CASE REPORT
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Complications of repeated percutaneous transhepatic biliary drainage (PTBD) for palliation of obstructive jaundice in cholangiocarcinoma patient

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ABSTRACT

Background: Cholangiocarcinoma, a malignancy of the biliary duct system, has been recognized as the second most common cause of biliary tract and primary liver malignancies. The incidence has increased in the last three decades worldwide. Percutaneous transhepatic biliary drainage (PTBD) has been considered a highly important palliative therapy for bile duct obstruction due to its high success rate and low incidence of cholangitis. However, bleeding and catheter dislodgment are still found during the procedure. This case discusses the complications of repeated PTBD stent placement as palliative therapy in a patient with obstructive jaundice due to cholangiocarcinoma.

Case Presentation: A 58-year-old female presented with a chief complaint of weakness and pain on the right side of the abdomen, particularly at the site of PTBD stent installation three days before being admitted to Dr. Soetomo General Hospital. In 2017, the patient was diagnosed with cholangiocarcinoma with obstructive jaundice and had undergone PTBD procedure five times during the period of July 2017 to March 2018 due to biliary leakages. Laboratory investigation indicated elevated bilirubin, decreased potassium, increased random blood sugar, increased blood urea nitrogen, high levels of the 2-hour postprandial blood glucose, and elevated HbA1c, suggesting the conditions of cholangiocarcinoma with obstructive jaundice complicated with hypokalemia, acute kidney injury and type-2 diabetes. The blood smear also indicated normochromic normocytic anisopoikilocytosis anemia and leukocytosis. The patient improved after PTBD replacement, antibiotics treatment, packed red cells transfusion, and rehydration therapy.

Conclusion: This case highlights that the complication of PTBD could occur relatively frequently and to prevent the complications in patients with post-PTBD regular medical check-up is therefore recommended. In addition, it is also critical to improve the patient knowledge on how to prevent the bleeding and to avoid the conditions that are potentially increase the chance of catheter dislodgment.

Keywords: Palliative treatment, percutaneous transhepatic biliary drainage, obstructive jaundice, cholangiocarcinoma.
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INTRODUCTION

Cholangiocarcinoma is a type of cancer in the biliary ramification that begins in the bile duct epithelium. It serves as the second most common cause of biliary tract malignancy after gall bladder carcinoma and the second most common cause of primary liver malignancy after hepatocellular carcinoma.[1-3] The initial symptoms of cholangiocarcinoma are often non-specific and mostly occur as the disease progresses to an advanced stage. It is classified into intrahepatic, perihilar extrahepatic, and distal extrahepatic.[1-3]

The incidence of cholangiocarcinoma has increased in the last three decades worldwide. The incidence is 1 to 2 per 100,000 cases in America, 2.8 per 100,000 in Hispanics, and 3.3 per 100,000 in Asia.[2-5] The lowest incidence has been noted in African Americans. The incidence and mortality have been reportedly higher in males compared to females.[2-5]

Percutaneous transhepatic biliary drainage (PTBD) is a palliative drainage procedure for the treatment of bile duct obstruction. It has been considered a highly valuable therapy of choice with a high success rate and a low incidence of cholangitis due to a low chance of getting retrograde bacterial contamination from the gut. However, bleeding and catheter dislodgment are still found after the PTBD treatment.[6] In this case report, we report a case of complication of repeated PTBD placement as palliative therapy for obstructive jaundice in cholangiocarcinoma.

CASE PRESENTATION

A 58-year-old female presented to the Emergency Department of Dr. Soetomo General Hospital with a chief complaint of weakness and pain on the right side of the abdomen, particularly at the site of PTBD installation three days prior to the hospital admission. The patients also complained of decreased appetite, nausea and vomiting, intermittent fever, itching, and pale stools.

The patient was diagnosed with cholangiocarcinoma with obstructive jaundice in 2017 and had undergone PTBD procedure five times. The first PTBD stent implantation was performed in July 2017 due to a total biliary obstruction at the distal common bile duct (CBD) due to cholangiocarcinoma, for which external drainage was performed, with a catheter tip located at the proximal CBD. In August 2017, the patient underwent PTBD repair due to fluid oozing from previous PTBD and the occurrence of a total distal CBD obstruction. The repair was conducted with the distal tip placed at the distal CBD. In January, February, and March 2018, the patient underwent PTBD replacement due to PTBD blockages. The replacement was performed in the right hypochondrium with the catheter tip in the CBD. However, there was PTBD malfunction at the end of March 2018, causing oozing of fluids and pus approximately 200 cc.

The patient also underwent several imaging procedures in 2017 to evaluate the condition after PTBD, including T-tube cholangiography, abdominal ultrasound sonography (USG), and magnetic resonance cholangiopancreatography (MRCP). The results of the upper-lower abdominal ultrasound on September 2017 indicated a distal CBD mass, causing dilatation of the right and left intrahepatic bile duct (IHBD), proximal to the mid of CBD, and slight dilatation of the pancreatic duct. The tip of the PTBD was located in the right IHBD and minimal ascites were detected. The result of the MRCP without contrast on July 2017 revealed abrupt cut-off at the level of distal CBD along with the proximal CBD dilatation, common hepatic duct, right and left IHBD, and gallbladder hydrops without the appearance of gallstone and pancreatic duct dilatation, suspected of cholangiocarcinoma in the distal CBD (Figure 1A). The result of T-tube cholangiography post exploration of PTBD on September 2017 showed an attached Neff percutaneous drain set catheter (plain photo) and suspected mass in the distal CBD and CBD dilatation, common hepatic duct, as well as the right and left hepatic duct (contrast study) (Figure 1B).

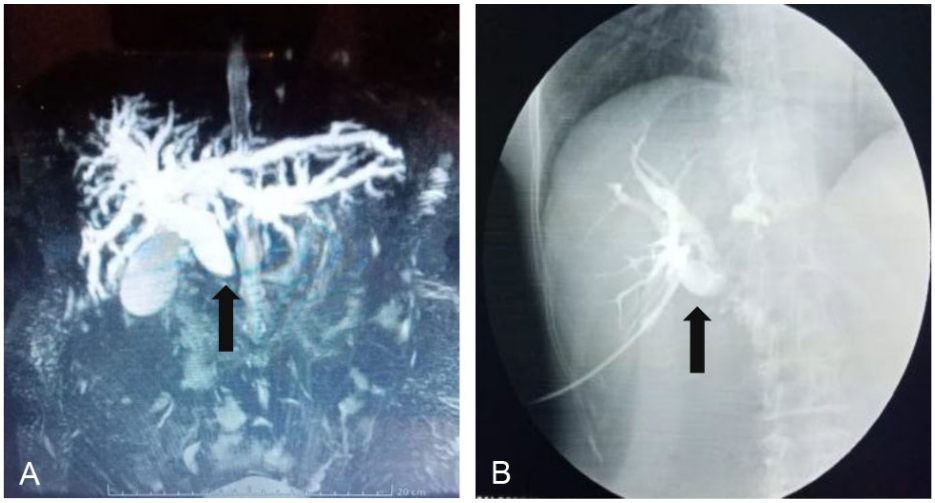

Figure 1. (A) Magnetic resonance cholangiopancreatography imaging (without contrast) and (B) T-tube cholangiography with contrast post percutaneous transhepatic biliary drainage exploration.

At the hospital admission, patient was indicated general weakness, Glasgow coma scale (GCS) of 15, blood pressure 100/60 mmHg, heart rate 88x/minute, respiratory rate 16x/minute, and temperature 36.5°C. The patient had scleral icterus, but no anemic conjunctiva, cyanosis, or dyspnea. No enlargement of lymph nodes. The chest examination revealed symmetrical movements and no intercostal retraction. Heart sounds were normal and no murmur and gallops were detected. Lung examination exhibited vesicular breathing over both of the hemithorax with no cracking and wheezing. The epigastric and the right upper abdomen were tender. The chest x-ray showed a normal impression and the electrocardiogram suggested a normal sinus rhythm with a heart rate of 74x/minute.

The initial laboratory investigation indicated elevated bilirubin, decreased potassium, increased random blood sugar, and increased blood urea nitrogen (BUN) levels (Table 1) suggesting a cholangiocarcinoma with obstructive jaundice pro-PTBD replacement with hypokalemia, acute kidney injury (AKI) and hyperglycemia.

The patient was admitted to the Emergency Care Unit and received nasal oxygen 3 L/minute, NaCl 0.9% injection (1000 cc/24 h), a balanced diet of 1900 kcal/24 hour, intravenous ranitidine 2x/day, intravenous metoclopramide 10mg 3x/day, intravenous ceftriaxone 1g 2x/day, oral folic acid 3x/day, KSR (potassium chloride) 3x/day, and paracetamol 500mg 3x/day. Further, several laboratory assessments (fasting blood glucose, 2-hour postprandial blood sugar, HbA1c, lipid profile, sodium, potassium, and chloride), PTBD replacement, as well as radiology consultation regarding the PTBD procedure were planned for the patients.

There was a decrease in abdominal pain on the 3rd day of the treatment. Fluid oozing from PTBD and icteric sclera were still observed. Laboratory examination showed hypokalemia, normal fasting blood sugar (91 mg/dL), high levels of the 2-hour postprandial blood glucose (201 mg/dL), and elevated HbA1c (6.8%). Sodium and potassium levels were below a normal limit (Table 1). These results were indicative of cholangiocarcinoma with obstructive jaundice pro-PTBD replacement with hypokalemia, AKI and type 2 diabetes mellitus (DM). Evaluation of potassium level after correction and Asering injection (2000cc/24 h) were planned for further therapy.

On the 5th day of the treatment, fluid oozing from PTBD was still found. There were also anemic conjunctiva and scleral

Table 1. The results of the patient's laboratory test.

Lab parameter (unit)	Results			
	Initial test	Day 3rd	Day 5th	Day 10th
Hemoglobin (g/dL)	10.5	–	7.5	10.4
White blood cells (/µL)	13,750	–	13,900	12,570
Hematocrit (%)	31.8	–	22.5	31.5
Platelets (/µL)	369,000	–	233,000	195,000
Neutrophils (%)	78.3	–	–	–
Partial thromboplastin time (second)	11	–	–	–
Activated partial thromboplastin time (second)	24.9	–	–	–
Random blood glucose (mg/dL)	213	–	–	–
Blood Urea Nitrogen (mg/dL)	105	–	33	10
Creatinine (mg/dL)	2.21	–	1.36	–
Serum glutamic oxaloacetic transaminase (U/L)	34	–	–	23
Serum glutamic pyruvic transaminase (U/L)	44	–	–	26
Albumin (g/dL)	4.13	–	–	–
Total bilirubin (mg/dL)	2.86	–	–	0.91
Direct bilirubin (mg/dL)	1.86	–	–	0.76
Sodium (mmol/L)	126	134	138	139
Potassium (mmol/L)	3.0	2.8	3.8	3.3
Chloride (mmol/L)	84	98	103	109
Blood Gas Analysis		–	–	–
pH	7.38	–	–	–
pCO_2 (mmHg)	27	–	–	–
pO_2 (mmHg)	72	–	–	–
HCO_3 (mEq/L)	16	–	–	–
BE (mmol/L)	-9.1	–	–	–
SaO_2 (%)	94	–	–	–
Fasting blood sugar (mg/dL)	–	91	–	–
Two-hour postprandial blood sugar (mg/dL)	–	201	–	–
HbAc1 (%)	–	6.8	–	–
Granulocytes (%)	–	–	79.9	–
Cholesterol (mg/dL)	–	–	90	–
Triglycerides (mg/dL)	–	–	56	–
HDL (mg/dL)	–	–	55	–
LDL (mg/dL)	–	–	33	–
HbSAg	–	–	non-reactive	–
Red blood cells (/µL)	–	–	–	3,760,000
Serum creatinine (mg/dL)	–	–	–	0.9

– not tested

icterus. Laboratory investigation revealed resolved hypokalemia, resolved AKI, type-2 DM, and anemia. The result of the blood smear indicated normochromic normocytic anisopoikilocytosis anemia and leukocytosis. The treatment was continued along with the transfusion of pack red cells (PRC) 1 unit/day until hemoglobin of ≥10 gr/dL was reached. Two days after the blood transfusion, anemia was still detected. The treatment was continued and PTBD replacement was conducted. The next day, the patient reported pain in the PTBD implantation site (Wong-Baker Faces Pain Scale 2). The sclera was anicteric. On the day 10th of the treatment, a complete blood screening upon blood transfusion was performed and the results indicated that hypokalemia, AKI, and anemia were resolved (Table 1). The patient was then discharged and underwent outpatient treatment. Oral cefixime 100mg (2x/day), paracetamol 500 mg (3x/day), ranitidine 150mg (2x/day), and metoclopramide mg (3x/day) were prescribed.

DISCUSSION

Cholangiocarcinoma is one of the leading causes of obstructive jaundice. The diagnosis of extrahepatic cholangiocarcinoma is based on clinical (jaundice, pale stools like putty, dark urine, itching all over the body, history of biliary colic and fever, weight loss, abdominal pain, and abdominal mass) and investigations (ultrasound: biliary duct dilatation; cholangiography: masses causing bile duct obstruction; or MRCP:

circumferential thickening and delayed enhancement of bile duct walls).[7-9] In the present case, the patient presented with complaints of weakness, right abdominal pain at the PTBD installation site, decreased appetite, nausea, vomiting, fever, itching, and pale bowel movements. The patient has been diagnosed with cholangiocarcinoma with obstructive jaundice since 2017 and has the PTBD installed.

Various non-invasive imaging techniques, including multidetector computed tomography (MDCT), magnetic resonance imaging (MRI), and MRCP, have been widely used for cholangiocarcinoma staging. MRCP is a widely accepted modality for imaging the biliary system,[10,11] while MDCT is used to determine the staging. MRCP provides high diagnostic accuracy and is utilized to determine the Bismuth-Corlette classification.[12] Using MRCP staging procedure, the patient's cholangiocarcinoma in the present case was classified into the Bismuth-Corlette type 4 since the bile flow was stopped at the level of the distal CBD accompanied by a dilatation of the proximal CBD, common hepatic duct, the right and left IHBD, and hydrops of the gall bladder without the appearance of gallstones and dilatation of the pancreatic duct (Figure 1A).

Cholangiocarcinoma is often non-operable at the time of diagnosis. Therefore, palliative treatment has become the therapy of choice to improve the quality of patients' life. The biliary intervention has been reportedly useful for decompression of biliary system obstruction to reduce pain and jaundice.[2] The European Society of Gastrointestinal Endoscopy (ESGE) has strongly recommended endoscopic retrograde cholangiopancreatography (ERCP) for decompression of malignant extrahepatic biliary obstruction instead of surgery or percutaneous procedures (moderate-quality evidence). Biliary drainage can be performed once ERCP is available. ERCP can also be employed to evaluate and overcome the possibility of microlithiasis.[13] When ERCP fails to provide adequate drainage, endoscopy ultrasonography (EUS) can be used (strong recommendation, low-quality evidence). In terms of the distal obstruction, PTBD can be utilized in the cases with ERCP failure.[14-16] ERCP has been recognized as the primary procedure for palliative stenting of distal bile duct obstruction. Compared to PTBD, ERCP had a higher success rate in reducing jaundice (ERCP 81% vs PTBD 61%, p=0.017) and low mortality within 30 days of treatment (15% and 33%, p=0.016). Nevertheless, studies regarding the implementation of PTBD and ERCP as therapy for distal biliary obstruction showed no significant difference in the success rate between PTBD and ERCP.[14]

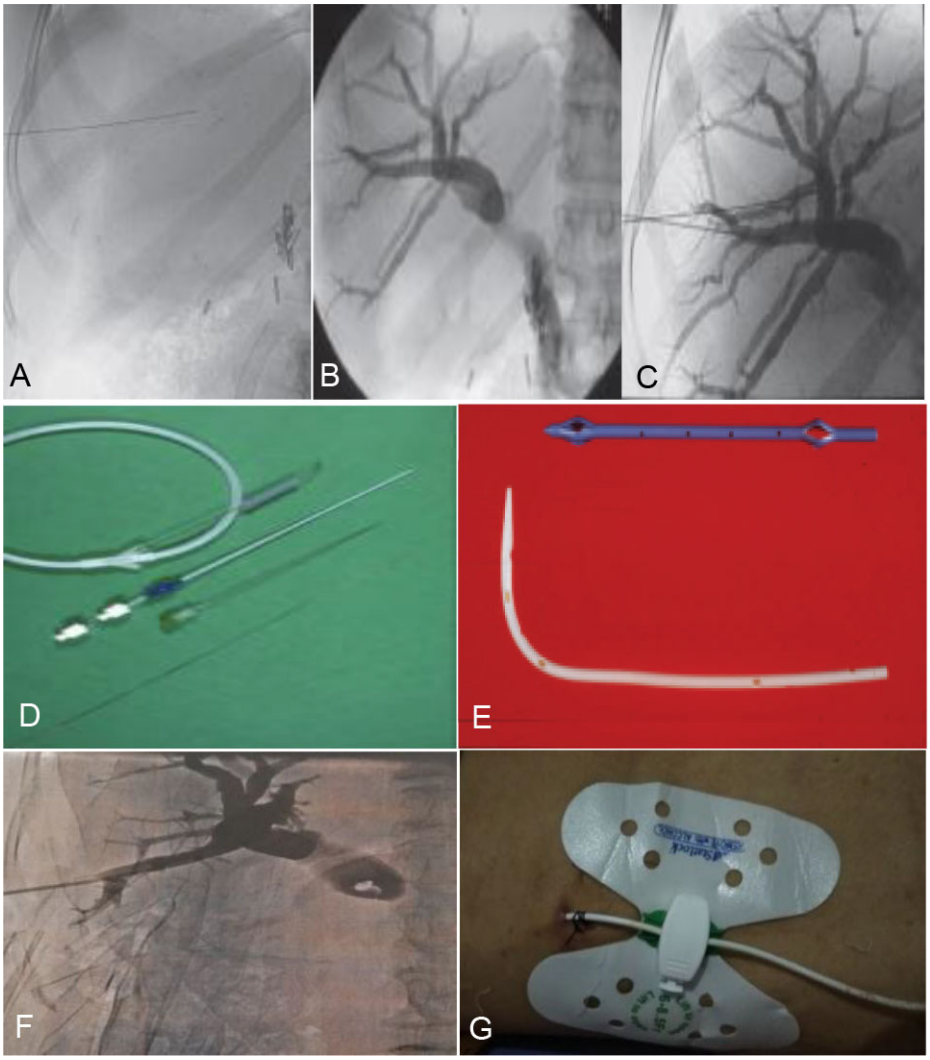

Figure 2. The procedure steps (A-C) and the equipment set of percutaneous transhepatic biliary drainage (D and D) (adopted from Sabharwal and Adam (2010). The imaging of the patient on April 2018 (F) and the patient condition 6 days post-PTBD replacement (G).

In the present case, ERCP should have been carried out since the patient had an obstruction in the distal CBD. Conversely, giving bypass treatment to the patient may result in high perioperative mortality and morbidity complications, as well as requires a longer hospital length of stay, whereas the PTBD procedure may cause bile leak complications post-PTBD. However, ERCP was not available in Dr. Soetomo Hospital due to the lack of the necessary equipment. Therefore, PTBD was chosen as the choice of therapy due to its minimum procedural complications and mortality rates.

PTBD is performed using a 22G needle placed at the midaxillary line, horizontally from the lateral border of the vertebral column (Figure 2A). The contrast is injected into the obstructed biliary system (Figure 2B). The second puncture is performed more peripherally and a better angle was chosen (Figure

2C). Most radiologists use the minimally invasive set (Acoustic set) (Figure 2D) or the Neff set to gain access. Endoprosthesis, which consists of metallic and plastic (Figure 2E), allows for internal drainage of bile across the obstructive lesion and avoids the use of an external catheter.[17] In this case report, new external drainage was installed on the right IHBD of the patient with the catheter tip located proximal to the CBD (Figure 2F and 2G). The last PTBD insertion was carried out using a 7F drainage plastic catheter in the right hypochondrium region with a tip located proximal to the CBD. The 7F plastic stent was smaller in diameter, thus reducing the risk of pain and bleeding; however, the use of this catheter resulted in repeated release of the stent in the patient. Other conditions such as benign stricture, low radial strength of the stent, tumor shrinking after chemotherapy, duodenal invasion, distal biliary stricture, and sphincterotomy have also been suggested to increase the risk of stent detachment.[18]

The technical success rate of PTBD varies between 86-100%, with approximate drainage success rate of 81-96%, therefore minimizing complications of PTBD implantation is prominent. About 1-49% of mortality and 6-58% of complication rates within 30 days post-PTBD have been reported.[17] The mortality rate increases by 8-28% in patients with obstructive jaundice undergoing surgery. Several factors such as hematocrit < 30%, total bilirubin >11 mg/dL, and malignancy can increase the risk of mortality. Poor prognosis in obstructive jaundice due to malignancy has contributed to a 95% of mortality within 1-2 years.[19,20]

PTBD complications could occur immediately during the procedure or later following the procedure, with complication mortality ranging from 0-2.8%. The immediate complications, including haemobilia, sepsis, and pericatheter leakage, occur 1-30 days after the procedure; whereas the late complications occur later than 30 days after the PTBD including cholangitis, catheter dislodgment, peritonitis, and bile hypersecretion which result in fluid and electrolyte balance disorders.[17,21-23] Patients with cholangiocarcinoma generally experience anemia due to blood loss, and folic acid can be given to prevent and overcome anemia.[24,25]

In this case, dislocation of the catheter, pericatheter leakage, and bile hypersecretion with clinical seepage at the site of PTBD was observed in the patient 30 days after the PTBD procedure, leading to an increase in kidney function and a decrease in potassium. Rehydration with 0.9% NaCl and administration with intravenous Asering and KN2 with oral KSR improved the kidney function and corrected potassium level. The patient also experienced blood loss and decreased hemoglobin from PTBD leakage. Normochromic normocytic anisopoikilocytosis anemia and leukocytosis were detected upon peripheral blood smear and PRC transfusion corrected the anemic. After ten days of treatment, the patient's condition improved and the patient was discharged from the hospital.

CONCLUSION

A 58-year-old female with cholangiocarcinoma post-PTBD was admitted to the hospital with complaints of weakness and pain in the right abdomen complicated with hypokalemia, AKI, type-2 DM, and anemia. There was a malfunction in the last PTBD replacement at the end of March 2018, subsequently resulting in the oozing of liquids. The patient was improved after PTBD replacement and received antibiotics, PRC transfusion, and rehydration as therapy. Regular control with professional healthcare workers is recommended for post-PTBD patients in order to prevent complications that could worsen the patient conditions.

PATIENT CONSENT

The patient had agreed and signed informed consent regarding publishing this clinical case in an academic journal without exposing the patient's identity.

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DISCLOSURE OF CONFLICTS OF INTEREST

The authors declare no conflict of interest regarding the manuscript.

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AUTHOR CONTRIBUTION

All authors contributed equally to the study.

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