Carbon dioxide enterography: a useful method for double-balloon enteroscopy-assisted ERCP

Development of double-balloon enteroscopy-assisted endoscopic retrograde cholangiopancreatography (DB-ERCP) has enabled endoscopic treatment of pancreato-biliary disease in patients with a surgically altered gastrointestinal anatomy [1]. However, scope insertion requires experience because of the maze-like gastrointestinal tract [2]. Intraluminal injection of indigo carmine to identify the afferent loop of Roux-en-Y anastomosis [3] may cause susceptibility to peristalsis and is unsuitable for complex reconstruction. To develop a smooth insertion method, we used a negative contrast technique with carbon dioxide to confirm the correct tract, termed CO₂ enterography, and we present case results here.

An 86-year-old man had previously undergone pancreatoduodenectomy had a suspected anastomotic stricture of the choledochojejunostomy. Fig. 1a shows the double-balloon enteroscope at the jeunojejunostomy, after which the operator inserted the tip of the scope into one of

![Fig. 1](image-url)  
**Fig. 1**  
**a** Double-balloon enteroscope at the jeunojejunostomy in an 86-year-old man who had previously undergone pancreatoduodenectomy and had a suspected anastomotic stricture of the choledochojejunostomy.  
**b** Fluoroscopy revealed CO₂ directed to the anal side, indicating the incorrect tract.  
**c** Insertion into another tract. CO₂ enterography revealed the correct tract for the choledochojejunostomy.  
**d** After reaching the target site, cholangiography showed no strictures.
the two tracts and injected CO₂ under the obstruction caused by scope balloon inflation. Fluoroscopy revealed CO₂ directed to the anal side (Fig. 1b), indicating the incorrect tract. Fig. 1c shows insertion into another tract, after which CO₂ enterography revealed the correct tract for the choledochojejunostomy. After reaching the target site, cholangiography showed no strictures (Fig. 1d). In an 84-year-old man who underwent a distal gastrectomy with Billroth II reconstruction, CO₂ enterography confirmed the correct tract (Fig. 2). CO₂ enterography was suitable for various surgically altered gastrointestinal tract cases.

We retrospectively investigated target site arrival times with (n=39) and without (n =16) CO₂ enterography in post-surgical patients, excluding those with Billroth I reconstruction. The average time was significantly shorter in the CO₂ enterography group (26 vs. 38 minutes, P=0.026). No adverse events related to CO₂ enterography were observed. Using CO₂ enterography, the correct tract was easily identified without wasted effort from insertion into the incorrect tract. Thus we consider it useful for insertion in DB-ERCP cases.

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References

Bibliography
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