%) of patients from Group A (<60 years) and 205(30%) from Group B (≥60 years). Around half of patients were males 317(45.9%). The most common ERCP findings was CBD sludge (44.3%) followed by choledocholithiasis, CBD biliary stricture (malignant) (8.4%), common hepatic duct stricture (1.7%), CBD bilairy stricture (benign) (1.2%), hilar biliary stricture (malignant) (1%), periampullary tumor (0.9%), suppurative cholangitis secondary to choledocholithiasis (0.9%), pancreatic tumor (0.9%), hilar biliary stricture (benign) (0.7%), pancreatic duct stricture (0.4%), pyloric tumor (0.3%), gall stone pancreatitis (0.1%), external compression of biliary system (0.1%). There were (3.9%) patients with complications. Procedure was successful among 659 (95.5%) patients. There were only 6(0.9%) mortalities. Out of 27 complicated cases, bleeding was seen in 14(51.9%) patients, pancreatitis was present in 10 (37%) patients, 2 (7.4%) patients had myocardial infarction, and bleeding and perforation was present in 1 (3.7%) case only. Table 1 displays comparison of patients' demographic, clinical profile (comorbidity and symptoms duration), and laboratory parameters among Group A

(<60 years) and 205 patients from Group B (≥60 years). There were 78.1% of patients with abdominal pain, 36.9% with jaundice and 17.1% with vomiting in group A whereas in group B, 68.3% of patients with abdominal pain, 51.2% with jaundice and 29.8% with vomiting.

In group A, 1% of patients were on antithrombotic medications, 2.5% were on hypertensive medications and1% on diabetic medications. In group B, 8.8% of patients were on antithrombotic medications, 6.3% were on hypertensive medications and 2.9% on diabetic medications. Detailed descriptive statistics of medication and procedure for antithrombotic and hypertensive management are presented in Table-II.

Characteristics	Group A (n=485)	Group B (n=205)	P-Value
Height (m)#	1.57±0.02	1.57±0.03	1
Weight (kg) #	76.91±5.06	76.25±5.63	0.131
BMI (Kg/m^2) #	22.33±0.94	22.33±0.83	1
Symptoms duration(days) #	16.87±29.37	16.87±24.78	1
Gender			
Male	214 (44.1)	103 (50.2)	0.140
Female	271 (55.9)	102 (49.8)	
Co-Morbid			
Diabetes	50 (10.3)	46 (22.4)	<0.001
Hypertension	54 (11.1)	61 (29.8)	<0.001
Smoker	-	3 (1.5)	0.008
Alcohol	-	1 (0.5)	0.124
Ischemic heart disease	13 (2.7)	20 (9.8)	<0.001
Cirrhosis	9 (1.9)	2 (1.0)	0.399
Stroke	-	2 (1.0)	0.029
Cholecystectomy	85 (17.5)	18 (8.8)	0.003
Clinical Features			
Abdominal Pain	379 (78.1)	140 (68.3)	0.006
Jaundice	179 (36.9)	105 (51.2)	0.001
Fatigue	6 (1.2)	3 (1.5)	0.811
Vomiting	83 (17.1)	40 (19.5)	0.452
Back Pain	3 (0.6)	1 (0.5)	0.267
Fever	44 (9.1)	28 (13.7)	0.072
Weight Loss	26 (5.4)	33 (16.1)	<0.001
Cholangitis	17 (3.5)	13 (6.3)	0.095
Anorexia	6 (1.2)	4 (2)	0.473
Laboratory parameters			
Hemoglobin (g/dL)#	12.15±1.51	11.61±1.59	<0.001
Total leukocyte ccount (/μL)#	10.08±8.06	10.02±4.68	0.921
Platelets (/μL)#	257.8±115.37	248.34±77.96	0.283
Urea (mg/dL)#	39.78±18.86	47.35±28.01	<0.001
Creatinine (mg/dL)#	3.74±18.57	5.23±22.67	0.369
Chloride (mmol/L)#	106.73±18.08	103.02±22.2	0.022
Sodium (mmol/day)#	129.34±27.11	131.48±25.01	0.333
Potassium (mmol/day)#	9.41±24.6	11.49±41.16	0.413
Bi-Carbonate (mmol/L)#	24.44±13.62	26.82±36.64	0.214
Serum Lipase (U/L)#	423.17±1666.44	172.59±606.56	0.037

Table-I. Distribution of demographics, clinical profile, laboratory parameters, medication and procedure overview among Group A (<60 years) and 205(30%) from Group B (≥60 years)

#Numerical variables were presented as Mean±SD

There was 32.4% of patients on intubation in group A and 26.7% in Group B. We found ERCP Success among 95.1% of patients in group A and 96.6% in group B. Mortality rate was 0.8% and 1.0% in group A and group B respectively. Complete CBD clearance was found among 42.5% of patients in group A and 70.2% in group B. Mean hospital stay and total procedure time was 2.20±1.79 days and 28.88±18.69 minutes in group A respectively whereas in group B, Mean hospital stay and total procedure time was 2.28±1.52 days and 31.00±23.75 minutes respectively. There was 3.5% of patients done with second ERCP within 30 days in Group A and 6.8% in group B. Table-III provided detailed descriptive statistics for clinical outcomes and procedures related to Intubation and ERCP.

Study Variables	Group A (n=485)	Group B (n=205)	P-Value
Using Antithrombotic Medications	5 (1.0)	18 (8.8)	<0.001
Using Hypertensive medications	12 (2.5)	13 (6.3)	0.013
Using Diabetic Medications	5 (1)	6 (2.9)	0.069
Sedation Drugs	329 (67.8)	147 (71.7)	0.315
Need of reversal agent	-	1 (0.5)	0.124
Use of General Anaesthesia Drug	60 (12.4)	24 (11.7)	0.807
Biliary Cannulation	412 (84.9)	176 (85.9)	0.759
Sphincteroplasty	64 (13.3)	41 (20.0)	0.023
Wire Size#	12.28±2.77	12.67±3.18	0.107
Sphincterotome	345 (71.1)	129 (62.9)	0.034

Table-II. Distribution of medication and procedure among Group A (<60 years) and Group B (≥60 years)

#Numerical variables were presented as Mean±SD

Outcomes	Group A (n=485)	Group B (n=205)	P-Value
Intubation	58 (32.4)	24 (26.7)	0.926
Admission			
Ward	297 (61.2)	144 (70.2)	0.005
Intensive care unit	7 (1.4)	6 (2.9)	
High dependency unit	41 (8.5)	19 (9.3)	
Daycare	72 (14.8)	25 (12.2)	
Outpatient	68 (14)	11 (5.4)	
Endoscopy Suite	411 (84.7)	181 (88.3)	
Post Procedure Shifting			
Ward	86 (17.7)	44 (21.5)	0.084
Day Care/Endoscopy Recovery	356 (73.4)	136 (66.3)	
Intensive care unit	4 (0.8)	6 (2.9)	
High dependency unit	39 (8)	19 (9.3)	
Sedation converted to general anesthesia	3 (0.6)	1 (0.5)	0.836
Cardiac Arrest	3 (0.6)	3 (1.5)	0.275
ERCP Procedure			
Successful	461 (95.1)	198 (96.6)	0.374
Failure	24 (4.9)	7 (3.4)	
Outcome			
Expired	4 (0.8)	2 (1.0)	0.845
Discharged	481 (99.2)	203 (99)	
Hospital Stay (days)	2.20±1.79	2.28±1.52	0.576
Total Procedure Time (min)	28.88±18.69	31.00±23.75	0.211
Complete commone bile duct clearence	206 (42.5)	60 (29.3)	0.001
Stent			
Yes	314 (64.7)	144 (70.2)	<0.001
No	171 (35.3)	61 (29.8)	
Balloon Usage	242 (49.9)	71 (34.6)	<0.001
Basket Use	4 (0.8)	1 (0.5)	0.633
Second ERCP performed within 30 days	17 (3.5)	14 (6.8)	0.054

Table-III. Clinical outcomes and procedures related to intubation and ERCP

By ERCP, majority of patients were found with CBD sludge (46.6%) in group A and CBD sludge (39.02%) in group B whereas complication rates were 3.7% and 4.4% in group A and Group B respectively. We found significant association of study group with ERCP findings(p=0.021) and insignificant association with complications(p=0.674) as presented in Table-IV.

DISCUSSION

Both the younger and older groups saw equal levels of success and problems. They propose that ERCP is useful in the identification and management of biliary blockage in senior citizens. Research on the therapeutic effectiveness of endoscopic treatments in the elderly is becoming more and more common, since the prevalence of bile duct stones, malignant biliary disease, and the danger of surgery increase with age.[12,13]

According to the findings of a study, ERCP procedures are safe and effective for older patients; however, because older patients are more susceptible to anesthetic and procedure-related problems than younger patients, older patients should get extra attention. For the treatment and diagnosis of hepatopancreatobiliary disorders in the elderly, ERCP is thought to be both safe and effective.[14,15] Nonetheless, the majority of papers on this topic are small- and small-group studies. Studies on this topic, both prospective and retrospective, typically use ERCP data from older adults.[16,17]

However, in a different research by Sugiyama et al.[18] that had 403 cases and exclusively 70-year-old patients, the success percentage of the retrospective ERCP treatment was found to be 98.5%. Early complications included one death, nine pancreatitis cases, seven hemorrhage cases and five cases of cholangitis.

Variables	Group A (n=485)	Group B (n=205)	P-Value
ERCP Findings			
Common hepatic duct stricture	9 (1.86)	3 (1.46)	0.021
Choledocholithiasis	169 (34.84)	73 (35.6)	
Biliary Leak	21 (4.33)	4 (1.96)	
Commone bile duct bilairy stricture (Benign)	6 (1.23)	2 (0.98)	
Commone bile duct biliary stricture (Malignant)	35 (7.21)	23 (11.21)	
Pyloric tumor	1 (0.21)	1 (0.48)	
Pancreatic duct Stricture	3 (0.62)	-	
Periampullary Tumor	1 (0.21)	5 (2.44)	
Commone bile duct sludge	226 (46.6)	80 (39.02)	
Suppurative cholangitis secondary to choledocholithiasis	3 (0.62)	3 (1.46)	
Hilar biliary stricture (Benign)	3 (0.62)	2 (0.98)	
Hilar biliary stricture (Malignant)	5 (1.03)	2 (0.98)	
Gall Stone Pancreatitis	-	1 (0.49)	
External Compression Of Biliary System	-	1 (0.49)	
Cholangitis secondary to blocked stent	-	1 (0.49)	
Periampullary Diverticulum	10 (1.45)	12 (1.74)	
others	3 (0.62)	4 (1.96)	
Complications			
Yes	18 (3.7)	9 (4.4)	0.674
No	467 (96.3)	196 (95.6)	
Complication Type			
Pancreatitis	8 (44.4)	2 (22.2)	0.343
Bleeding	9 (50)	5 (55.6)	
Myocardial Infarction	1 (5.6)	1 (11.1)	
Bleeding and Perforation	-	1 (11.1)	

Table-IV. Comparison of ERCP findings and complications in both groups

Chi-Square/Fisher exact test was applied.

The study carried out by Mitchell et al.[19] involved the retrospective examination of 121 patients who were 90 years of age or older. The study revealed that 91.3% of the patients had successful cannulation, however there were 4 deaths, 3 cases of hemorrhage, and no pancreatitis.

Atypical presentations were more common in older individuals, according to Ashton et al.'s study.[17] Choledocholithiasis was found to exist in 20% of individuals between the ages of 70 and 89, according to Sugiyama et al.[18] In contrast to previous research indicated that the incidence of pancreatitis following pre-cut papillotomy was greater in senior individuals.[19] The study also concluded that the procedure can be used in suitable patients who are at risk of pancreatitis and have endoscopist experience.

A research[11] reported a cannulation success rate of 98.4%; no perforation, hemorrhage, liver failure, or basket compression were seen. There is a 10–15% chance of discovering stones in the bile duct when gallstones are present.[20,21] Before and after laparoscopic cholecystectomy, ERCP seem to be quite helpful in identifying and eliminating choledochal stones.[22]

A research[11], which included gallstones, found that 12% of patients had choledocholithiasis. In 29 patients (48.3%), sphincterotomy was successfully completed; in 8 individuals (13.3%), stenting was completed. It is deemed safe to do ERCP as an outpatient treatment for diagnostic reasons since problems are often observed in the first 4–6 hours of the operation.[11] 15% of patients had ERCP-related complications found. Infectious complications accounted for 8.3% of all complications, with pancreatitis coming in second at 5%. Between 0.4% and 1.8% of individuals receiving ERCP develop acute cholangitis; this proportion is greater in patients with partial biliary blockage and those in whom sufficient bile drainage is not possible. Cholangitis (5% of patients) was the most frequent consequence; in patients without blockage or a dilated biliary system, the incidence of cholangitis was much lower, particularly in older patients.

The development of complications was not significantly affected by the diagnosis made during the ERCP operation, nor by the existence of pancreatitis, cholecystitis, cholecystectomy, or cholangitis. Acute pancreatitis is one of the most frequent post-ERCP sequelae, occurring in 0.94–0.4% of cases and more often in female patients.[22] Pancreatitis was observed in 3 (5%) of the research participants and was shown to be the second most prevalent complication after ERCP. For the development of pancreatitis, there was no statistically significant difference in the diagnostic or treatment ERCP operations. Individuals who experienced pancreatitis following ERCP: pancreatitis was found in 1 (3.3%) case if the patient was younger than 65. In contrast, pancreatitis linked to ERCP occurred in 2 (6.6%) instances in patients who were older than 65. The use of baskets and biliary sphincterotomy from therapeutic applications considerably exacerbated the development of pancreatitis following ERCP, although it was shown that therapeutic and diagnostic applications had no effect on the development of pancreatitis.[11]

Patients who are older have an increased risk of hypoxia, hypotension, and arrhythmia. Systemic air embolism is regarded as an uncommon consequence, but premedication issues such sedation intolerance, arrhythmia, and cardio-respiratory arrest are observed in 0.5–1% of patients with ERCP.[23] One patient (1.6%) in the over-65 age group died in a study[11], as a result of hypoxia brought on by sedative intolerance. ERCP associated mortality rate has been recorded with an average of 0.4% and up to 1%.

This study had some limitations. Being a single center study, the findings needs further verification. We only noted a relatively short-term outcomes. There is a need to perform prospective analysis to record long-term outcomes

CONCLUSION

Since pancreatic and hepatobiliary tract cancers are more common in older people and require surgical intervention due to high morbidity and death rates, ERCP procedures are thus just as crucial in the diagnosis and treatment of older

patients as they are in younger ones. When carried out by skilled practitioners, ERCP can be used safely and effectively in the elderly to diagnose and treat hepatobiliary and pancreatic disorders.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Mir Nosherwan Khan:** Data collection, Drafting, Responsible for data's integrity, Approved for publication.
2	**Lubna Kamani:** Conception, Design, Critical revision, Proof reading, Approved for publication.
3	**Baseer Ahmad:** Literature review, Data collection, Data analysis, Proof reading, Approved for publication.