



A STUDY OF ERCP PERFORATIONS OVER 12 YEARS FROM THE NATIONAL ENDOSCOPIC DATABASE: EFFECT OF PROCEDURAL VOLUMES, DURATION AND COMPLEXITY

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Introduction

- Perforation during ERCP is rare (<1%) but potentially fatal event (up to 20% mortality).
- Given its rarity, most data is through study of case series from large centers or analysis of large databases
- There is very little real-world data on endoscopist and center procedural volumes, ERCP duration and complexity on the occurrence of perforation.

Methods

- Retrospective study from Clinical Outcome Research Initiative National Endoscopic Database CORI-NED (2000-2012)
- Patients who underwent ERCP were stratified based on endoscopist's volume (quartiles), center's volume (quartiles), total procedure duration and complexity grade of the ERCP based on procedure details. Effects of these variables on the perforations that occurred were studied. Continuous variables were compared between perforations (P) and no perforations (NP) using the unpaired t- test with statistical significance set at $p < 0.05$ (2-tailed).

Results

- A total of 14,153 ERCPs were performed by 258 endoscopists at 48 facilities, with 20 reported perforations (0.14%) among 16 endoscopists. Mean patient age in years (\pm SD) 61.6 ± 14.8 vs 58.1 ± 18.8 (P vs NP, $p = NS$, Figure 1a).
- Cannulation rate was 100% and 91.5% for P and NP respectively. 13/20 (65%) of endoscopists were high volume performers in the 4th quartile and 11/20 (55%) of perforations occurred in centers with the highest volumes (4th quartile).
- Total procedure duration in minutes was 40.33 ± 23.5 vs 60.1 ± 29.9 (NP vs P, $p = 0.008$, highly significant, Figure 1b). Fluoroscopy duration in minutes was 3.3 ± 2.3 vs 3.3 ± 2.6 (P vs NP $p = NS$, Fig 1c). 50% of the procedures were complex and greater than grade 1 difficulty (Table 1). 3/20 (15%) patients had prior biliary surgery. 13/20 (65%) had sphincterotomies performed with stent insertion. Peritonitis occurred in only 1/20 (0.5%), (Table 1).

Physician	Physician volume quartile	Center volume quartile	Indication	ERCP difficulty grade	Dilation of strictures	Sphincterotomy performed	Stent placement	Sphincterotomy Device	Peritonitis	Prior biliary Surgery
1	4	4	LHD tumor biopsy	3	No	No	No	NA	No	No
2	4	4	Pancreatic tumor	3	No	Yes	Yes	*	No	Yes
2	4	4	CBD stone	3	Yes	Yes	Yes	Cotton Cannulotome	No	No
2	4	4	CBD stricture	3	Yes	Yes	Yes	Cotton Cannulotome	No	No
3	3	3	RHD tumor biopsy	3	No	Yes	Yes	Cotton Cannulotome	No	No
4	3	2	CBD stone	1	No	Yes	Yes	Cotton Cannulotome	No	No
5	4	4	CBD stone	1	No	Yes	Yes	Papillotome	Yes	No
6	4	3	Stent placement	1	No	Yes	Yes	Autotome	No	No
7	4	3	CBD stone	1	No	No	No	*	No	No
8	3	4	CBD stone	1	No	No	No	*	No	No
9	4	3	Pancreatic tumor	3	No	Yes	Yes	Cotton Cannulotome	No	No
10	3	3	Sphincter of Oddi dysfunction	3	No	Yes	Yes	*	No	No
11	4	4	CBD stone	2	No	Yes	Yes	Cannulating Sphincterotome	No	Yes
11	4	4	Stent replacement	1	No	No	No	NA	No	No
11	4	4	Pancreatic pseudocyst drainage	4	No	Yes	Yes	Needle Knife Precut	No	Yes
12	4	4	CBD stone	1	No	Yes	Yes	*	No	No
13	4	4	CBD stone	1	No	No	No	NA	No	No
14	3	3	Stent placement	1	No	Yes	Yes	Cotton Cannulotome	No	No
15	3	3	CBD stone	1	No	No	No	NA	No	No
16	3	3	CBD stone	3	No	No	No	NA	No	Yes

*unavailable

Table detailing perforations during ERCP

Discussion

- Overall adverse events as a composite during ERCP have been shown to occur at a lower rate with higher volume endoscopists and centers. It has also been suggested that ERCP-related complications, especially perforations tend to occur more frequently in lower volume centers by and with lower endoscopist volume by quartiles.
- Our nationwide population-based study about ERCP identified several factors related to procedure complexity, center and endoscopist performance as significant risk factors for ERCP-related perforations. The risk factors for ERCP-related perforations were a higher grade of complexity requiring a longer duration of procedure, a high-volume center and a high volume endoscopist.
- The study results should be interpreted in the context of its limitations, most of which are inherent to large database studies, such as selection bias and reporting limited to immediate procedural complications.

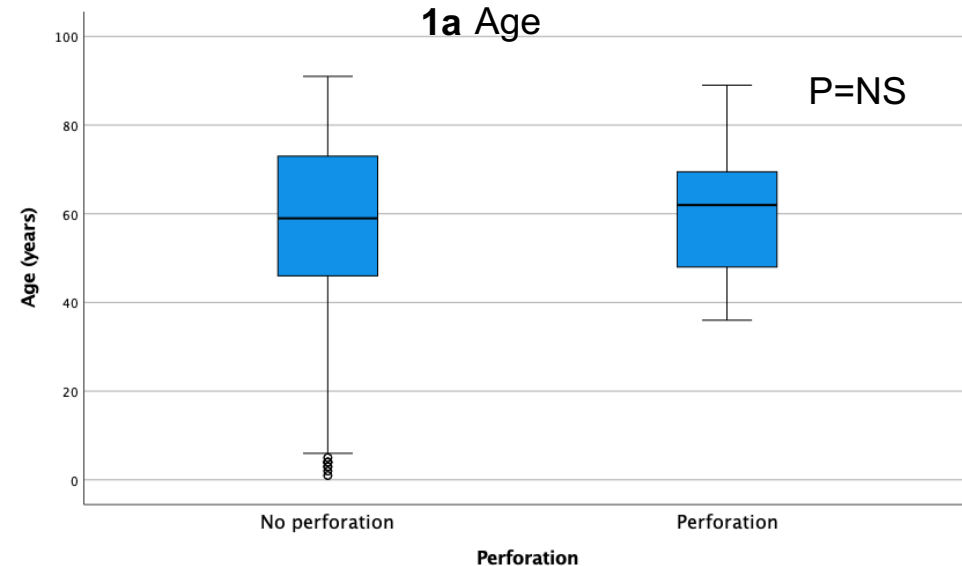
Conclusions

- Our study shows that the increase in procedure complexity raises the requisite expertise threshold needed to deal with complex pathology successfully.
- ERCP will continue its exponential growth to deal with more complex hepatobiliary pathologies.
- In order to raise the expertise of future endoscopists, higher volume centers with adequate training numbers for aspiring endoscopists is the need of the hour.

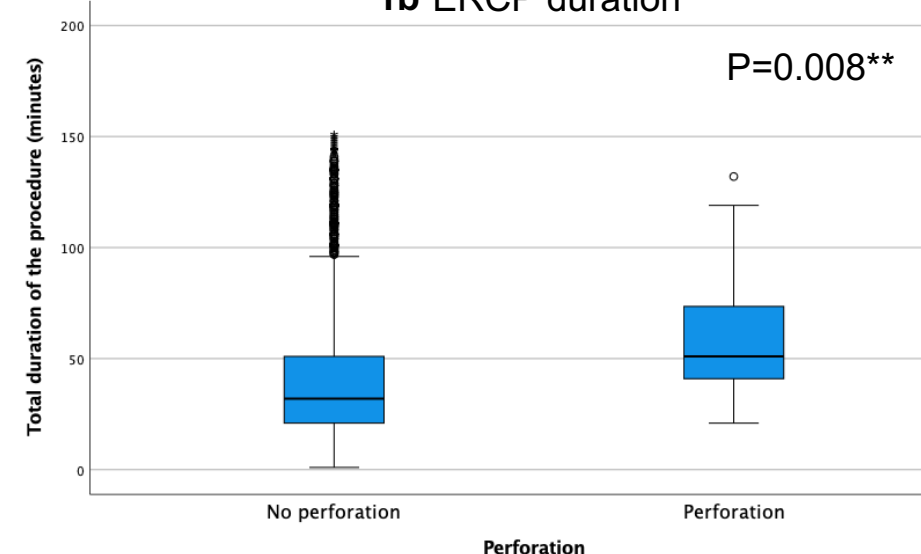
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1a Age



1b ERCP duration



1c Fluoroscopy duration

