The application of texture and color enhancement imaging in transpapillary biliary cannulation

The efficacy of image-enhanced endoscopy (IEE) has been widely reported in the management of gastrointestinal tract lesions [1–3]; however, the efficacy of IEE has not been well discussed in the pancreatobiliary field. Recently, a novel IEE tool called texture and color enhancement imaging (TXI; Olympus, Tokyo, Japan) was launched. TXI has two modes: mode 1, which enhances brightness, texture, and color contrast; and mode 2, which enhances brightness and texture [4]. Herein, we report the usefulness of TXI in biliary cannulation (Video 1).

Case 1 was a 79-year-old woman who underwent endoscopic retrograde cholangiopancreatography (ERCP) for cholangitis. The flat-shaped papilla was located in the periampullary diverticula. The orifice of the bile duct was unclear under white-light imaging (WLI); however, TXI mode 2 enhanced the brightness and texture of unevenness on the surface of the papilla, leading to the clear recognition of the orifice (Fig. 1). Finally, biliary cannulation was achieved without pancreatic ductal intervention.

Case 2 was an 81-year-old man with advanced pancreatic cancer who underwent ERCP for a malignant distal biliary obstruction. The scope position was unstable owing to duodenal invasion of the tumor, and use of the transpapillary biliary approach was challenging. Therefore, we performed precutting using a precut needle knife (NeedleCut 3V KD-V441M; Olympus, Tokyo, Japan). Upon observation of the incised surface of the papilla under TXI mode 1, a hole opening on the sphincter muscle suggesting the orifice of the bile duct was well recognized (Fig. 2). Successful biliary cannulation was achieved by the insertion of the ERCP catheter into the hole.

The identification of the papilla orifice is important for transpapillary biliary intervention. Texture and color enhancement imaging amplifies the difference in the structure of the papilla, leading to an easier understanding of the papilla orifice. Therefore, TXI can aid in biliary cannulation, especially in cases with an unclear biliary orifice.

Competing interests

Dr. Katanuma received honoraria as a lecture fee from Olympus Co., Tokyo, Japan. The authors have no conflicts of interest to declare.
**Fig. 2** After precutting, the bile duct orifice was more clearly recognized under TXI mode 1 (texture, brightness, and color enhanced) than with white-light imaging (WLI).

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