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 pancreatobiliary 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 jejunoojejunostomy, after which the operator inserted the tip of the scope into one of the jejunojejunostomy, after which the operator inserted the tip of the scope into one of

![Fig. 1](image_url)
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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Fig. 2 An 84-year-old man underwent a distal gastrectomy with Billroth II reconstruction. a CO2 enterography confirmed the correct tract with Billroth II reconstruction. b Schema. Orange area corresponds to the afferent loop.