Outcomes and loop pattern analysis of a road-map technique for duodenal intubation with side-viewing duodenoscope for ERCP in Billroth II gastrectomy patients

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- **CONFLICT OF INTERESTS**

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Introduction

- Endoscopic retrograde cholangiopancreatography (ERCP) in patients who have undergone Billroth II gastrectomy is a major challenge, and the choice of endoscope is still a matter of debate.
- A road-map technique using an anticipative guidewire and catheter have been used for the fluoroscopic and endoscopic guidance in advance of the duodenoscopic progression in the afferent loop

Study Aims

- The aims of this study were to evaluate the outcomes of the road-map technique for duodenal intubation using a side-viewing duodenoscope for ERCP in Billroth II gastrectomy patients, and to analyze the formation and release patterns of common bowel loops that occur when the duodenoscope navigates the afferent limb.

Patients

- From January 2003 to December 2019, patients with a previous Billroth II gastrectomy who underwent ERCP and fulfilled the eligibility criteria were retrospectively reviewed from a prospectively designed ERCP database system in Ajou University Hospital.
- The eligibility criteria were: 1) age >20 years; 2) prior Billroth II gastrectomy with or without Braun anastomosis; 3) naïve papilla; 4) ERCP initiated with a side-viewing duodenoscope; and 5) road-map technique using a preceding guidewire and catheter technique used for the afferent limb navigation.
- We excluded patients with prior ERCP history, patients in whom ERCP was initiated with a forward-viewing endoscope, and patients with peritoneal carcinomatosis.

Endoscopic retrograde cholangiopancreatography outcomes in Billroth II gastrectomy patients (N=113)

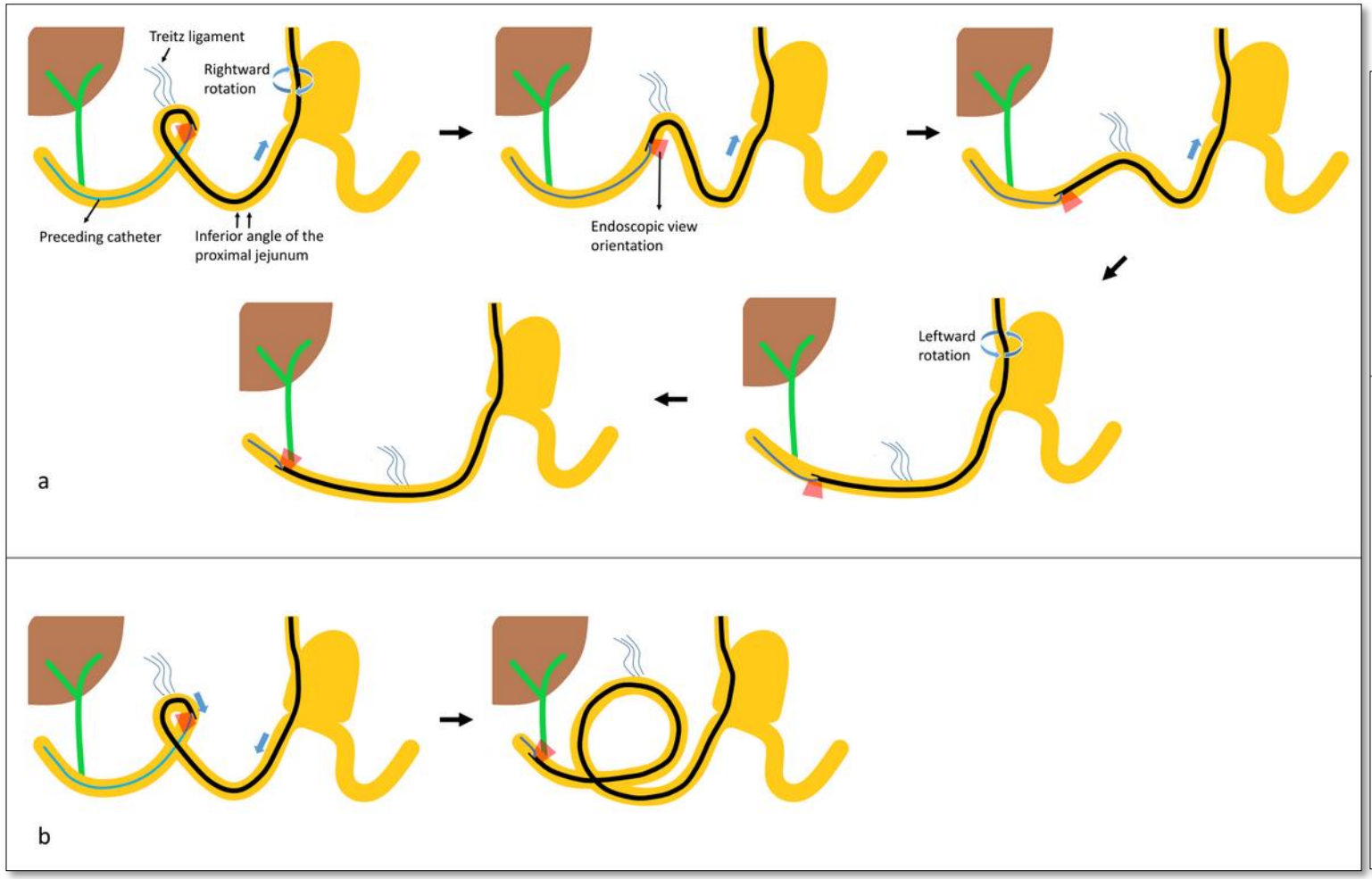
Duodenoscopy / overall approach success, n (%)	97 (85.8) / 108 (95.6)
Causes of duodenoscopy approach failure, n	16
Bowel perforation occurrence	3
Long U-loop formation before reaching the ligament of Treitz	9
Failure in passing the ligament of Treitz	4
Duodenoscopy / overall cannulation success, n (%)	92 (81.4) / 104 (92.0)
Duodenoscopy / overall therapeutic success, n (%)	91 (80.5) / 99 (87.6)
Reasons for overall therapeutic failure, n	14
Approach failure albeit forward scope or P-E RV	1
Cannulation failure / Occurrence of bowel perforation	6 /4
Failure in complete stone extraction	2
Failure in biliary stenting due to tight stricture	1

Loop patterns analysis of inserting a duodenoscope in the afferent loop in patients with duodenoscopy approach success (N=97)

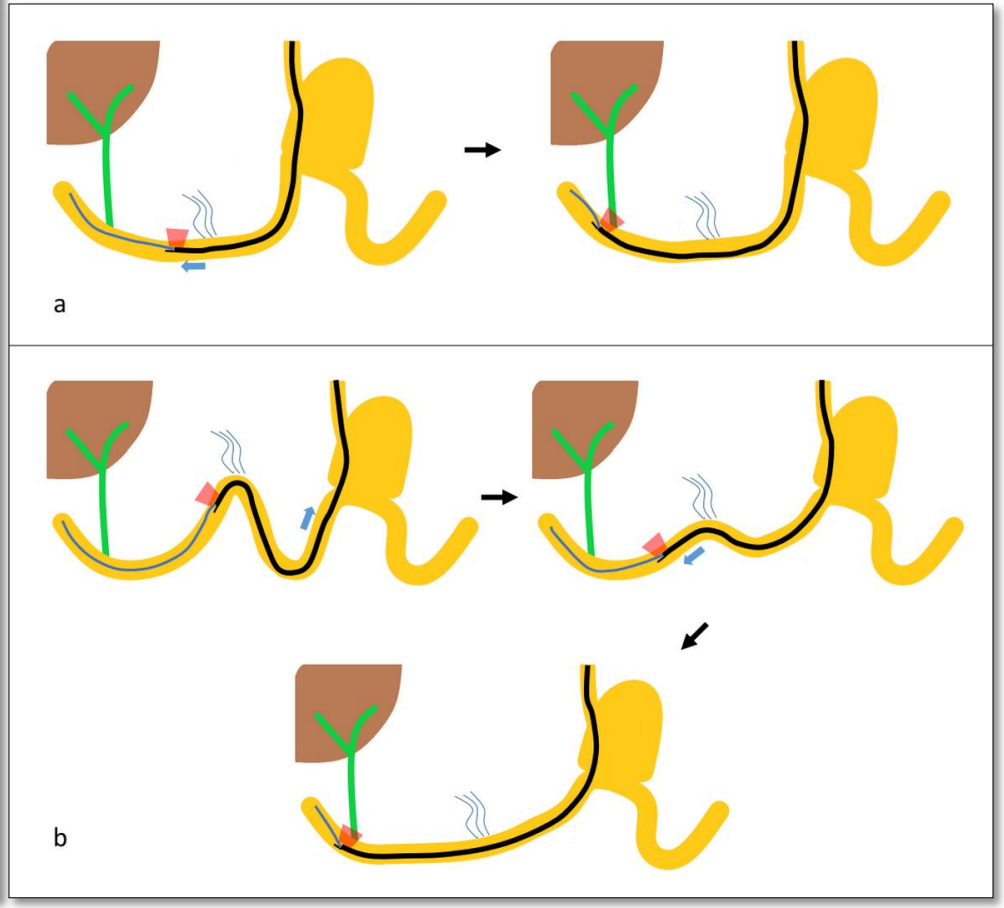
Reverse ɣ-loop	29 (29.9%)
Fixed reverse ɣ-loop	5 (5.2%)
Simple U-loop	22 (22.7%)
N-loop	28 (28.9%)
Reverse α-loop*	13 (13.4%)

Adverse events in the study sample (N=113)

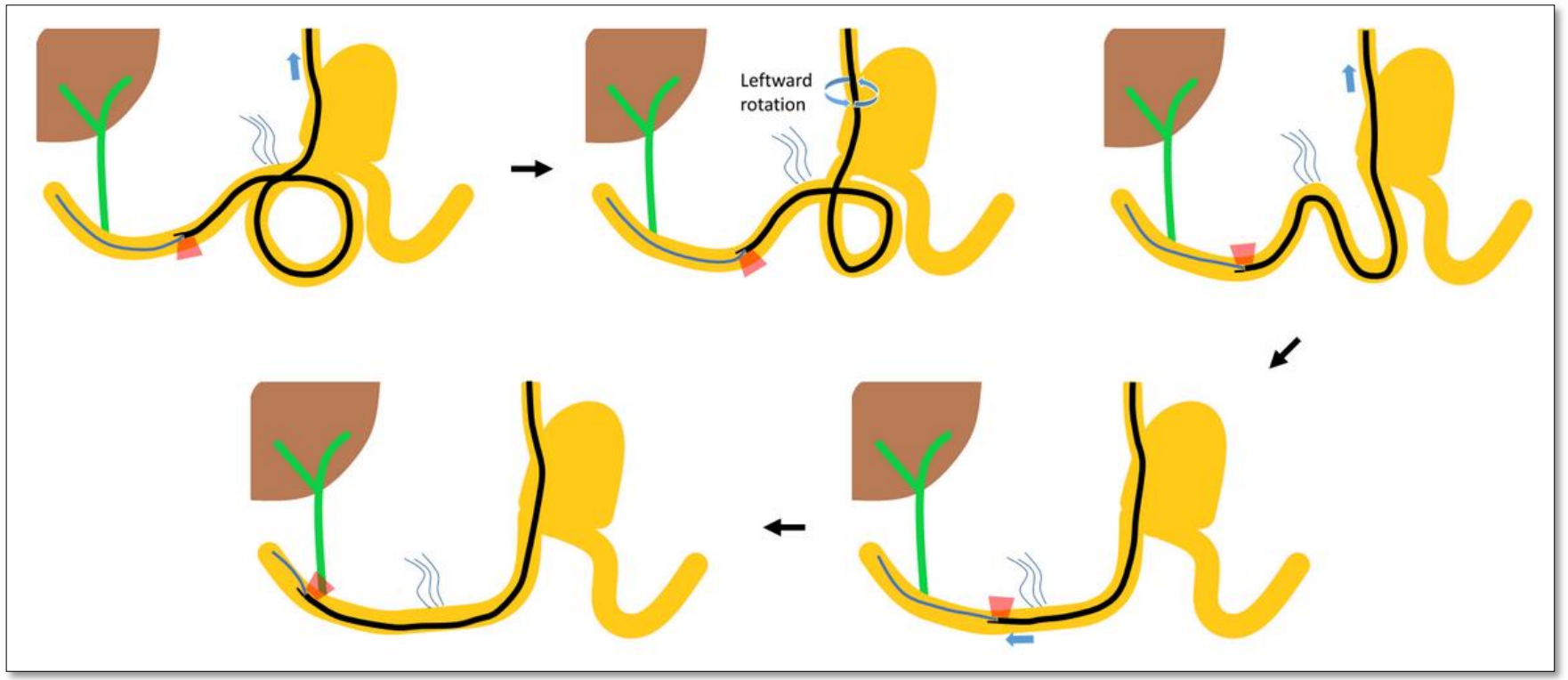
Overall adverse events, n (%)	9 (8.0)
Duodenoscope-related bowel perforation	4 (3.5)
During approach	3 (2.7)
During therapeutic intervention	1 (0.9)
Pancreatitis	3 (2.7)
Cholecystitis	1 (0.9)
Transient respiratory failure	1 (0.9)
Procedure-related mortality	0 (0.0)



The loop patterns of inserting a duodenoscope in the afferent loop. a Reverse gamma (ɣ) loop, b Fixed reverse gamma loop.



The loop patterns of inserting a duodenoscope in the afferent loop. a Simple U-loop, b N-loop.



The loop patterns of inserting a duodenoscope in the afferent loop; Reverse alpha (α) loop.

Conclusions

- The road-map technique may benefit duodenoscope-based ERCP in Billroth II gastrectomy patients by minimizing the tangential axis alignment between the duodenoscopic tip and the driving of the afferent limb and by predicting and counteracting the common bowel loops that occur when the duodenoscope navigates the afferent limb.