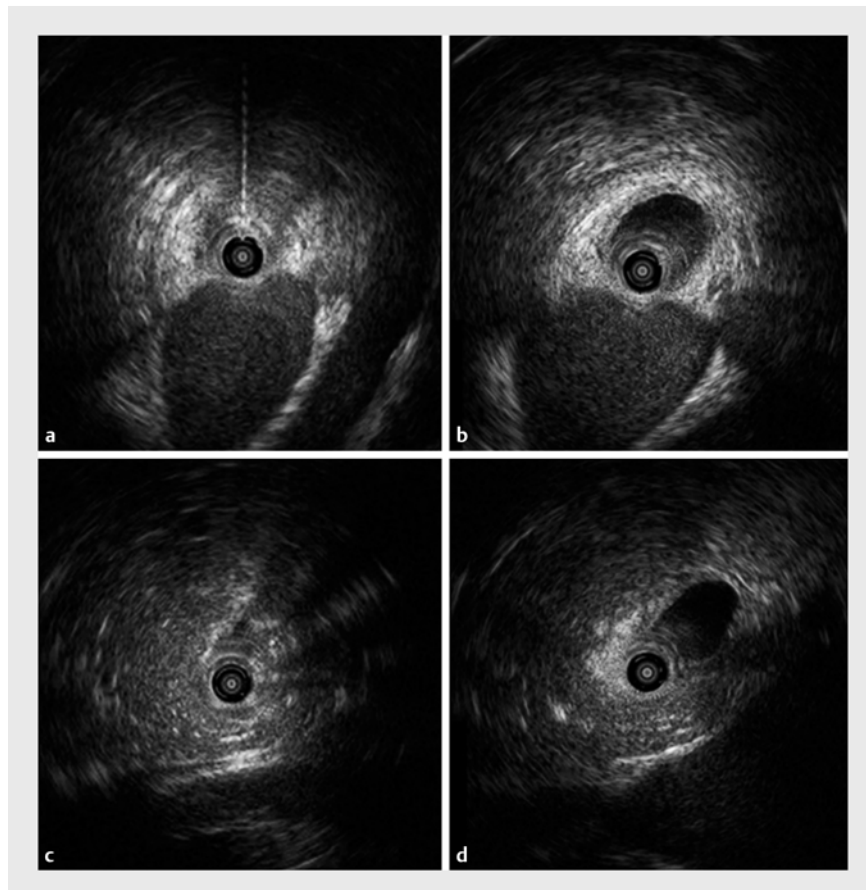


## Irrigation-assisted intraductal ultrasonography with a 3-Fr microcatheter during endoscopic retrograde cholangiography



► **Fig. 1** Intraductal ultrasonography (IDUS) images showing: **a** conventional IDUS of the extrahepatic bile duct wall; **b** irrigation-assisted IDUS in the same area as image **a**; **c** conventional IDUS of the intrapancreatic bile duct wall; **d** irrigation-assisted IDUS in the same area as image **c**.

Intraductal ultrasonography (IDUS) is one of the most useful intraductal modalities for investigating the structure of the biliary wall layers and for the presence of stones during endoscopic retrograde cholangiography (ERC) [1–3]. In patients with pneumobilia, however, conventional IDUS is significantly limited in its ability to provide accurate cross-sectional imaging.

A 42-year-old man who had undergone endoscopic sphincterotomy for the extraction of common bile duct (CBD) stones 1 month previously experienced CBD stone recurrence. Lithotomy was

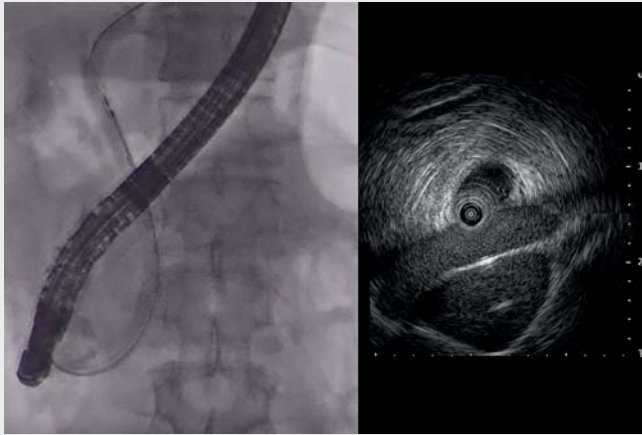
performed using a side-viewing duodenoscope (TJF-260V; Olympus, Tokyo, Japan). Because of this recurrent episode, IDUS (UMG20–29R; Olympus) was performed to confirm complete stone clearance following standard CBD sweeping with a basket catheter. However, air bubbles in the CBD prevented cross-sectional imaging of the intraluminal contents and ductal layer (► **Fig. 1 a, c**). To overcome this limitation, we first introduced a 3-Fr microcatheter (Dimon ERCP catheter; Hanako Medical, Saitama, Japan), which is an over-the-wire microcatheter with a radiopaque tip, into the CBD. The



► **Fig. 2** Photograph of the side-viewing duodenoscope used in the “two-devices-in-one-channel” method. MC, 3-Fr microcatheter (Dimon ERCP catheter; Hanako Medical); UP, high-frequency intraductal ultrasonography probe (UMG20–29R; Olympus); GW, 0.025-inch guidewire.

IDUS probe was then advanced over the guidewire alongside the microcatheter. IDUS was performed while simultaneously flushing the CBD with quarter-diluted contrast agent via the microcatheter. This technique achieved clear imaging with coordinated manipulation of the probe and microcatheter in the same working channel (► **Fig. 1 b, d**) and detected a tiny remnant stone in the cystic duct (► **Fig. 2**; ► **Video 1**).

A 3-Fr microcatheter is slim enough to enable it to be paired in the “two-devices-in-one-channel” method in endoscopic procedures. Simultaneous irrigation via the microcatheter during IDUS ameliorates acoustic coupling and produces reliable examinations that are suitable for the evaluation of the wall layers in patients with pneumobilia, as well as for the detection of stones. As the water-filling method is routinely used before endoscopic ultrasonography to evaluate invasion depth in gastrointestinal cancer, we believe irrigation assist-



**Video 1** Irrigation-assisted intraductal ultrasonography with a novel microcatheter during endoscopic retrograde cholangiography.

ance with the 3-Fr microcatheter during IDUS has promise as a routine method for pancreaticobiliary endoscopy in patients with pneumobilia.

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### Competing interests

The authors declare that they have no conflict of interest.

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