

Effect of Indirect Biliary Cannulation on Endoscopic Retrograde Cholangiopancreatography Outcome

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Abstract:

Background and aim: - Variable techniques could be used to raise the success rate and reduce complications of endoscopic retrograde cholangiopancreatography (ERCP).

We aimed to evaluate the effect of indirect biliary cannulation techniques as double guide-wire technique (DGT), trans-pancreatic sphincterotomy (TPS) and/or temporary pancreatic stenting on ERCP procedure outcome.

Patients and methods: - From 73 patients subjected to ERCP in our endoscopy unit, during the period between January 2016 to December 2017, 47 patients were managed with standard free direct cannulation maneuver (group-I), 21 patients managed with indirect maneuvers (DGT and/or TPS as group-II) and ERCP was failed in 5 cases; in 3 of them temporary pancreatic stent was placed but with no value.

Results: - From 73 patients, standard free direct cannulation was done in 47 patients with success rate 64.4%, the remaining 26 patients managed with indirect maneuvers with successful cannulation of CBD in 21 cases with success rate 80.7% and total success rate of 94.4%.

Procedure duration was longer in patients of indirect maneuvers than patients of standard free direct cannulation maneuver, with high significant difference (P value of 0.0036).

The post-ERCP complications were noticed in 21 patients with complications rate of 28.8 %. Complications were significantly higher in patients of indirect maneuvers than patients of standard direct maneuver (47.6% vs. 23.4%). Post-ERCP pancreatitis recorded in 7 patients (9.6%) with significant higher rate in patients of indirect maneuvers than patients of direct maneuver (23.8% vs. 4.3%).

Conclusion: - Indirect biliary cannulation (DGT and/or TPS) solved the problem of failed cannulation but had a higher rate of complications and took longer time.

Keyword: - ERCP; endoscopic retrograde cholangiopancreatography, Indirect ERCP maneuvers.

Introduction: -

Successful biliary cannulation is a crucial step for endoscopic retrograde cholangiopancreatography (ERCP)¹. Experienced endoscopists should achieve successful biliary cannulation rates more than 90%². Some factors as altered anatomy, inflamed tissues and adenomatous papilla or periampullary diverticulum may increase the bile duct (BD) cannulation difficulties³.

Altered endoscopic techniques were developed in the past few years to increase the success rate of cannulation⁴.

Double-guidewire technique (DGT) is the use of a guidewire to occupy the pancreatic duct (PD)⁵. Double-guidewire technique has been used with promising results in cases of failed cannulation⁵.

Alternative techniques for difficult cannulation is transpancreatic sphincterotomy (TPS) in which sphincterotomy cut in the PD to help biliary cannulation and/or temporary pancreatic stenting; it

could be explained as the cut either opens the BD or exposes the duct's anatomy⁶.

Double-guidewire technique and TPS might facilitate biliary cannulation. However, with DGT and TPS post-ERCP pancreatitis was reported in 0% to 25% of patients³.

Objective: - We aimed to evaluate the effect of indirect biliary cannulation techniques as double guide-wire technique (DGT), trans-pancreatic sphincterotomy (TPS) and/or temporary pancreatic stenting regarding procedure duration, success and complications.

Patients and methods: -

This prospective study was carried out at Al-Hussein University Hospitals ERCP Unit, during the between January 2016 to December 2017, on 89 cases of ERCP. **The study was approved by the Ethics Board of Al-Azhar University.**

Sixteen patients with history of pancreatobiliary surgery, not cholecystectomy, previous ERCP, duodenal obstruction or acute pancreatitis were excluded.

The remaining 73 patients were classified according to the procedure progress, as 47 cases of standard free direct biliary cannulation (as group-I), 21 cases of difficult cannulation in whom indirect maneuvers were done (as group-II) and 5 cases of failed ERCP. For all patient clear written consent, full clinical and routine laboratory assessment and abdominal sonography were done and ERCP was performed in the standard manner using a side-view endoscope (Fujinon ED-250 XT Duodenoscope). After cannulation of the CBD, an initial cholangiogram was taken.

All patients were monitored at least for 24 hours after the procedure to detect symptoms and signs of complications (e.g. tachycardia, hypotension, fever, vomiting and/or abdominal pain). Serum amylase was done four hours post-ERCP. Patients were then either hospitalized or followed up by phone contact.

Statistical analysis: -

χ^2 -test of significance and F-test of the equality of two variances were used to compare proportions between two qualitative parameters. Probability (P value) was considered significant if less than 0.05.

Results: - A total of 89 patients with obstructive jaundice were included in this study, 16 cases were excluded because of previous pancreatobiliary surgery or ERCP procedure.

The remaining 73 patients divided according to the procedure done as; group I consisted of 47 cases managed with standard direct free cannulation maneuver and 21 cases managed with indirect maneuvers. The procedure was failed in 5 cases; 3 cases of duodenal mass, one case of hidden papilla and one case of flat tiny papilla.

There was no significant difference between the studied groups regarding age and sex distribution, clinical presentation, laboratory findings and sonographic findings.

Procedure duration was longer in patients of indirect maneuvers than patients of standard direct free cannulation maneuver, with high significant difference (P value of 0.0036) (*table 1*)

Table 1: - Procedure findings and maneuver done in each group

68 cases of succeed ERCP	Gp-I (n: 47)	Gp-II (n: 21)	X ²	P
Duration of procedure				
<30 min.	30 (63.8%)	5 (23.8%)	11.2234	*0.0036
30-60 min.	14 (29.8%)	10 (47.6%)		
>60 min.	3 (6.3%)	6 (28.6%)		
peri-papillary diverticulum	2 (4.3%)	1 (4.8%)	0.008	0.9251
Papillary swelling	3 (6.3%)	3 (14.3%)	1.126	0.2884
Duodenal mass	1 (2.1%)	1 (4.8%)	0.352	0.5525
Calcular (52 = 71.2%)	41 (87.2%)	11 (52.3%)	2.1671	0.3383
- Stone extraction without lithotriptor use	35 (74.5%)	8 (38%)		
- Lithotriptor use	4 (8.5%)	1 (4.8%)		
- Stent placement	2 (4.2%)	2 (9.5%)		
Neoplastic (12)	4(8.5%)	8 (38%)	0.300	0.5838
- Stent placement	3 (6.4%)	7 (33.3%)		
- Baloon dilation followed with stent	1 (2.1%)	1 (4.8%)		
Stricture (2)	1 (2.1%)	1 (4.8%)	0.3528	0.5525
- Stent placement	1 (2.1%)	0		
- Baloon dilation then stent	0	1 (4.8%)		
Normal biliary system (2)	1 (2.1%)	1 (4.8%)	0.3528	0.3528

* Significant

Standard free direct cannulation was done in 47 patients with success rate 64.4%, the remaining 26 patients managed with indirect maneuvers with

successful cannulation of CBD in 21 cases with success rate 80.7% and total success rate was 94.4%. (Table 2)

Table 2: - Success rate of ERCP

73 cases	Gp-I (n: 47)	Gp-II (n: 21)	F	P
Success rate	47\73 (64.4%)-Odd r:1.55	21\26 (80.8%) Odd r:1.23	0.1454	0.51

The post-ERCP complications were noticed in 21 patients with complications rate of 28.8 %. Post-ERCP complications were higher in patients of indirect maneuvers versus patients of standard direct maneuver (47.6% versus 23.4%). Post-ERCP

pancreatitis recorded in 7 patients (9.6%) with significant higher rate in patients of indirect maneuvers versus patients of standard direct maneuver (23.8% versus 4.3%). (Table 3)

Table 3: - Post-ERCP complications among the studied groups.

73 cases of done ERCP		Gp-I (n: 47)	Gp-II (n: 21)	X ²	P
Abdominal pain	(5 – 6.8%)	3 (6.3%)	2 (9.5%)	0.210	0.6466
Infection	(5 – 6.8%)	2 (4.3%)	1 (4.8%)	0.924	0.3364
Contrast nephropathy	(1 – 1.3%)	1 (2.1%)	0	0.453	0.2503
Pancreatitis	(7 – 9.6%)	2 (4.3%)	5 (23.8%)	6.0101	*0.014225
Melena	(1 – 1.3%)	1 (2.1%)	0	0.453	0.2503
Hematemesis	(1 – 1.3%)	1 (2.1%)	0	0.453	0.2503
Haemodynamics instability and ICU Admission	(1 – 1.3%)	1 (2.1%)	0	0.453	0.2503
Perforation		0	0		
Death		0	0		
Total	(21 – 28.8 %)	11 (23.4%)	10 (47.6%)	3.9872	*0.0458

* Significant

Discussion: -

In the 1990s, new techniques such as DGT and TPS were introduced to overcome the difficult biliary cannulation.

From 73 patients subjected to ERCP in our endoscopy unit, during the between January 2016 to December 2017, 47 patients were managed with standard direct free cannulation maneuver (group-I), 21 patients managed with indirect biliary cannulation (group-II) and ERCP was failed in 5 cases.

With using of DGT, the rate of biliary cannulation was raised, this finding could be explained as the pancreatic guidewire can straighten both the PD and BD and occupying the PD, thus facilitating cannulation and reducing repeated pancreatic cannulation⁷⁻⁸.

In our study standard free direct cannulation was done in 47 patients with success rate 64.4%, the remaining 26 patients managed with indirect biliary cannulation (DGT and/or TPS) with successful

cannulation of CBD in 21 cases with success rate 80.7% and total success rate of 94.4%.

This result agrees with **Maeda et al.**⁹ who compared DGT with standard technique and found a higher success rate (93%) with DGT. Also, **Kahaleh et al.**¹⁰ reported success rate of pancreatic sphincterotomy as 85%.

Procedure duration was longer in patients of indirect biliary cannulation maneuvers than patients of standard direct free cannulation maneuver, with high significant difference (P value of 0.0036). This could be explained as we shift to indirect biliary cannulation after 3 attempts of standard direct free cannulation and total time of the procedure was considered, which may be noticed as study limitation, timer resetting with use of indirect biliary cannulation was a must.

In our study post-ERCP complications were noticed in 21 patients with complications rate of 28.8 %. Severe post-ERCP complications with hospital admission or death were not recorded in our study.

This finding agrees with **Freeman and Guda**¹¹ who reported a post-ERCP complication rate of more than 20%.

Complications were significantly higher in patients of indirect biliary cannulation maneuvers than patients of standard direct maneuver (47.6% vs. 23.4%).

Post-ERCP pancreatitis was recorded in 7 patients (9.6%) with significant higher rate in patients of indirect biliary cannulation maneuvers than patients of standard direct free cannulation maneuver (23.8% vs. 4.3%).

Similarly, **Herrerros *et al.***¹² prospective randomized multicenter study, reported that, DGT post-ERCP pancreatitis is 17% versus 8% for standard direct free cannulation.

Young *et al.*¹³ reported that post-ERCP pancreatitis with DGT was significantly higher than that with TPS (38.2% vs 10.8%, $P = 0.011$).

Patients of DGT needed more extensive manipulation and longer procedure time which may influence the development of post-ERCP pancreatitis¹³.

We could conclude that indirect biliary cannulation as DGT and/or TPS is highly recommended to raise up the rate of ERCP success, but higher rate of mild post-ERCP complications is expected. Further study evaluating the prophylactic pancreatic duct stenting is highly recommended.

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