



Experience of endoscopic retrograde cholangiopancreatography with side-viewing duodenoscope in patients with previous gastric surgery

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ABSTRACT

Objective: Endoscopic Retrograde Cholangiopancreatography (ERCP) with conventional side-viewing duodenoscope can be challenging and unsuccessful at altered anatomy in the gastrointestinal tract. This study aimed to evaluate our experience with ERCP in patients with previous gastric surgery.

Material and Methods: Patients on whom ERCP was performed from January 2017 to August 2021 and who had previous gastric surgery were included into the study. Age, sex, comorbidity, Charlson's Comorbidity Index (CCI), ERCP indication, previous gastric surgery (indication, type of resection and reconstruction), history of cholecystectomy, and MRCP results were evaluated retrospectively. The results were compared as successful ERCP (SERCP) or unsuccessful ERCP (USERCP). Also, odds ratio ERCP failure was also evaluated.

Results: Forty-three patients were included into study. Mean age was 68.8 ± 13.6 years. The most common sex was female (51.2%). The most common ERCP indication was choledocholithiasis with 44.2%, gastric surgery indication was peptic ulcer with 72.1%, gastric resection was subtotal with 67.4%, and reconstruction was gastrojejunostomy with 58.1%. The success rate of ERCP was 44.2%. Mean CCI was 4.16 ± 2.28 . Only malignancy history was significantly higher in the USERCP group ($p= 0.026$). Male sex, non-choledocholithiasis indication, history of malignancy, $CCI > 4$, total gastrectomy, Roux-NY (RNY) reconstruction, history of cholecystectomy, and intercalarily to the bile duct dilatation in MRCP were likelihood for USERCP.

Conclusion: While history of malignancy and cholecystectomy were the only significant factor for unsuccessful ERCP, male sex, total gastrectomy, RNY anastomosis result in a higher likelihood of ERCP failure in patients with previous gastric surgery. Alternative devices to side-viewing duodenoscope will increase success in selected patients.

Keywords: Endoscopic retrograde cholangiopancreatography, gastrectomy, roux ny, gastrojejunostomy

INTRODUCTION

The incidence of biliary tract stones (BTS) increases after gastrectomy as a result of (1) resection of the hepatic branch of the nervus vagus, (2) non-physiologic reconstruction, (3) biliary tract infection, (4) and altered response and secretion of cholecystokinin (1). Biliary tract stones occurs at a rate of 16.6% after gastric surgery, whereas the incidence is 4.4% in the general population. Biliary tract stones is most common after total gastrectomy with 6.6%, proximal gastrectomy with 5.4%, and distal gastrectomy with 4.8%. Biliary tract stones is most common after Billroth II with 18% and Roux-en-Y (RNY) reconstruction with 17.8%. The incidence of BTS reaches 39% after ten years of gastric surgery. Fifty-three percent of BTS occur at the the common biliary duct (CBD). Common biliary duct stones with 70.5% and cholangitis with 14.1% are the most common indication of ERCP in patients with previous gastric surgery (2-4).

Endoscopic Retrograde Cholangiopancreatography (ERCP) is an important and effective diagnostic and therapeutic modality for pancreaticobiliary disorders. The difficulty of ERCP has been graded by Cotton et al. and American Society for Gastrointestinal Endoscopy (ASGE), and previous gastric surgery has been graded as more difficult (5,6). The difficulties of ERCP with previous gastric surgery include (1) identifying the pancreaticobiliary enteral limb; (2) reaching and identifying the major papilla or the pancreaticoenteric and/or bilioenteric anastomoses (3); selectively cannulating the biliary or pancreatic duct from an altered orientation; and (4) performing therapeutic interventions with ERCP (7). The success rate of the ERCP procedure varies from 70.4% to 99% and decreases with higher grades (8,9). The

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success rate of ERCP changes with the type of gastric surgery performed. The overall success rate of ERCP with gastric surgery has been reported as 91.8%; however, the success rate decreases to 86.4% in pancreaticoduodenectomy patients (10-12). Indication of ERCP, type of previous gastric surgery, and type of the previous reconstruction have been reported as significant risk factors for ERCP success in patients with previous gastric surgery (13). The aim of this study was to evaluate our experience with ERCP in patients with previous gastric surgery.

MATERIAL and METHODS

After receiving approval from the ethics committee of İstanbul Prof. Dr. Cemil Taşcıoğlu City Hospital (16/06/2020 date and 250 number), accessible patient records from January 2017 to August 2021 of those with previous gastric surgery on whom ERCP was performed were evaluated retrospectively. No written consent was obtained from the patients because the study was retrospective.

Patient's age, sex, the indication of ERCP, findings of magnetic resonance cholangiopancreatography (MRCP), the success of ERCP (successful ERCP: SERCP, unsuccessful ERCP: USERCP), treatment of unsuccessful ERCP, survival, comorbidities, and Charlson's Comorbidity Index (CCI) were evaluated retrospectively. Additionally, the indication of gastric surgery, previous gastric surgery, type of gastric resection, type of reconstruction, history of cholecystectomy, and the year ERCP was performed were also evaluated. Moreover, all parameters were compared with ERCP being successful or unsuccessful.

All ERCP procedures were performed by an experienced endoscopist surgeon, under sedoanalgesia and in prone position. All patients received nasal oxygen, followed by monitoring oxygen saturation and electrocardiography. Prophylactic antibiotics were explicitly used. ERCP was performed under fluoroscopic control by side-viewing duodenoscope with a total length of 120 cm and a working channel of 3.4 mm in diameter, which allowed the use of a wide range of catheters according to the diagnostic or therapeutic objective (Fujinon XL-4450, Tokyo, Japan). All patients were hospitalized one day to be followed for ERCP complications.

Indication of ERCP was evaluated as choledocholithiasis, cholangitis, suspicion of malignancy, pancreatitis, and biliary fistula. Findings of MRCP were evaluated as normal, dilated biliary tract, dilated biliary tract with calculi, dilated biliary tract with sudden end, dilated biliary tract with external pressure. Treatment of USERCP was evaluated as percutaneous transhepatic cholangiography (PTC), surgery (choledocotomy, choledocoduodenostomy, or hepaticojejunostomy), or conservative treatment.

Indications of gastric surgery were evaluated as peptic ulcer, gastric malignancy, pancreatic malignancy, pyloric stenosis, or obesity. Previous gastric surgery was evaluated as distal sub-

total gastrectomy with gastrojejunostomy (Billroth II gastrectomy) (BR-II), total gastrectomy with RNY gastrojejunostomy (TG+RNY-GJ), distal subtotal gastrectomy with RNY gastrojejunostomy (DG+RNY-GJ), gastrojejunostomy (GJ), Jaboulay pyloroplasty (JP), or sleeve gastrectomy with bypass (SG+B). Type of gastric resection was evaluated as none, subtotal, or total. Type of reconstruction was evaluated as gastrojejunostomy (GJ), RNY gastrojejunostomy (RNY), Jaboulay pyloroplasty (JP), or bypass.

Statistical analysis was performed with SPSS 15.0., age was expressed as mean \pm standard deviation. Nonparametric values were analyzed with Mann-Whitney U, parametric values with t test, odds ratio was analyzed for unsuccessful ERCP (95% Confidence Interval, Lower- Upper Bound), and $p < 0.05$ was accepted as significant.

RESULTS

From one thousand three hundred ninety ERCP performed patients, 43 patients with previous gastric surgery were included into the study. Mean age was 68.8 ± 13.6 years, 51.2% of the patients were females. Choledocholithiasis was the most common indication of ERCP with 44.2% ($n = 19$), cholangitis with 17.9% ($n = 12$), and suspicion of malignancy with 18.6% ($n = 8$). Isolated DBT was the most common finding of MRCP as 37.3% ($n = 16$), DBT with calculi as 27.9% ($n = 12$), and normal only in two patients (4.6%). The success rate of ERCP was 44.2% ($n = 19$). Surgery was the most common treatment for unsuccessful ERCP with 45.8% ($n = 11$), choledochotomy + T tube drainage performed in six patients, choledochoduodenostomy performed in four patients, and hepaticojejunostomy in one patient. Perforation occurred in only two patients; one of them died (2.3%). Hypertension was the most common comorbidity with 39.5% ($n = 17$), and diabetes mellitus and heart disease with 23.2% ($n = 10$). Mean of CCI was 4.16 ± 2.28 (Table 1).

Peptic ulcer was the most common indication of gastric surgery with 72.1% ($n = 31$), gastric malignancy with 14% ($n = 6$), and pancreatic malignancy with 7% ($n = 3$). DG+GJ was the most common previous gastric surgery with 51.1% ($n = 22$), TG+ RNY with 18.6% ($n = 8$), and DG+RNY with 14% ($n = 6$). 67.4% ($n = 29$) of the patients performed distal subtotal, and 18.6% ($n = 8$) total gastrectomy. 58.1% ($n = 25$) of the patients performed GJ (Figure 1), and 32.4% ($n = 14$) RNY (Figure 2) reconstruction. Of the patients, 69.8% ($n = 30$) underwent cholecystectomy. Higher numbers of ERCP were performed in 2017 with 27.9% ($n = 12$) and 2019 with 25.6% ($n = 11$) (Table 2).

Mean age was 66.9 ± 13.5 years in USERCP and 71.1 ± 13.6 years in SERCP, but the difference was not statistically significant ($p = 0.322$). 62.5% of USERCP and 36.8% of SERCP were males, but the difference was not statistically significant ($p = 0.099$). Choledocholithiasis was the most common indication of ERCP, both USERCP and SERCP (41.7% vs. 47.4%), 20.8% of the USERCP, and 36.8% of the SERCP had cholangitis. The difference

Table 1. Results of ERCP with previous gastric surgery

Age (years)*	68.8 ± 13.6	
Sex	n	%
Male	21	48.8
Female	22	51.2
Indication	n	%
Choledocholithiasis	19	44.2
Cholangitis	12	27.9
Suspicion of malignancy	8	18.6
Pancreatitis	3	7
Biliary fistula	1	2.3
MRCP Results	n	%
Normal	2	4.6
DBT	16	37.3
DBT with calculi	12	27.9
DBT with sudden ends	11	25.6
DBT with external pressure	2	4.6
ERCP success	n	%
Yes	19	44.2
No	24	55.8
Treatment of USERCP	n	%
PTC	4	16.7
Surgery	11	45.8
Conservative	9	37.5
Survival	n	%
Mortality	1	2.3
Alive	42	97.7
Complication	n	%
No	41	95.4
Yes	2	4.6
Comorbidities	n	%
Hypertension	17	39.5
Diabetes Mellitus	10	23.2
Heart disease	10	23.2
Malignancy	9	20.9
Neurologic disease	7	16.3
Pulmonary disease	5	11.6
Endocrinologic disease	3	7
Chronic renal failure	2	4.6
CCI*	4.16 ± 2.28	

*Mean ± SD, ERCP: Endoscopic retrograde cholangiopancreatography, MRCP: Magnetic resonance cholangiopancreatography, DBT: Dilated biliary tract, USERCP: Unsuccessful ERCP, PTC: Percutaneous transhepatic cholangiography. CCI: Charlson comorbidity index.

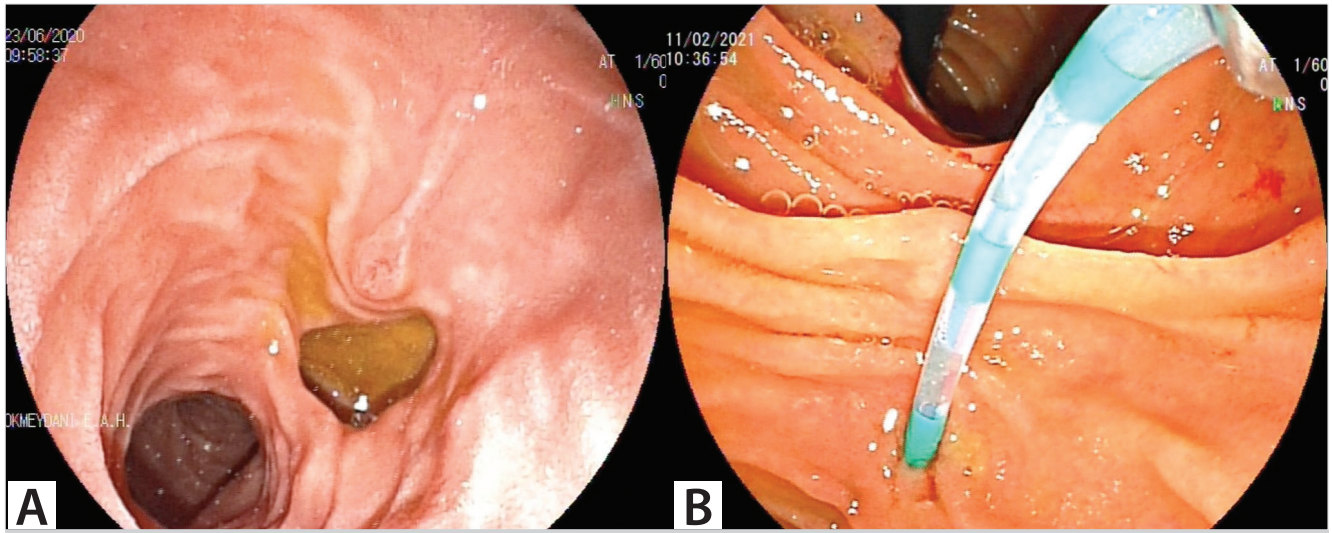


Figure 1. Duodenoscopic images of ERCP in patient with previous gastric surgery **A:** Papilla and duodenum, **B:** Cannulation of papilla.

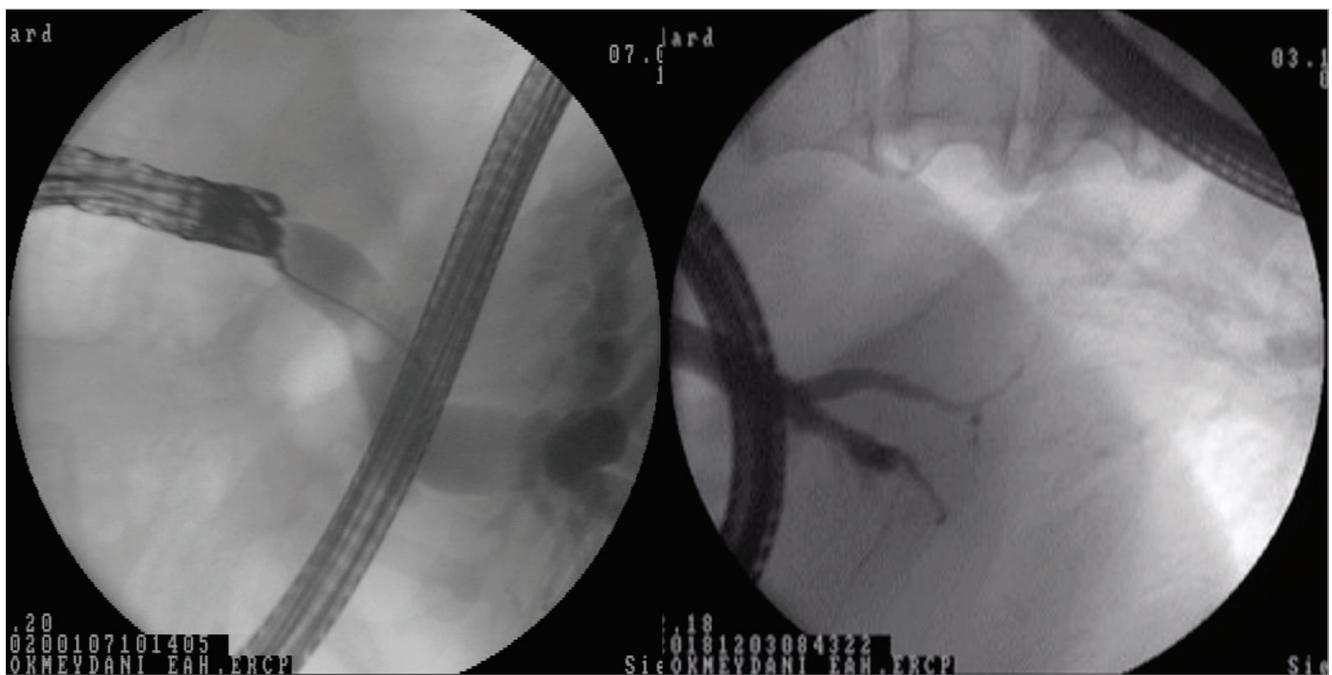


Figure 2. Fluoroscopic images of ERCP in patient with previous gastric surgery.

for ERCP indication was not statistically significant ($p=0.406$). From comorbidities, only history of malignancy was statistically higher in USERCP with 33.3% vs. 5.3% ($p=0.026$). The mean of CCI for USERCP was 4.04 ± 2.23 , for SERCP was 4.32 ± 2.40 , but not statistically different ($p=0.701$). Peptic ulcer was the most common indication of gastric surgery for both groups (66.7% vs. 73.7%), and the subsequent indication for USERCP was gastric malignancy with 20.8%, for SERCP was pyloric stenosis with 15.8%. The difference in the indication of gastric surgery was not statistically significant ($p=0.588$). Subtotal gastrectomy was the most common type of gastric resection for both USERCP

and SERCP with 66.7% vs. 68.4%, respectively, and 8.3% ($n=2$) of the USERCP and 21.1% ($n=4$) of the SERCP had no gastrectomy. The difference in the type of gastric resection was not statistically significant ($p=0.124$). Gastrojejunostomy was the most common type of reconstruction for both USERCP and SERCP with 58.3% vs. 57.9%, respectively, and JP and bypass were performed only on SERCP patients. The difference for reconstruction was not statistically significant ($p=0.80$). 41.7% of USERCP patients and 15.3% of SERCP patients had history of cholecystectomy. The difference between the history of cholecystectomy was not statistically significant ($p=0.07$). The success of

Table 2. Results of previous gastric surgery and time of ERCP

Indication of gastric surgery	n	%
Peptic ulcer	31	72.1
Gastric malignancy	6	14
Pancreatic malignancy	3	7
Pyloric stenosis	2	4.6
Obesity	1	2.3
Previous gastric surgery	n	%
DG+GJ	22	51.1
TG+RNY	8	18.6
DG+RNY	6	14
GJ	3	7
JP	3	7
SG+B	1	2.3
Type of gastric resection	n	%
None	6	14
Subtotal	29	67.4
Total	8	18.6
Type of reconstruction	n	%
GJ	25	58.1
RNY	14	32.6
Jaboulay	3	7
Bypass	1	2.3
History of Cholecystectomy	n	%
No	30	69.8
Yes	13	30.2
Time of ERCP (year)	n	%
2017	12	27.9
2018	8	18.6
2019	11	25.6
2020	9	20.9
2021	3	7

DG+GJ: Distal gastrectomy with gastrojejunostomy, TG+RNYGJ: Total gastrectomy with RNY gastrojejunostomy, DG+RNYGJ: Distal gastrectomy with RNY gastrojejunostomy, GE: Gastroenterostomy, JP: Jaboulay pyloroplasty, SG+B: Sleeve gastrectomy with bypass. GE/GJ: Gastroenterostomy/gastrojejunostomy, RNYGJ: RNY gastrojejunostomy, ERCP: Endoscopic retrograde cholangiopancreatography.

the ERCP rate increased by years from 25% to 66.7%, but the difference was not statistically significant ($p=0.297$). Only DBT was the most common MRCP findings for SERCP with 84.2%; however, DBT with calculi was the most common for USERCP with 37.5%. The difference in MRCP findings was not statistically significant ($p=0.259$) (Table 3).

The ODDs ratio for the history of malignancy was 1.889 (1.235-2.889), DBT+findings in MRCP was 1.707 (0.850-3.428), and history of cholecystectomy was 1.648 (1.015-2.677). The ODDs ratio for unsuccessful ERCP is shown in Table 4.

DISCUSSION

Gallstones occur more commonly in patients with gastric surgery, and half of the BTS occur at CBD. Endoscopic retrograde cholangiopancreatography is an important and useful diagnostic and therapeutic modality for CBD stones. However, ERCP in patients with surgically altered gastric anatomy is more difficult and has a lower success rate. Therefore, forward-viewing gastroscope, colonoscope, single or double-balloon enteroscope, endo USG assisted ERCP, or laparoscopic-assisted transgastric ERCP are alternative devices for conventional side-viewing duo-

Table 3. Comparison of USERCP and SERCP

Parameters	USERCP (n= 24)		SERCP (n= 19)		p
Age (year)*	66.9 ± 13.5		71.1 ± 13.6		0.322
Sex	n	%	n	%	0.099
Female	9	37.5	12	63.2	
Male	15	62.5	7	36.8	
Indication of ERCP	n	%	n	%	0.406
Choledocholithiasis	10	41.7	9	47.4	
Cholangitis	5	20.8	7	36.8	
Suspicion of malignancy	7	29.2	1	5.3	
Pancreatitis	1	4.2	2	10.5	
Biliary fistula	1	4.2	0	0	
Comorbidities	n	%	n	%	p
Hypertension	7	29.2	10	52.6	0.122
Diabetes mellitus	4	16.7	6	31.6	0.256
Heart disease	5	20.8	5	26.3	0.676
Malignancy	8	33.3	1	5.3	0.026
Neurologic disease	3	12.5	4	21.1	0.456
Pulmonary disease	2	8.3	3	15.8	0.454
CCI*	4.04 ± 2.23		4.32 ± 2.40		0.701
Indication of gastric surgery	n	%	n	%	0.588
Peptic ulcer	16	66.7	14	73.7	
Gastric malignancy	5	20.8	1	5.3	
Pancreatic malignancy	3	12.5	0	0	
Pylori stenosis	0	0	3	15.8	
Obesity	0	0	1	5.3	
Type of gastric resection	n	%	n	%	0.124
None	2	8.3	4	21.1	
Subtotal	16	66.7	13	68.4	
Total	6	25	2	10.5	
Type of reconstruction	n	%	n	%	0.80
GJ	14	58.3	11	57.9	
RNY	10	41.7	4	21.1	
Jaboulay	0	0	3	15.8	
Bypass	0	0	1	5.3	

*Mean ± SD, ERCP: Endoscopic retrograde cholangiopancreatography, SERCP: Succeeded ERCP, USERCP: Unsuccessful ERCP, DG+GJ: Distal gastrectomy with gastrojejunostomy, TG+RNYGJ: Total gastrectomy with RNY gastrojejunostomy, DG+RNYGJ: Distal gastrectomy with RNY gastrojejunostomy, GE: Gastroenterostomy, JP: Jaboulay pyloroplasty, SG+B: Sleeve gastrectomy with bypass. GE/GJ: Gastroenterostomy/gastrojejunostomy, RNYGJ: RNY gastrojejunostomy.

Table 3. Comparison of USERCP and SERCP (continue)

Parameters	USERCP (n= 24)		SERCP (n= 19)		p
	n	%	n	%	
History of cholecystectomy					0.07
No	14	58.3	16	84.2	
Yes	10	41.7	3	15.8	
Time of ERCP (year)	n	%	n	%	0.297
2017	7	58.3	5	41.7	
2018	6	75	2	25	
2019	6	54.5	5	45.5	
2020	4	44.4	5	55.6	
2021	1	33.3	2	66.7	
MRCP results	n	%	n	%	0.259
Normal	2	8.3	0	0	
DBT	6	25	10	52.6	
DBT with sudden ends	6	25	5	26.3	
DBT with calculi	9	37.5	3	15.8	
DBT with external pressure	1	4.2	1	5.3	

ERCP: Endoscopic retrograde cholangiopancreatography, SERCP: Succeeded ERCP, USERCP: Unsuccessful ERCP, MRCP: Magnetic resonance cholangiopancreatography, DBT: Dilated biliary tract.

Table 4. Risk factors of unsuccessful ERCP (Odds Ratio)

Parameters	Odds Ratio	%95 Confidence Interval	
		Lower Bound	Higher Bound
Gender (male/female)	1.591	0.899	2.814
Indication of ERCP (others/choledocholithiasis)	1.108	0.643	1.910
History of malignancy (yes/no)	1.889	1.235	2.889
CCI (CCI > 4/CCI < 4)	1.588	0.843	2.991
Indication of gastric surgery (others/peptic ulcer)	1.292	0.764	2.185
Type of gastrectomy (total/subtotal)	1.359	0.810	2.281
Reconstruction (RNY/GJ)	1.429	0.898	2.272
History of cholecystectomy (yes/no)	1.648	1.015	2.677
Findings of MRCP (+ findings/only DBT)	1.707	0.850	3.428

ERCP: Endoscopic retrograde cholangiopancreatography, CCI: Charlson's comorbidity index, RNY: Roux NY gastrojejunostomy, GE: Gastrojejunostomy MRCP: Magnetic resonance cholangiopancreatography, DBT: Dilated biliary tract.

denoscopy in patients with previous gastric surgery (7).

Mean age of ERCP patients with gastric surgery has been reported as >60 years and a higher male rate with 70.3-79.5% (14,15). In our study, mean age of the patients was similar with the literature as 68.8 ± 13.6 years, and ERCP was successful in older patients (71.1 ± 13.6 vs. 66.9 ± 13.7 years). Female was the most common sex for all ERCP (51.2%) and SERCP patients (63.2% vs. 37.5%).

Wu et al. have reported that CBD stone and cholangitis were the most common indication of ERCP in patients with previous gastric surgery (69.1%), and indication of ERCP affected the success

of diagnostic and therapeutic ERCP (13). In our study, choledocholithiasis was the most common indication for all ERCP, USERCP, and SERCP patients. However, the second most common indication for SERCP was cholangitis, but for USERCP, it was the suspicion of malignancy (36.8% vs. 29.2%). While isolated DBT was the most common MRCP finding of SERCP, additional findings to DBT were more common to MRCP finding of USERCP (52.6% vs. 66.7%).

Indication of previous gastric surgery has affected the success of ERCP due to gastrectomy and reconstruction technique. Peptic ulcer or gastric cancer is the indication of Billroth II gastrec-

tomy; however, RNYGJ is performed for gastric cancer or obesity surgery (16,17). In a recent study, peptic ulcer has been the most common indication of gastric surgery with 69.5%, and in 48% of the operated peptic ulcer patients, ERCP was successful. Also, ERCP was successful in all operated pyloric stenosis and obesity patients.

Type of surgery is the most important factor for ERCP success in patients with previous gastric surgery. Type of gastric resection affects performing ERCP; however, type of reconstruction is a more significant factor affecting ERCP success. The preferred endoscopic device changes with the type of reconstruction from duodenoscope to advanced device endoscope (7). We could only use a side-viewing duodenoscope for ERCP in patients with previous gastric surgery; and therefore, the success rate of ERCP was lower than expected.

Distal gastrectomy or antrectomy with end to side gastrojejunostomy is called Billroth II gastrectomy and performed for peptic ulcer or gastric cancer. The success rate of duodenoscope for reaching the papilla has been reported as 70-90%, and performing biliary cannulation reported as 60-91%. Success rates of other endoscopic interventions reaches to 81-91.5% (18,19). In our study, BR-II was the most commonly performed gastric surgery, but the success rate of ERCP with conventional side-viewing duodenoscope was 41.2%, which is lower than the literature. Independent from the type of gastric resection, gastrojejunostomy was similar for both USERCP and SERCP (58.3% vs. 57.9%)

Total or distal subtotal gastrectomy with RNY gastrojejunostomy performed for gastric cancer or obesity surgery has recently become more popular and useful. There is a controversy for the type of gastric resection that affects ERCP success; however, the length of the RNY limb affects the success of ERCP. Short RNY limb (40-50 cm) is performed in non-bariatric surgery, and long RNY limb (100 cm) is performed at bariatric surgery. Duodenoscope or forward-viewing endoscopes are inadequate for ERCP patients with long RNY limbs. Colonoscope and enteroscope (single balloon, double-balloon, or rotational overtube) are more useful endoscopic devices for ERCP patients with long RNY limbs. The success of enteroscopy has been reported as 71-80%, and success of ERCP has been reported as 63-88%. The success of colonoscope has been reported as 50%, and success of ERCP has been reported as 70% (13,18,20). In our study, the success rate of ERCP in patients with previous gastric surgery was affected by the type of gastric resection. Subtotal gastrectomy rate was similar for both groups; however, total gastrectomy rate was higher in USERCP patients (25% vs. 10.5%). RNY-GJ was more common in unsuccessful ERCP patients (41.7% vs. 21.1%).

Gastrojejunostomy without gastric resection is performed for passage continuity at gastric outlet or pylorus saving pancreaticoduodenectomy. The success rate of endoscope insertion

has been reported as 86-93.1%; however, ERCP success rate has been reported as 51-63%. The success rate of ERCP increases with advanced device endoscopes (21,22). In our study, the success rate of ERCP in all GJ patients was 46.2% (12/16), and that of ERCP in GJ patients with and without gastric resection was 45.5% (10/22) and 50% (2/4), respectively. GJ with gastric resection decreased the success rate of ERCP.

JP is a side-to-side gastroduodenal anastomosis, which aims to achieve passage continuity of the pyloric stenosis. The success rate of ERCP in patients with JP has been reported as 75% (23). SG+B is performed for obesity, and gallstone occurred with 21.76%, and common biliary duct stone occurred with 9.63%. The success rate of duodenal insertion has been reported as 80-100%, and the success rate of ERCP has been reported as 60 to 70% with advanced device endoscopes (24-26). In our study, the success rate of ERCP in patients with JP and SG+B was 100% despite using conventional side-viewing duodenoscope.

The success rate of ERCP in patients with previous gastric surgery has been reported higher in experienced endoscopists (66.1% vs. 62.5%); however, complication rate has been reported higher in inexperienced endoscopists (6.25% vs. 3.3%) (27). In a recent study, the success rate of ERCP has increased from 41.7% to 66.7% by the experience of the endoscopist.

CBD stones have been reported as 5-15% after open cholecystectomy and as 0.5-2.3% after laparoscopic cholecystectomy. The success rate of ERCP after cholecystectomy has been reported as 97.7% in the literature (28,29). However, there is no study regarding the effect of cholecystectomy on the success of ERCP in patients with previous gastric surgery. In our study, the history of cholecystectomy in patients with previous gastric surgery was 30.2%, and ERCP success rate of cholecystectomy patients was 15.8%.

The success of ERCP increases by choosing alternative devices due to previous gastric resection and reconstruction. However, a side-viewing duodenoscope can be sufficient for ERCP except for long limb Roux-NY gastrojejunostomy. Wu et al. have evaluated age, sex, the indication of ERCP, type of gastric resection, type of reconstruction, and blood thinner as risk factors for ERCP success with side-viewing duodenoscope. Indication of ERCP, type of gastric resection, and reconstruction have been found significant risk factors of ERCP success (13). In our study, male sex, history of malignancy, history of cholecystectomy, other accompanying findings of DBT in MRCP, total gastrectomy, RNY anastomosis, and CCI > 4 decreased the success rate of ERCP in patients with previous gastric surgery.

The limitation of this study is that it is not a prospective randomized clinical trial. A higher number of patients and using alternative devices for ERCP are needed for further studies.

CONCLUSION

Performing ERCP in patients with previous gastric surgery is difficult due to technical challenges. While history of malignancy and cholecystectomy were the only significant factor for unsuccessful ERCP, male sex, total gastric resection, RN-Y reconstruction, comorbidities (CCI > 4), calculi, sudden end or external pressure of choledochal in MRCP had a higher likelihood of unsuccessful ERCP with conventional side viewing duodenoscope. Forward viewing gastroscope, single or double-balloon enteroscope, device enhanced endoscopy, or colonoscopy can be used for total gastrectomy and/or RNY gastrojejunostomy patients. Surgery, especially choledochotomy with T tube drainage, is the primary treatment of unsuccessful ERCP.

Ethics Committee Approval: This study was approved by İstanbul Prof. Dr. Cemil Taşçıoğlu City Hospital Ethics Committee (Decision no: 4870771-514.10, Date: 16.06.2020).

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ORJİNAL ÇALIŞMA-ÖZET

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Mide ameliyatı geçiren hastalarda yandan görüşlü duodoskopi ile endoskopik retrograd kolanjiyopankreatografi deneyimimiz

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ÖZET

Giriş ve Amaç: Gastrointestinal sistem anatomisi değişenlerde konvansiyonel yandan görüşlü duodoskop ile endoskopik retrograd kolanjiyopankreatografi (ERCP) zor ve başarısız olabilmektedir. Mide ameliyatı geçiren hastalarda ERCP deneyimimizi değerlendirmeyi amaçladık.

Gereç ve Yöntem: Ocak 2017'den Ağustos 2021 tarihleri arasında ERCP yapılmış mide cerrahisi geçirmiş hastalar çalışmaya dahil edildi. Hastaların yaş, cinsiyet, komorbidite, Charlson Komorbidite İndeksi (CCI), ERCP endikasyonu, geçirilmiş mide cerrahisi (endikasyonu, mide rezeksiyon ve rekonstrüksiyon şekli), kolesistektomi öyküsü, MRCP sonuçları geriye dönük değerlendirildi. Sonuçlar başarılı (SERCP) veya başarısız (USERCP) olmasına göre de karşılaştırıldı. Ayrıca ERCP başarısızlığının Odds oranları değerlendirildi.

Bulgular: Kırk üç hasta çalışmaya dahil edildi. Ortalama yaş $68,8 \pm 13,6$ idi. En sık görülen cinsiyet kadındı (%51,2). En sık ERCP endikasyonu %44,2 ile koledokolitiazis, mide cerrahisi endikasyonu %72,1 ile peptik ülser, %67,4 ile subtotal mide rezeksiyonu ve %58,1 ile gastrojejunostomi rekonstrüksiyonu idi. Endoskopik retrograd kolanjiyopankreatografinin başarı oranı %44,2 idi. Ortalama CCI $4,16 \pm 2,28$ idi. USERCP grubunda sadece malignite öyküsü anlamlı derecede yüksekti ($p=0,026$). Erkek cinsiyet, koledokolitiazis dışı endikasyon, malignite öyküsü, CCI > 4, total gastrektomi, roux ny (RNY) rekonstrüksiyonu, kolesistektomi öyküsü, MRCP'de safra kanalı dilatasyonuna ek olarak bulgu olanlarda USERCP olasılığı daha yüksek saptandı.

Sonuç: Malignite ve kolesistektomi öyküsü, başarısız ERCP için tek anlamlı faktörler iken, erkek cinsiyet, total gastrektomi, RNY anastomozu, daha önce mide ameliyatı geçirmiş hastalarda başarısız ERCP olasılığı daha yüksek olmaktadır. Seçilmiş hastalarda yandan görüşlü duodenskopa alternatif cihazlar başarı oranı artacaktır.

Anahtar Kelimeler: Endoskopik retrograd kolanjiyopankreatografi, gastrektomi, roux ny, gastrojejunostomi

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