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Usefulness of red dichromatic imagining for peroral cholangioscopy

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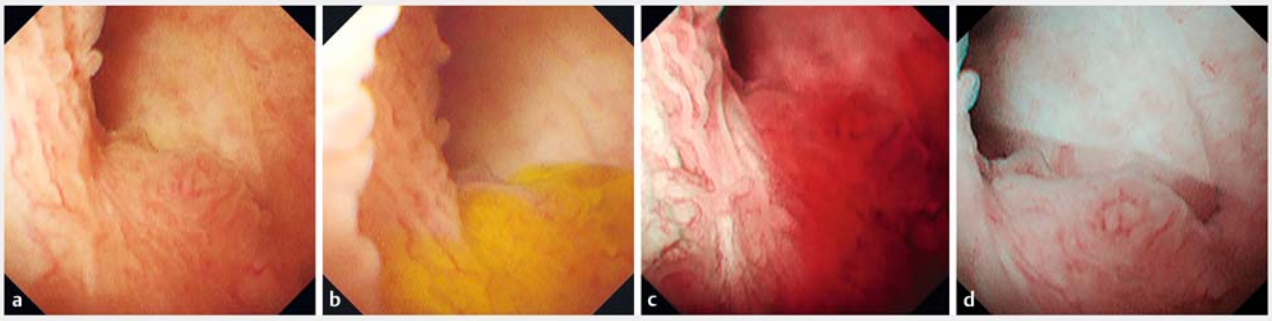
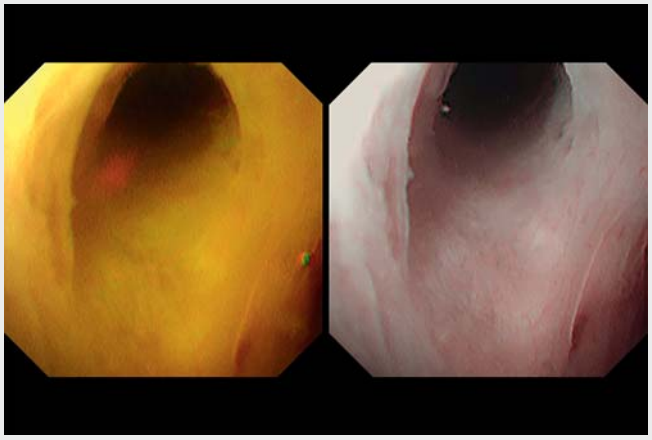


▶ **Fig. 1** Observation of bile duct cancer using white-light imaging (WLI), narrow-band imaging (NBI), and red dichromatic imaging (RDI). **a** A clear image of the tumor was obtained using WLI. **b** But in the presence of bile juice, the view became unclear. **c** NBI showed a red image from the effects of bile juice. **d** RDI showed a clear image even in the presence of bile juice.

▶ **Fig. 2** A biopsy of the lesion was performed with RDI-3. It was possible to accurately recognize the lesion, even in the presence of bile juice.



Video 1 Performance of peroral cholangioscopy using red dichromatic imaging (RDI) with a new-generation endoscopy system.

Peroral cholangioscopy (POCS) was developed as a diagnostic modality to directly observe bile duct lesions that are difficult to visualize by cholangiography. However, one of its main issues is that the images are strongly affected by bile juice. Red dichromatic imaging (RDI) is a new image-enhancing technology using light tones of red, amber, and green. RDI is part of a new-generation endoscopy system (EVIS X1; Olympus Medical, Tokyo, Japan) and consists of three modes [1–4]. Among the three available modes, RDI-3 is most suitable for observing the bile duct using POCS, as yellows can be excluded with minimal alteration of reds and greens [2]. We herein report a case in which RDI-3 was useful for both the observation and biopsy of biliary cancer under POCS.

A 65-year-old woman was admitted to our hospital for an examination of wall thickening of the bile duct after gallbladder cancer surgery. Contrast-enhanced computed tomography showed enhancement of the bile duct in the perihilar area. Endoscopic retrograde cholangiography and mother-baby POCS were performed using a TJF-Q290V and CHF-B290 scope (Olympus Medical) with the EVIS X1 system. After saline injection and washing out the bile juice, observation was started. A continuous, flat, elevated lesion was noted in the perihilar area, and a good image was initially obtained with white-light imaging (WLI) and narrow-band imaging (NBI). However, bile juice overflowing from the proximal side made it difficult to obtain clear images. Therefore, WLI was switched to RDI-3,

and a good-quality image was obtained by excluding the yellow color of the bile juice (▶ **Fig. 1**). A biopsy from the lesion was then performed, and we were able to accurately recognize the lesion even in the presence of bile juice (▶ **Fig. 2**, ▶ **Video 1**). The pathological finding was malignancy.

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Competing interests

The authors declare that they have no conflict of interest.

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