Case Report

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Endoscopic transpapillary gallbladder drainage for management of acute cholecystitis with coagulopathy

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Abstract

Acute cholecystitis is a common and frequently occurring disease, and laparoscopic cholecystectomy is the preferred treatment method. Percutaneous transhepatic gallbladder drainage is regarded as the first-line palliative procedure for elderly patients with poor cardiopulmonary function who cannot tolerate general anesthesia. However, for patients with acute cholecystitis who are undergoing treatment with oral antithrombotics or who have abnormal coagulation mechanisms, endoscopic transpapillary gallbladder drainage may be a good choice. Endoscopic transpapillary gallbladder drainage is an endoscopic retrograde cholangiopancreatography-based technique that drains the gallbladder by placing a tube into the cavity of the gallbladder though the cystic gall duct. It is the application of the concept of natural orifice transluminal endoscopic surgery in the biliary system. This technique can not only achieve gallbladder drainage but can also minimize the risk of procedure-induced bleeding. In this paper, we describe a representative case to introduce the key points of this procedure and the associated clinical care, hoping to provide useful information for clinicians and nurses.

Keywords

Acute cholecystitis, coagulopathy, endoscopic retrograde cholangiopancreatography, endoscopic transpapillary gallbladder drainage, natural orifice transluminal endoscopic surgery, case report

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Introduction

Acute cholecystitis (AC) is a common and frequently occurring disease that is usually caused by gallbladder stones, and laparoscopic cholecystectomy is the preferred treatment method.[1] Percutaneous transhepatic gallbladder drainage (PTGBD) is regarded as the first-line palliative procedure for elderly patients with poor cardiopulmonary function who cannot tolerate general anesthesia.[2,3] However, special considerations are needed for patients who are undergoing treatment with oral antithrombotics or who have abnormal coagulation mechanisms. If nonsurgical treatment does not readily alleviate AC in these patients, an alternative treatment method is required. PTGBD cannot be performed because of the particularly high risk of bleeding associated with this procedure. Therefore, endoscopic transpapillary gallbladder drainage (ETGBD) may be a good choice in these patients.[4]

ETGBD is an endoscopic retrograde cholangiopancreatography (ERCP)-based technique that drains the gallbladder by placing a tube into the cavity of the gallbladder though the cystic gall duct. Thus, ETGBD is the application of the concept of natural orifice transluminal endoscopic surgery in the biliary system. This technique can not only achieve gallbladder drainage but can also minimize the risk of procedure-induced bleeding.[5] As the growing population ages, the number of people taking oral antithrombotics will increase along with rising incidences of cardiovascular and cerebrovascular diseases. The number of patients who need PTGBD may grow rapidly in the near future. Therefore, it is necessary to introduce the key points of this procedure and the associated clinical care.

Case description

We performed ETGBD for five patients with AC and abnormal coagulation from January to December 2019, and good clinical results were achieved in all patients. The cannulation time of the main duodenal papilla ranged from 1 to 8 minutes (average, 2.4 minutes), and the time of selective entry of the guide wire into the gallbladder tube ranged from 3 to 28 minutes (average, 12.7 minutes) with a technical success rate of 100%. The postoperative hospitalization ranged from 3 to 7 days (average, 4.2 days) with a clinical success rate of 100% and without post-ERCP complications such as pancreatitis, bleeding, and perforation. We herein describe one of these patients as a representative case to illustrate the key points and postoperative care of the ERCP procedure.

A 78-year-old man was admitted to a local hospital with a diagnosis of AC caused by gallstones. He had a 4-day history of right upper abdominal pain with fever. After 3 days of antibiotic treatment, the patient's symptoms were not significantly improved, and he was therefore transferred to our hospital. The patient had a >10-year history of chronic obstructive pulmonary disease. A coronary stent had been placed for treatment of acute myocardial infarction 1 year previously, and he had been taking enteric-coated aspirin tablets since then. Abdominal ultrasound showed that the gallbladder was obviously enlarged (length of 14 cm), had a thickened wall (8 mm), and contained multiple gallbladder stones (maximum size of approximately 15 mm). His liver function was generally normal. Routine blood tests showed the following results: white blood cell count, 15×10^9/L (reference range, 4–10×10^9/L); percentage of neutrophils, 95% (reference range, 50%–70%); platelet count, 89×10^{12}/L (reference range, 100–300×10^{12}/L); prothrombin time, 21 s (reference range, 9.4–12.5 s); international normalized ratio, 2.3 (reference range, 0.86–1.13); and C-reactive protein concentration, 20.3 mg/L (reference range, 0–4 mg/L). Physical

examination revealed significant tenderness in the right upper abdomen, a palpably enlarged gallbladder, and positive Murphy's sign. The patient was determined to have grade III AC according to the Tokyo Guidelines 2018 for the severity grading of AC.

Patients with suppurative AC cannot be improved by conservative treatment. However, advanced age, poor cardiopulmonary function, and anticoagulant treatment have become contraindications for surgery and PTGBD. Therefore, ETGBD was considered for this patient. During ERCP, the cystic gall duct was overselected after successful biliary cannulation, and the tip of the guide wire was placed in the gallbladder cavity (Figure 1). A 5-French nasogallbladder drainage tube (Figure 2) was placed to drain the purulent bile. The drainage tube was strictly managed after the procedure to ensure that the drainage remained unobstructed and that the drainage tube was not accidentally removed. The patient's abdominal pain and other symptoms gradually improved, and the color of the bile gradually changed to normal. A secondary abdominal ultrasound examination indicated that the size of the gallbladder was normal. Low-molecular-weight heparin was chosen to replace the previous anticoagulant drugs for 1 week, and laparoscopic cholecystectomy was performed after the patient's condition had improved.

Discussion

ETGBD is a new ERCP-based technique that was developed in recent years for the purpose of gallbladder drainage. Its advantage is that it reaches the gallbladder through the natural biliary cavity, which is especially suitable for patients with AC complicated by a coagulation disorder or a large amount of ascites because the risk of life-threatening procedure-related bleeding is minimized. A large-population study sponsored by Hamada et al.[6] showed that the continuation of antiplatelet agents may

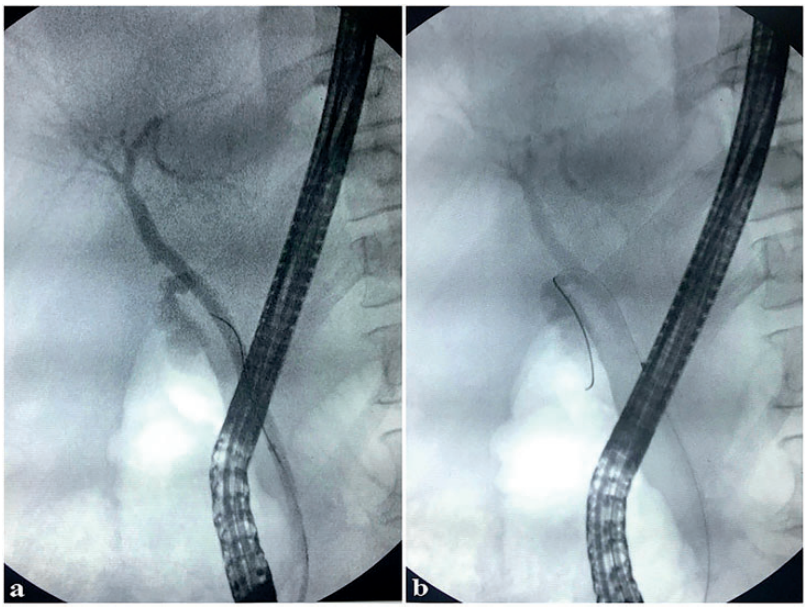

Figure 1. Selective insertion of the guidewire into the cystic gall duct. (a) Contrast agent entered the cystic gall duct and gallbladder after cholangiography. (b) The guidewire entered the gallbladder.

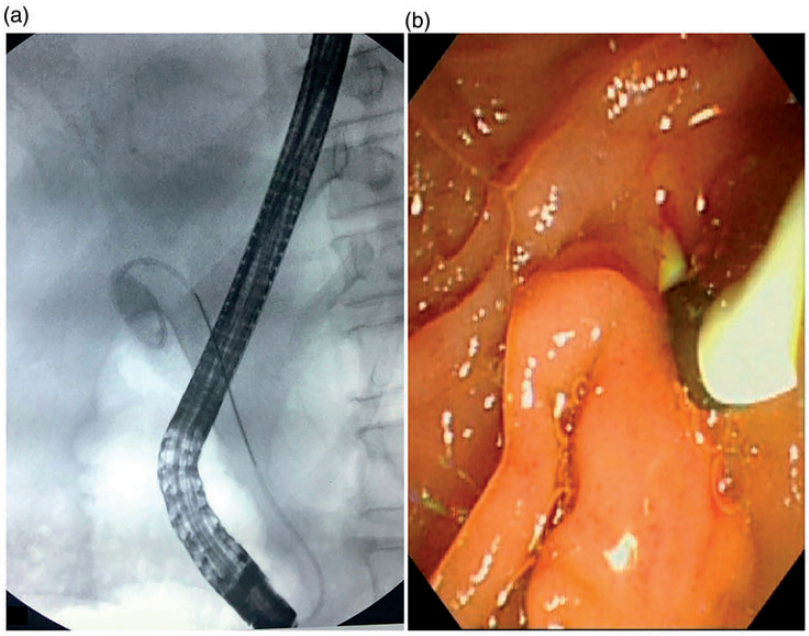

Figure 2. Placement of the naso-gallbladder drainage tube. (a) The tip of a 5-French gallbladder drainage tube was placed into the gallbladder. (b) No sphincterotomy was performed at the main duodenal papilla.

increase severe bleeding after PTGBD [780/34,606 (2.3%) patients], whereas PTGBD without endoscopic sphincterotomy (EST) may reduce the risk of procedure-related bleeding. Sagami et al.[7] found no significant difference in the rate of bleeding complications between ETGBD with and without antithrombotic therapy. A recent meta-analysis by the European Society of Gastrointestinal Endoscopy showed that despite the occurrence of post-ERCP pancreatitis in patients undergoing ETGBD (5.1%) being higher than that in patients undergoing endoscopic ultrasound-guided gallbladder drainage (1.4%) and PTGBD (1.1%), the incidences of hemorrhage and biliary leakage were significantly lower in patients undergoing ETGBD (1.9% and 1.4%, respectively) than in those undergoing endoscopic ultrasound-guided gallbladder drainage (4.3% and 2.9%, respectively) and PTGBD (2.0% and 2.7%, respectively).[8] EST is not recommended for patients with coagulation disorders because of the high risk of uncontrollable post-procedure gastrointestinal bleeding. Therefore, for some rare cases of AC complicated by common bile duct stones, removing the stones after EST should be avoided and endoscopic naso-gallbladder drainage or endoscopic gallbladder stenting can be considered. After the patient's condition has improved, endoscopic or surgical treatment should be performed after replacement with low-molecular-weight heparin. Therefore, ETGBD can be regarded as the preferred gallbladder drainage method for patients with AC complicated by a coagulation disorder. Notably, however, perioperative drugs and techniques can be given prophylactically for patients with a high risk of post-ERCP pancreatitis because these treatments can effectively reduce the occurrence of post-ERCP pancreatitis.

In terms of procedural skills, several considerations are needed. First, according to a

recent study,[9] the presence of cystic duct stones, dilation of the common bile duct, and the direction of the cystic duct (proximal and caudal branches) are regarded as important predictors of ETGBD difficulties. Therefore, preoperative magnetic resonance cholangiopancreatography or computed tomography is recommended to observe the location and direction of the confluence of the cystic duct and common bile duct, which is conducive to superselection of the cystic duct. Because magnetic resonance cholangiopancreatography more clearly displays the biliary tract, it is the first choice for patients without contraindications. Second, a vital technique for superselecting the cystic duct is to avoid EST after successful cannulation, even for patients without contraindications for EST. The purpose is to keep the common bile duct and gallbladder cystic duct filled; otherwise, it is difficult for the guide wire to enter the cystic duct because bile emptying after EST will cause the opening of the cystic duct to close. Third, the bile should be pumped back before cholangiography and then the same amount of contrast agent should be injected, starting at the lower end of the common bile duct. This procedure may avoid an increased risk of biliary tract infection due to increased pressure from direct injection of contrast agents; however, further studies are needed. Finally, an elbow guide wire is the first choice, and superselection of the cystic duct can be facilitated by an assistant rotating the tail of the guide wire. These details contribute to a successful procedure.

Certainly, management of the naso-gallbladder duct after ERCP is also important to improve the clinical success rate. We should focus on observing whether abdominal pain is reduced or aggravated, whether the naso-gallbladder drainage tube is unobstructed, and the characteristics of the drainage fluid. If no bile or suction resistance is found, X-ray fluoroscopy should be performed to determine whether the drainage tube is reflexed or displaced. Purulent bile can be drained and the drainage tube can be slowly flushed with gentamicin saline. Exerting too much force or flushing too fast should be avoided because such techniques may cause a sudden increase in pressure in the biliary tract and lead to adverse events such as emerging abdominal pain and aggravated biliary tract infection.[10] The drainage tube can be removed when the color of the drainage changes to clear yellow, abdominal pain is relieved, and no fever is present.

Conclusion

ETGBD is a safe and effective method in the treatment of AC, especially for patients with coagulation disorders or those taking anticoagulant drugs. However, the procedure is difficult and requires close intraoperative cooperation and postoperative drainage tube management. Various difficulties may be encountered during the procedure. A high surgical skill level and an assistant's close cooperation are needed to increase the chance of technical success, and reasonable management of the drainage tube after ETGBD is needed to ensure clinical success.

Ethics

The study protocol was approved by the Ethics Committee of the Lanzhou University Second Hospital. The authors certify that they have obtained written informed consent from the patient, who provided consent for anonymous publication of his images and other clinical information.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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