Complication Forum

Infectious peritonitis after endoscopic ultrasound-guided biliary drainage in a patient with ascites

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A B S T R A C T

Summary of Event: Bacterial, mycotic peritonitis and Candida fungemia developed in a patient with moderate ascites who had undergone endoscopic ultrasound-guided biliary drainage (EUS-BD). Antibiotics and antifungal agent were administered and ascites drainage was performed. Although the infection improved, the patient’s general condition gradually deteriorated due to aggravation of the primary cancer and he died.

Teaching Point: This is the first report to describe infectious peritonitis after EUS-BD. Ascites carries the potential risk of severe complications. As such, in patients with ascites, endoscopic retrograde cholangiopancreatography (ERCP) is typically preferred over EUS-BD or percutaneous drainage to prevent bile leakage. However, ERCP may not be possible in some patients with tumor invasion of the duodenum or with surgically altered anatomy. Thus, in patients with ascites who require EUS-BD, we recommend inserting the drainage tube percutaneously and draining the ascites before and after the intervention in order to prevent severe infection.

Keywords: Endoscopic ultrasonography; Endoscopic ultrasound-guided biliary drainage; Endoscopic ultrasound-guided choledochoduodenostomy; Interventional endoscopic ultrasound

Event Details

A 68-year-old man with advanced pancreatic cancer had undergone systemic chemotherapy comprising gemcitabine plus nab-paclitaxel. After 8 months, he was admitted with vomiting. Esophagogastroduodenoscopy revealed stenosis of the second portion of the duodenum. Therefore, we placed a duodenal stent. After 2 months, he was re-admitted with obstructive jaundice. Computed tomography revealed dilation of the bile duct with malignant lower bile duct stenosis and moderate ascites (Fig. 1). Because the approach to the duodenal papilla of Vater was difficult due to the duodenal stent, endoscopic ultrasound-guided choledochoduodenostomy (EUS-CDS) was performed with the patient’s consent. The common bile duct was punctured at the duodenal bulb. After suctioning the bile juice, contrast medium was injected and a 0.025-inch guidewire was introduced. Then, the fistula was dilated using a 6-Fr diathermic dilator (Cysto-Gastro-Set; Endo-Flex, Voerde, Germany). Finally, we attempted to place a fully covered self-expandable metal stent (FCSEMS, 12 mm × 6 cm, Bonastent M-Intraductal; Medico’s Hirata, Tokyo, Japan), but delivery system could not pass through the fistula. Even after dilation using a 4-mm balloon, delivery system was still unsuccessful. The common bile duct collapsed due to bile juice leakage and delivery system never advanced. Therefore, we changed the plan from EUS-CDS to EUS-guided hepaticogastrostomy (EUS-HGS) and the puncture point at the duodenal bulb was closed using clips.

The intrahepatic bile duct (B2) was punctured. Then, contrast medium was injected and a 0.025-inch guidewire was placed into the common bile duct and through the duodenal stent. Then, the

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fistula was dilated using a dilator catheter (ES dilator; Zeon Medi-caI, Tokyo, Japan). Finally, a 10 mm × 6 cm FCSEMS (X-Suit NIR; Olympus, Tokyo, Japan) was placed as an antegrade stent to cover the puncture site, while a 6 mm × 12 cm FCSEMS (Hanarostent; Boston Scientific, Tokyo, Japan) was placed via the stomach (Fig. 2). Bile juice culture at that time was negative.

On day 2, the patient had only a mild fever and slight abdominal pain. Computed tomography revealed a small amount of free air within expectation of the procedure and a level of ascites that was not so different than before EUS-guided biliary drainage (EUS-BD) (Fig. 3). Therefore, on day 3, we started liquid meal. However, on day 5, C-reactive protein level increased signifi-
significantly without symptoms of high fever or abdominal pain (Fig. 4). Abdominal ultrasound revealed severe ascites with septum (Fig. 5). Abdominal drainage was performed immediately. The fluid was dirty and yellow and ascites culture revealed *Enterococcus faecium* and *Candida glabrata*. Thereafter, *C. glabrata* also grew from a blood culture. Biliary peritonitis led to bacterial and mycotic peritonitis and, finally, to Candida fungemia. Teicoplanin and micafungin were administered and abdominal drainage was performed daily. Subsequently, C-reactive protein level gradually decreased and the ascites became clear. In addition, *E. faecium* in the ascites and *C. glabrata* in the blood became negative. However, the patient’s general condition gradually deteriorated due to aggravation of the primary cancer and he died on day 30.

**Discussion**

EUS-BD was first reported in 2001 and has demonstrated high success rates. Thus, EUS-BD has become an alternative to percutaneous transhepatic biliary drainage (PTBD) and surgery in patients with failed biliary cannulation or inaccessible papilla. We previously reported the high success rate and efficacy of EUS-CDS. However, we could not insert a CDS stent in this case because the axes of the stent and bile duct became perpendicular and delivery system of the stent could not follow the guidewire. Stent placement was also difficult because tension of the bile duct became weak due to bile juice aspiration and leakage.

EUS-BD has the potential risk of complications, bile leakage, peritonitis, perforation, bleeding, and pneumoperitoneum. However, severe or fatal complications are rare. We previously reported double penetration of the duodenum as a unique adverse event of EUS-CDS. Double penetration of the duodenum may cause retroperitoneal perforation, retroperitonitis, and sometimes may advance seriously. However, EUS-CDS using a forward-viewing echoendoscope can effectively prevent double penetration.

EUS-HGS has the potential for other unique and severe complications, including liver abscess, pseudoaneurysm, and internal stent migration. A fatal case has been reported previously. However, this complication can be prevented by using stents with lengths of 10 or 12 cm.

We observed severe bacterial and mycotic peritonitis after EUS-BD in the present case. Kawakubo et al reported that bile leakage was more frequently observed in patients who underwent plastic stent placement (10%) compared with covered self-expandable metal stent placement (4%). Therefore, covered stents are recommended in EUS-BD.

Ascites carries the potential risk of infectious peritonitis like this case. As such, endoscopic retrograde cholangiopancreatography (ERCP) is preferred over EUS-BD or PTBD because it usually does not cause bile leakage. However, ERCP may not be possible in some cases with tumor invasion of the duodenum or with surgically altered anatomy. PTBD also cannot prevent ascites infection. After experiencing this case, if ERCP fails, we insert a drainage tube percutaneously and drain the ascites before and after the intervention (EUS-BD or PTBD) to prevent severe ascites infection.
Park et al reported a one-step technique to deploy a FCSEMS, while Anderloni et al reported the use of a lumen-apposing FCSEMS with electrocautery for gallbladder drainage. Pure one-step devices without a guidewire can prevent bile leakage, so may be useful and safe in EUS-BD, especially in patients with ascites.

**Prevention**

Ascites carries the potential risk of severe complications. ERCP is preferred over EUS-BD or PTBD to prevent bile leakage. If ERCP fails, we recommend inserting a drainage tube percutaneously and draining the ascites before and after the intervention (EUS-BD or PTBD) to prevent severe ascites infection. Pure one-step devices without a guidewire can prevent bile leakage, so may be useful and safe especially in patients with ascites.

**Teaching Point**

EUS-BD is useful in cases with failed biliary cannulation or inaccessible papilla. However, ascites carries the potential risk of severe complications in EUS-BD. The most suitable biliary drainage procedure depends on the individual patient’s condition. It is necessary for us to prevent complications by the development of better techniques and dedicated devices.

**Conflicts of Interest**

No potential conflict of interest relevant to this article was reported.

**References**


![Fig. 5. Abdominal ultrasound on day 5 revealed severe ascites with septum. (A) Liver surface. (B) Pelvis.](image-url)