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Peroral ultra-slim endoscopy-guided biliary drainage and stone extraction for upper gastrointestinal stenosis with a naïve papilla (with videos)

Running head: Direct endoscopy-guided stone extraction

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8

Direct biliary drainage using ultra-slim endoscopy has recently been developed for treating acute cholangitis [1-3]. Endoscopic retrograde cholangiopancreatography (ERCP) using an ultra-slim endoscope is technically difficult and may increase post-ERCP pancreatitis risk in patients with naïve papillae. Therefore, its use is limited to patients with previous endoscopic sphincterotomy (ES) and/or papillary balloon dilation (EPBD). Additionally, the small diameters of the instrument channels of endoscopic devices have limited diagnostic or therapeutic application. We present a successful case of biliary drainage for acute cholangitis and bile duct stone extraction with ultra-slim endoscopy in a patient with a naïve papilla and altered gastrointestinal (GI) anatomy.

A 72-year-old man presented with acute cholangitis due to a bile duct stone (**Fig. 1**). He had undergone video-assisted thoracoscopic surgery for esophageal cancer with anterior mediastinal reconstruction using a gastric tube 4 months previously. He developed anastomotic stricture, followed by multiple balloon dilations. Endoscopic biliary drainage was selected because percutaneous transhepatic biliary or gallbladder drainage was anatomically inaccessible. Esophagogastroduodenoscopy (EGD) revealed anastomotic stricture (**Video S1**). An EGD scope could pass the stricture, but not the acute angulation of foregut after the anterior mediastinal reconstruction. A conventional duodenoscope (JF-260V, Olympus Medical systems, Tokyo, Japan) could not even pass the anastomotic stricture. Therefore, we attempted urgent biliary drainage using an ultra-slim endoscope (GIF TYPE XP260N; Olympus Medical Systems) (**Video S1**) and a 5-Fr straight-tip multiple flap nasobiliary drainage catheter (Gadelius Medical K.K., Tokyo, Japan) for the naïve papilla (**Fig. 1a, Video S1**). After inserting the nasobiliary drainage catheter, we performed ES. The ampulla of Vater was cut along the placed

nasobiliary drainage catheter from the orifice using an ultra-slim snare (SD-221-L25, Olympus Medical Systems) (**Video S2**). The procedure time was 56 minutes at this session. Stone extraction was not attempted immediately after ES because procedure time had already reached nearly an hour at that time. Acute cholangitis resolved after biliary drainage. Five days later, the bile duct stone was extracted with an ultra-slim 5-Fr basket catheter (FG-18Q-1, Olympus Medical Systems) without any complications (**Fig. 1b-c, Video S3**). No additional dilation of the papilla of Vater was necessary as prior ES was sufficient for stone extraction. The procedure time was 28 minutes at second session. He was discharged 4 days after stone extraction and has had no recurrence within 12 months of follow-up.

ERCP with nasobiliary drainage using an ultra-slim endoscope has been recently reported in patients with altered GI anatomy or GI tract obstruction [1-4]. Previous studies included patients with prior ES, EPBD, or metallic stent placement [1-4]. We searched PubMed for articles published between January, 1946, and February, 2015 using the terms “ultrathin endoscope, ultra thin endoscope, ultra thin endoscopy, ultra slim endoscopy, ultra slim endoscope, or ultra-slim endoscope” and “sphincterotomy”. On the basis of these search, this is the first report of ultra-slim endoscope-guided biliary drainage through a naïve papilla and stone extraction following ES using ultra-slim endoscope alone for altered GI anatomy. Conventional EGD failed to perform transpapillary procedure including selective bile duct cannulation, biliary drainage, ES, and stone extraction for naïve papillae with altered GI anatomy or GI tract obstruction because of scope rigidity. In particular, one of the disadvantage of the anterior mediastinal reconstruction is the foregut angulation. Reconstructed gastric tube is pulled backward as it enters the abdominal cavity.

1 Although challenging, ultra-slim endoscope-guided biliary drainage should be
2 recognized as treatment for bile duct stone-induced acute cholangitis comorbid with
3 altered GI anatomy or GI tract obstruction.
4

Figure and Video legends

Fig. 1: a: Radiograph showing selective bile duct cannulation via wire-guided cannulation using a 5-Fr multiple flap nasobiliary drainage catheter placed over the 0.035-inch stiff-type guidewire (inset: endoscopic view of the 5-Fr multiple flap nasobiliary drainage catheter advancing over the guidewire). b; Radiograph showing bile duct stone extraction with an ultra-slim 5-Fr basket catheter. c: Endoscopic image showing the extracted bile duct stone.

Video S1

Biliary drainage technique using an ultra-slim endoscope and a 5-Fr straight-tip multiple flap nasobiliary drainage catheter for the naïve papilla. After advancing ultra-slim endoscope through the anastomotic stricture, we attempted selective bile duct cannulation. First, selective bile duct cannulation was achieved using wire-guided cannulation combined with a 5-Fr nasobiliary drainage catheter and the 0.025-inch guidewire. However, a 5-Fr nasobiliary drainage catheter could not be advanced across the 0.025-inch guidewire. Second, the 0.025-inch guidewire was replaced with 0.035-inch stiff-type. Finally, a 5-Fr multiple flap nasobiliary drainage catheter was placed successfully over the 0.035-inch stiff-type guidewire.

Video S2

Endoscopic sphincterotomy using an ultra-slim snare after inserting nasobiliary drainage catheter.

1 **Video S3**

2 Bile duct stone extraction technique using an ultra-slim endoscope and an ultra-slim

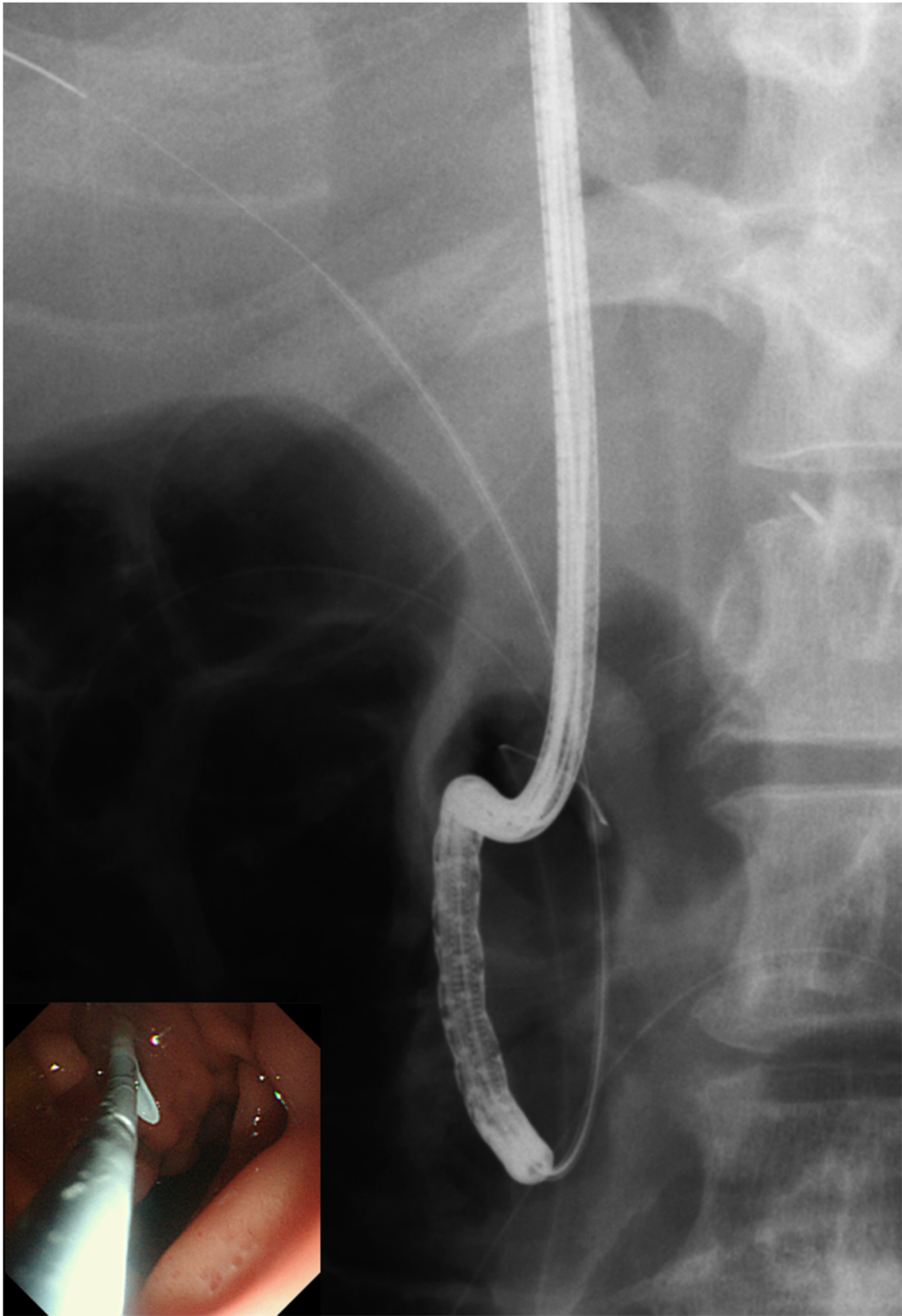
3 5-Fr basket catheter after endoscopic sphincterotomy.

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1 Fig. 1a



2

3

1 Fig. 1b



1 Fig. 1c

