

Single Case

Bedside Percutaneous Approach in a Critically Ill ICU Patient with Complex Pancreatobiliary Disorder Followed by Endoscopic Approach: Lessons Learnt from a Tertiary Referral Center

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Keywords

Biliary sepsis · Percutaneous approach · Common bile duct stone · Pancreatic pseudocyst

Abstract

Pancreatobiliary disorder is a challenging clinical condition, especially when this condition is causing severe infection or biliary sepsis, and sometimes it requires intensive care unit (ICU) treatment. Biliary drainage is the mainstay of therapy; however, the choice of the drainage method is dependent on the patient's clinical condition and the disease itself. A 79-year-old female was transferred on a ventilator to our ICU from another hospital due to biliary sepsis, a large common bile duct stone, and an infected pancreatic pseudocyst. The patient also has other comorbidities such as heart problems, hypothyroidism, and diabetes mellitus. Bedside percutaneous transhepatic biliary drainage without fluoroscopy and percutaneous cyst aspiration was successfully performed, which improved the patient's condition; this was followed by

an endoscopic approach, i.e., endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic ultrasound-guided pancreatic pseudocyst drainage. The clinical improvement showed itself in the change of the patient's respiratory status and ventilator mode. In conclusion, the percutaneous approach has a big role in managing critically ill patients in the ICU setting. However, expertise, training experience, and a multidisciplinary team approach are very important for successful management and patient outcome.

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Introduction

Pancreatobiliary disorder in critically ill intensive care unit (ICU) patients is one of the challenging conditions in clinical practice. The most common etiology is obstructive jaundice causing biliary sepsis [1, 2]. Until now, endoscopic retrograde cholangiopancreatography (ERCP) has still been considered as the primary choice for biliary drainage [3, 4]. However, in a failed ERCP procedure, percutaneous transhepatic biliary drainage (PTBD) or endoscopic ultrasound (EUS)-guided biliary drainage can be an alternative treatment [5, 6]. In the ICU setting, especially patients on a ventilator cause a clinical dilemma, since a portable ventilator has to be available, the center needs to have highly qualified ERCP personnel as well as a good multidisciplinary team, and patients have to have a good prognosis. Therefore, we would like to show a really complex case of pancreatobiliary disorder based on our experience at our hospital.

Case Presentation

A 79-year-old female on a ventilator was transferred to our ICU from another hospital due to biliary sepsis. Previously, the patient had been treated for about 1 week with combined antibiotics and another supportive treatment. The patient looked severely ill and jaundiced. The patient also has comorbidities such as heart problems, hypothyroidism, and diabetes mellitus. The total and direct bilirubin levels were high (10.94 and 9.67 mg/dL), with a very high CRP level (269.48 mg/L). The abdominal ultrasound (US) and MRI evaluation from the previous hospital showed a large cyst 14.7 × 6.2 cm in size suspected from the left liver lobe which caused gastric compression, and there was also evidence of bile duct obstruction with a large stone in the distal common bile duct (CBD) area (Fig. 1).

The main treatment given during admission was as follows: a combination of the antibiotics piperacillin-tazobactam with amikacin, levothyroxine, insulin therapy, and other supportive treatments. Then an abdominal MRI was blindly reviewed by our senior radiologist, and it was concluded that there was a large cyst possibly arising from the pancreas (possible pancreatic pseudocyst [PPC]). After discussion with the family, it was decided to do biliary drainage. The bedside biliary drainage procedure was performed in the ICU without any fluoroscopy guidance, only transabdominal US guidance. After the dilated bile duct was seen on the US image, an 18-G Chiba needle was used to puncture the dilated bile duct, followed by bile fluid aspiration and guide wire insertion. The distance between the tip of the needle inside the bile duct and the area of the US probe was measured for length guidance marked on the PTBD pigtail catheter (DIAL abdominal drainage catheter, China). Then, slowly, the needle was

pulled out with maintenance of the guide wire inside the bile duct. The final step was PTBD pigtail catheter insertion into the bile duct, after which, by following the marker, the needle inside the catheter was pulled out and the catheter was pushed further inside. When there was evidence of bile fluid from the drain catheter, the catheter was fixed and locked to prevent migration. The cyst was evaluated further for percutaneous aspiration.

The dark-brown cyst fluid during aspiration showed evidence of an infected cyst. The cyst fluid analysis showed an infected cyst with amylase at 42 U/L, lipase at 125 U/L, and CEA at 476.55 ng/mL. After several days, the bilirubin level was decreased (3.38 mg/dL), and the CRP level had gone down (180.93 mg/L). There was evidence of breathing improvement after cyst aspiration, which was shown by the change of ventilator mode (continuous mechanical ventilation/CMV mode to synchronization mode and until continuous positive airway pressure mode).

On the 6th day, the pigtail catheter was accidentally dislodged and pulled out. So, it was decided to do the endoscopic procedure with the portable ventilator in the fluoroscopy room. An ERCP procedure was performed, and the cholangiogram showed a large stone. Due to the patient's clinical condition, a 7-Fr double-pigtail stent was placed inside the CBD for salvage biliary drainage (Fig. 2). After having placed the stent, EUS was performed for cyst evaluation (Fig. 3). A first evaluation of the location for puncture was difficult as it was very close to the left liver lobe. After the second evaluation, using a 19-G FNA needle, the cyst was punctured slowly, and the liver lobe was spontaneously pushed away during needle insertion, followed by guide wire insertion through the cyst cavity. A 6-Fr cystotome was used to make a sufficient fistula track; then, a 7-Fr double-pigtail stent was inserted into the cyst cavity (Fig. 4).

The patient's condition was getting better day by day until the patient could breathe spontaneously and be discharged from the ICU. After several days in the common ward, the patient was discharged from our hospital in good clinical condition. Three months later, the patient underwent a repeat ERCP procedure for CBD stone crushing using a SpyGlass Cholangioscopy DS Direct Visualization System (Boston Scientific, USA), and the pancreatic cyst showed a reduction in size on EUS examination. The pancreatic cyst stent has been maintained for the next 3 months.

Discussion

To our knowledge, this is the first comprehensive case report on a critically ill patient on a ventilator in an ICU due to combined pancreatic and biliary disorder, showing how innovative, simple steps can be made in management with a successful outcome before any standard procedures need to be performed. Most cases of biliary obstruction are caused by a CBD stone or malignancy [7]; however, large pancreatic cysts should also be considered, as they can also compress the bile duct, causing obstructive jaundice [8, 9]. In countries where pancreatic stones and acute and chronic pancreatitis are prevalent, pancreatic cysts may be a single issue to be managed [10]. Our study has shown that most of our biliary obstruction cases are caused by a CBD stone, with a chronic pancreatitis condition in some patients [11]. However, a large CBD stone coincident with a large pancreatic cyst is considered a rare condition, and this requires good comprehensive management, especially in critically ill patients.

Large CBD stones are usually managed with the ERCP procedure [12, 13]; however, in critically ill patients due to biliary sepsis or patients with many comorbidities, PTBD has become the best management, even though it still leads to some potential risks and

complications such as a dislodged catheter, infection, bile leak, and even bile peritonitis. PTBD is usually performed under fluoroscopy guidance, but studies by our colleagues on patients with malignant biliary obstruction have shown a benefit of bedside PTBD without fluoroscopy guidance when compared to ERCP in terms of the risk of inflammation due to contrast agent use [14, 15]. This procedure also has been done for many years at our university hospital. The only problem is when the bile duct dilatation is not severe, or in the case of hilar stricture. Bedside PTBD is also considered very useful in the center, where ERCP or fluoroscopy is not available. The percutaneous approach for the ERCP procedure has also been recommended for elderly or high-risk patients, as pancreatitis is still the most feared complication, carrying a mortality risk [16, 17].

PPC is a local complication of acute pancreatitis, where fluid can be sterile or infected. Gallstone disease is the most common cause, possibly leading to acute gallstone pancreatitis. The percutaneous approach has been considered as the easiest way to manage pancreatic fluid collection. Recently, the endoscopic approach using EUS equipment has been the preferred method over the percutaneous or surgical approach [18]. However, in the ICU setting, the percutaneous approach may be more feasible than the endoscopic approach, since the EUS procedure might carry a high risk of potential complications. In our case, we did not perform percutaneous catheter drainage, because there was a difference in opinion between the two radiologists about the cyst's origin. Another reason is to prevent the risk of catheter dislodgement into the cyst or peritoneal cavity. Our case report shows a great benefit of the percutaneous approach for critically ill patients, even if only by performing cyst fluid aspiration, as the compression effect from the cyst also burdens the respiratory system. Regarding the endoscopic approach, recent data have shown that fully covered self-expanding metallic stents have yielded a better drainage result than plastic stents; however, in our study's experience, even a single double-pigtail stent alone showed satisfying results in PPC drainage [19]. However, it requires a longer time for a significant drainage result and there is potential cyst fluid leakage. In our past experience, there was no leakage complication when using plastic stents for PPC drainage [20].

All of these procedures were performed at a highly multidisciplinary expert center of a tertiary referral hospital. However, this case shows a lesson well learnt in clinical practice, as bedside PTBD and cyst fluid aspiration are simple procedures to conduct even at peripheral centers or hospitals after short training. Unique to our setting is that the endoscopic as well as the percutaneous approach is usually performed by a consultant gastroenterohepatologist. In our country, PTBD is included in the gastrointestinal fellowship program as this procedure was pioneered by our senior hepatologists, whereas in most other countries PTBD is performed by interventional radiologists.

In conclusion, the percutaneous approach has a considerable role in managing critically ill patients in the ICU setting. However, expertise, training experience, and a multidisciplinary team are very important for successful management.

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Statement of Ethics

The patient and the patient's family have given written informed consent for publication of the data and images.

Conflict of Interest Statement

The authors have no conflicts of interest.

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Author Contributions

C.R.A. Lesmana collected patient data and wrote the manuscript; C. Herjuningtyas and Y.E. Pratiwi collected patient data and images; S. Inggriani prepared the radiology images and their interpretation for the manuscript; L.A. Lesmana supervised the process and gave some suggestions for the manuscript.

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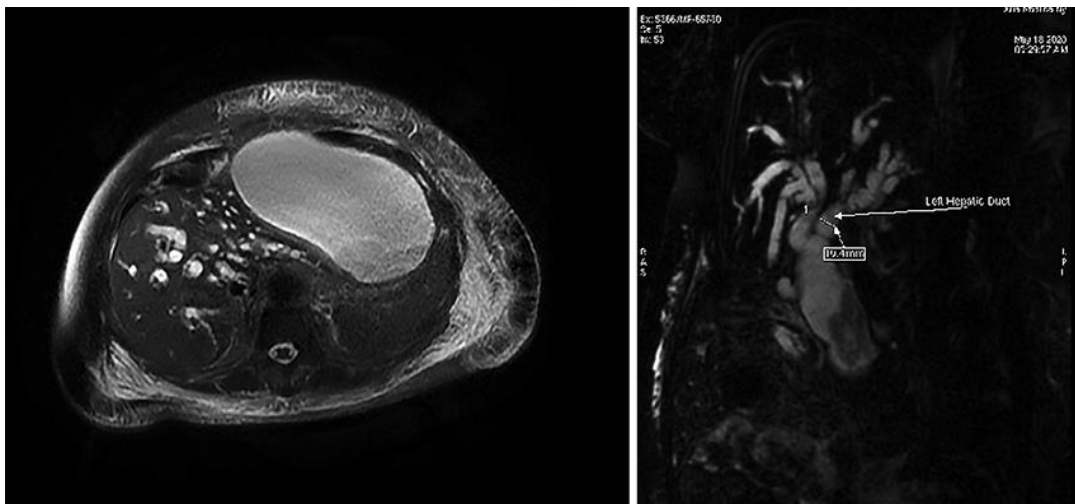


Fig. 1. MRI-magnetic resonance cholangiopancreatography showing a pancreatic pseudocyst and a dilated common bile duct with a large stone.



Fig. 2. Endoscopic retrograde cholangiopancreatography image of common bile duct stenting and cholangiogram.



Fig. 3. Endoscopic ultrasound image showing the cyst's location before puncturing with the FNA needle.

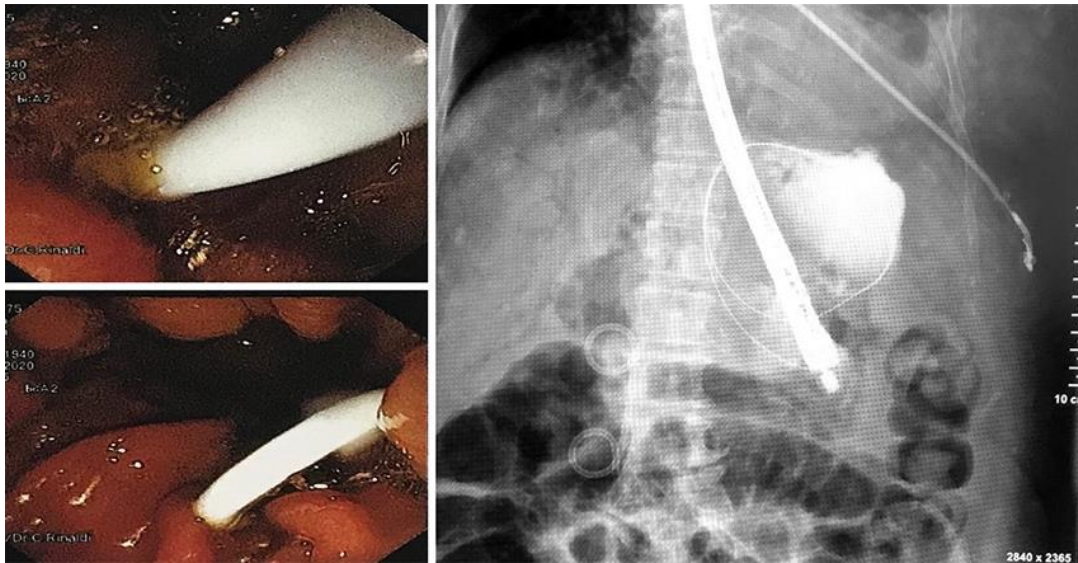


Fig. 4. Endoscopic image of the 7-Fr double-pigtail stent for pancreatic pseudocyst drainage and fluoroscopy image of the endoscopic ultrasound procedure.