

Percutaneous Transhepatic Biliary Decompression in An Adult with Complicated Type IVA Choledochal Cyst: A Case Report

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ABSTRACT

Background: Choledochal cysts are rare congenital abnormalities characterized by dilatations of the biliary tree. Adult patients frequently present with complications such as choledocholithiasis, cholangitis, pancreatitis, or recurrent intra-abdominal infection. Percutaneous transhepatic biliary drainage (PTBD) may provide temporary decompression in selected patients with complicated biliary disease when immediate definitive management is challenging. This case report aimed to describe the technical approach and short-term outcome of right-sided external PTBD in an adult with a complicated Todani type IVA choledochal cyst and to highlight its role as a temporizing biliary decompression strategy.

Case presentation: A 50-year-old woman with a Todani type IVA choledochal cyst involving the bilateral intrahepatic bile ducts, common hepatic duct, and common bile duct, together with choledocholithiasis, had undergone cholecystectomy and later laparotomy, abscess evacuation, biopsy, and adhesiolysis for pancreatitis and multiple intra-abdominal abscesses.

Results: Follow-up ultrasonography and magnetic resonance cholangiopancreatography showed persistent intrahepatic and extrahepatic biliary dilatation with heterogeneous contents suspicious for biliary infection. Right-sided external PTBD was performed through an intercostal approach under ultrasonographic and fluoroscopic guidance using local anesthesia without sedation. Cholangiography opacified both intrahepatic systems, the common hepatic duct, and the common bile duct. An 8-Fr pigtail catheter was placed in the dilated right intrahepatic biliary system. The procedure was technically successful without immediate complication. At 24 hours, approximately 80 mL of bile had drained, abdominal pain had decreased, and the patient remained hemodynamically stable.

Conclusion: External PTBD established short-term biliary drainage in this complex adult case. It may serve as a temporizing intervention but does not replace definitive treatment or long-term surveillance of the underlying type IVA choledochal cyst.

Keywords: choledochal cyst, biliary decompression, percutaneous transhepatic biliary drainage, Todani type IVA

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BACKGROUND

Choledochal cysts, also termed bile duct cysts, are rare congenital abnormalities characterized by cystic or fusiform dilatation of the intrahepatic and/or extrahepatic biliary tract. The Todani classification categorizes these abnormalities according to their anatomical distribution. Type I disease is confined predominantly to the extrahepatic bile duct, whereas type IVA disease is characterized by multiple dilatations involving both the intrahepatic and extrahepatic bile ducts. The combined involvement in type IVA disease creates a more complex anatomical and therapeutic condition than an isolated extrahepatic cyst (Brown et al., 2023; Ghotbi et al., 2023).

Although choledochal cysts are frequently diagnosed during childhood, a proportion remain unrecognized until adulthood. Adult patients are less likely to present with the complete classic triad of abdominal pain, jaundice, and a palpable abdominal mass. Instead, they commonly become symptomatic because of complications, including choledocholithiasis, recurrent cholangitis, pancreatitis, biliary obstruction, hepatic abscess, secondary biliary cirrhosis, and biliary malignancy (Brown et al., 2023; Bloomfield et al., 2024). Prolonged bile stasis, recurrent inflammation, intraductal stone formation, and abnormal pancreatobiliary ductal anatomy may contribute to these complications. Todani type IVA choledochal cysts require particular attention because both the intrahepatic and extrahepatic biliary systems are involved. In addition to extrahepatic cystic or fusiform dilatation, patients may develop intrahepatic strictures, hepatolithiasis, recurrent segmental cholangitis, hepatic abscesses, and progressive hepatic parenchymal injury. The distribution of intrahepatic disease, the presence of strictures or stones, previous surgical procedures, and the patient's

general condition influence the selection and timing of treatment (Brown et al., 2023; Ghotbi et al., 2023). Complete excision of the abnormal extrahepatic bile duct followed by biliary-enteric reconstruction, most commonly Roux-en-Y hepaticojejunostomy, is generally recommended for type I and type IV choledochal cysts. Additional hepatic resection may be considered in selected type IVA cases with localized and clinically significant intrahepatic disease. Definitive excision aims to reduce recurrent biliary complications and remove most of the abnormal extrahepatic epithelium. This is important because a meta-analysis of 2,904 patients reported malignancy in 10.7% of choledochal malformations and showed a higher risk of subsequent malignancy after cystic drainage than after complete cyst excision (ten Hove et al., 2018). Drainage alone should therefore not be considered definitive treatment.

Percutaneous transhepatic biliary drainage provides image-guided access to the biliary system for cholangiography and external or internal–external drainage. It is an established method of biliary decompression in selected patients with biliary obstruction, cholangitis, or bile leakage, particularly when immediate endoscopic or surgical management is unsuccessful, unavailable, or unsuitable (Ahmed et al., 2016; Madhusudhan et al., 2021). In choledochal cyst disease, PTBD does not correct the underlying congenital abnormality but may serve as a temporizing or staged intervention to decompress the biliary system and facilitate subsequent clinical management.

Evidence regarding PTBD specifically in adults with type IVA choledochal cysts remains limited. The present case is notable because external PTBD was performed through a right intercostal approach under local anesthesia in a patient with persistent

intrahepatic and extrahepatic biliary dilatation, suspected infected biliary contents, and a complex postoperative abdomen after cholecystectomy and laparotomy. This case report aimed to describe the technical approach and 24-hour outcome of right-sided external PTBD and to highlight its potential role as a temporary decompressive intervention when immediate definitive management is clinically challenging.

CASE PRESENTATION

Patient information and clinical history

A 50-year-old woman presented in March 2026 with generalized weakness for seven

days, nausea, reduced oral intake, and abdominal discomfort. She denied vomiting, fever, and clinically apparent jaundice. Her relevant history began in August 2024, when magnetic resonance cholangiopancreatography (MRCP) demonstrated fusiform dilatation of the right and left intrahepatic bile ducts, common hepatic duct, and common bile duct, consistent with a Todani type IVA choledochal cyst. Multiple stones were present in the common bile duct and cystic duct, with gallbladder hydrops (presented in Table 1).

Table 1. Timeline of the patient’s clinical course

Date	Clinical Event
August 9 th , 2024	MRCP demonstrated a Todani type IVA choledochal cyst, multiple choledocholithiasis, and gallbladder hydrops.
September 2024	Cholecystectomy was performed.
November 2024	CT showed persistent biliary dilatation, findings concerning for cholangitis or infected biliary contents, pancreatitis, and multiple intra-abdominal abscesses.
November 2024	Laparotomy, abscess evacuation, biopsy, and adhesiolysis were performed.
March 23 rd , 2026	Ultrasonography showed persistent intrahepatic and extrahepatic biliary dilatation and a suspected residual postoperative abscess.
March 24 th , 2026	MRCP showed persistent type IVA biliary dilatation with heterogeneous intraluminal contents.
March 27 th , 2026	Right-sided external PTBD was performed.
March 28 th , 2026	Drain output was approximately 80 mL; abdominal pain decreased; no immediate complication was documented.

MRCP: magnetic resonance cholangiopancreatography; CT: computed tomography; PTBD: percutaneous transhepatic biliary drainage.

The patient underwent cholecystectomy in September 2024; gallbladder histopathology showed chronic glandular cholecystitis. In November 2024, contrast-enhanced abdominal computed tomography showed persistent intrahepatic and extrahepatic biliary dilatation with mural thickening and enhancement concerning for cholangitis or infected biliary contents,

together with pancreatitis and multiple gas-containing, rim-enhancing intraperitoneal collections. She underwent laparotomy, evacuation of multiple pocketed abscesses, biopsy, and adhesiolysis. Pancreatic histopathology showed inflammatory granulation tissue. The laparotomy wound remained incompletely healed and intermittently discharged pus.

RESULTS

Clinical and laboratory findings

On admission, the patient was conscious and oriented, with a Glasgow Coma Scale score of 15. Blood pressure was 100/72 mmHg, heart rate 77 beats/min, respiratory rate 20 breaths/min, and body temperature 36.5°C. No scleral icterus was observed. Abdominal examination showed an approximately 1 cm dehiscence at the previous laparotomy site with purulent discharge but no active bleeding. Bowel sounds were normal, and no significant abdominal tenderness was identified.

On March 22nd, 2026, the leukocyte count was $19.1 \times 10^3/\mu\text{L}$ and the platelet

count was $474 \times 10^3/\mu\text{L}$. Hemoglobin was 12.0 g/dL, prothrombin time 13.5 seconds, activated partial thromboplastin time 27.4 seconds, and international normalized ratio 0.98. Albumin was 3.7 g/dL, creatinine 0.6 mg/dL, urea 23 mg/dL, and potassium 3.1 mmol/L. By March 25th, two days before PTBD, the leukocyte count had decreased to $7.9 \times 10^3/\mu\text{L}$, whereas hemoglobin was 9.3 g/dL and the platelet count remained mildly elevated at $430 \times 10^3/\mu\text{L}$. Aspartate aminotransferase and alanine aminotransferase levels were 73 and 112 U/L, respectively (Table 2).

Table 2. Laboratory findings during hospitalization

Parameter	March 22 nd , 2026	March 25 th , 2026	Reference range
Hemoglobin (g/dL)	12.0	9.3	12.0–15.6
Leukocytes ($\times 10^3/\mu\text{L}$)	19.1	7.9	4.5–11.0
Platelets ($\times 10^3/\mu\text{L}$)	474	430	150–450
AST (U/L)	–	73	<31
ALT (U/L)	–	112	<34
Albumin (g/dL)	3.7	–	3.5–5.2
Creatinine (mg/dL)	0.6	–	0.6–1.1
INR	0.98	–	–

AST: aspartate aminotransferase; ALT: alanine aminotransferase; INR: international normalized ratio; –: data not available.

Imaging assessment

Abdominal ultrasonography on March 23rd, 2026 demonstrated persistent cystic dilatation of the bilateral intrahepatic and extrahepatic bile ducts. An irregular hypoechoic lesion at the right hypochondriac surgical bed extended toward the cutaneous and subcutaneous tissues, raising suspicion for a residual postoperative abscess (Figure 1).

MRCP on March 24th, 2026 showed marked persistent dilatation of the bilateral intrahepatic bile ducts, common hepatic

duct, and common bile duct, with irregular margins and heterogeneous intraluminal signal. These findings raised concern for complex or potentially infected biliary contents. The distal common bile duct appeared narrowed but remained anatomically visible to the ampulla of Vater. In view of the persistent biliary dilatation, suspected biliary infection, prior intra-abdominal abscesses, and complex postoperative condition, the patient was referred for percutaneous biliary drainage (Figure 2).

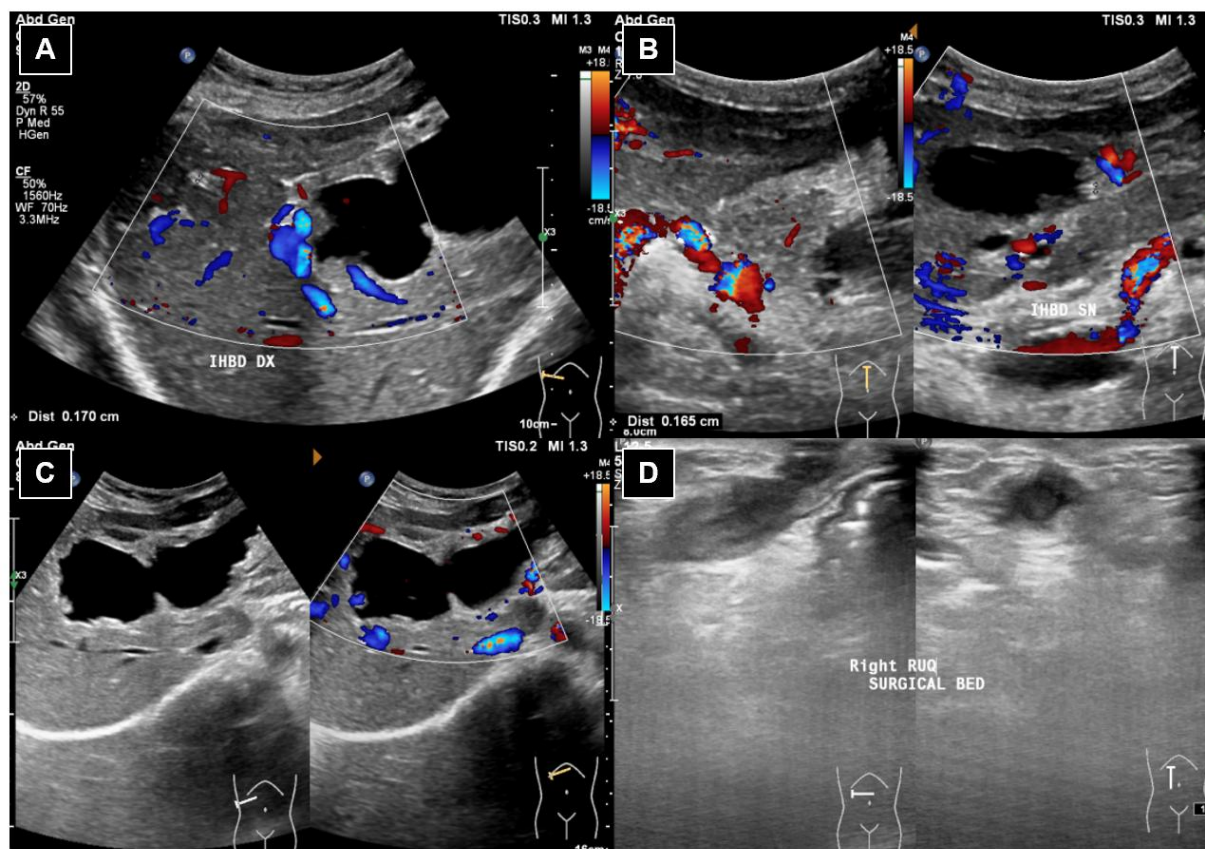


Figure 1. Abdominal ultrasonography.

(A–C) Dilatation of the intrahepatic and extrahepatic bile ducts, consistent with a Todani type IVA choledochal cyst. (D) An ill-defined hypoechoic lesion with irregular margins in the right hypochondrial peri surgical bed, communicating with the cutaneous and subcutaneous tissues, suspicious for a residual abscess.

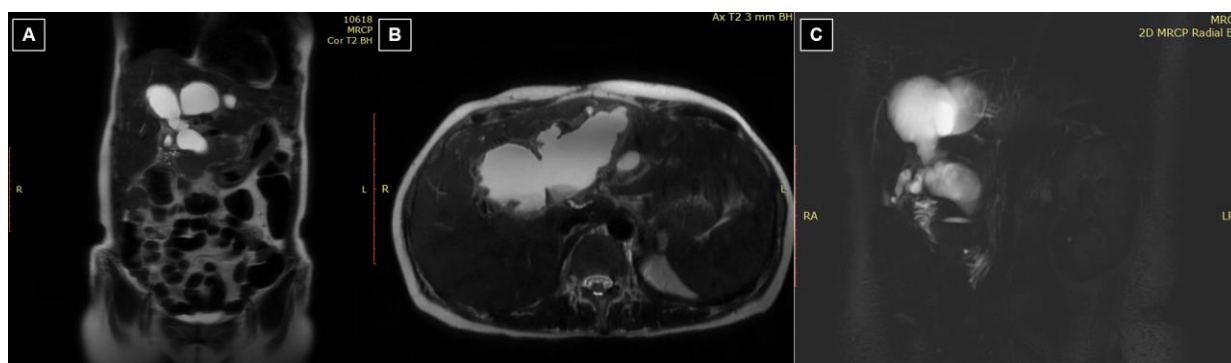


Figure 2. Magnetic resonance cholangiopancreatography.

Coronal (A) and axial (B) T2-weighted images demonstrate dilatation of the bilateral intrahepatic bile ducts (IHBDs), common hepatic duct (CHD), and common bile duct (CBD), with heterogeneous intraductal signal intensity suspicious for infected biliary contents. The MRCP image (C) shows dilatation of the bilateral IHBDs, CHD, and proximal CBD, consistent with a Todani type IVA choledochal cyst. The distal CBD appears narrowed although continuity toward the duodenum remains identifiable. The gallbladder is not visualized, consistent with the history of cholecystectomy.

Percutaneous transhepatic biliary drainage

Right-sided external PTBD was performed on March 27th, 2026 after written informed consent. The intervention was conducted under local anesthesia with 2% lidocaine, without intravenous sedation or general anesthesia (Figure 3). Following sterile preparation of the right upper abdomen, an

intercostal approach was selected. Under ultrasonographic guidance, a dilated right intrahepatic bile duct was punctured with a 21-gauge Chiba needle. Bile return confirmed intraductal access. A 0.018-inch guidewire was advanced, and the access tract was prepared for an 8-Fr drainage system.

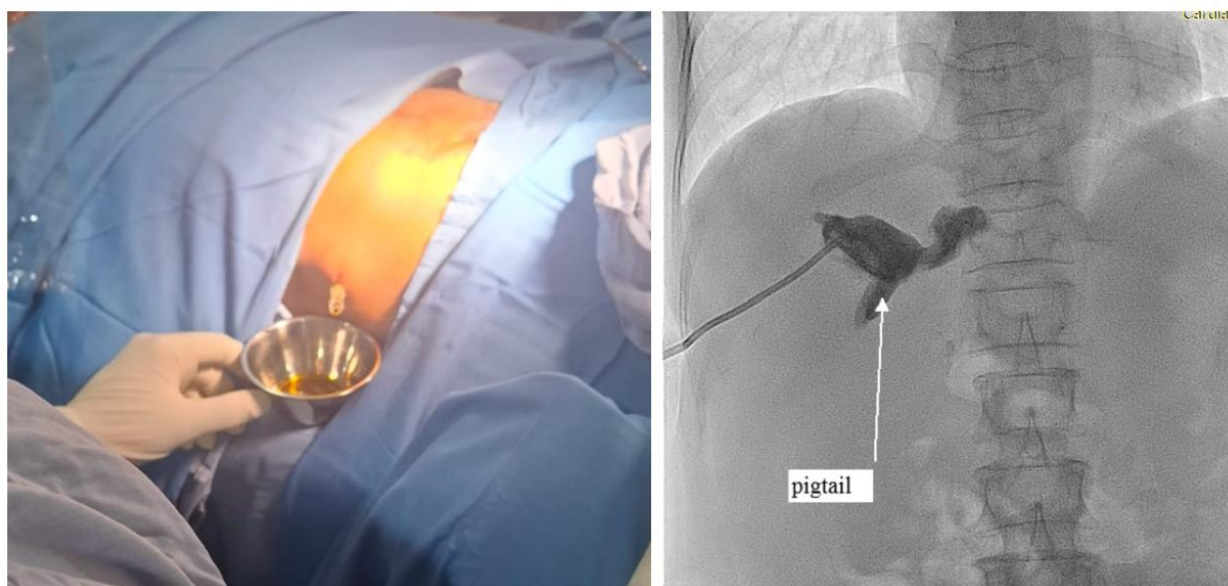


Figure 3. Percutaneous transhepatic biliary drainage procedure.

Following ultrasound-guided puncture of the bile duct with a 21-gauge Chiba needle, bile return was observed (left). The post-procedural cholangiographic image visualizes contrast opacification of the right and left intrahepatic bile ducts and the common hepatic duct, with the pigtail drainage catheter positioned within the right intrahepatic biliary system (right).

Cholangiography showed fusiform dilatation and opacification of the right and left intrahepatic bile ducts, common hepatic duct, and common bile duct, confirming communication between the right and left intrahepatic systems. No transpapillary passage of contrast into the duodenum was visualized during the observation period, and no definite contrast extravasation was

identified. Because the preceding MRCP had shown the common bile duct to the ampulla, complete distal obstruction could not be established from this finding alone.

A 0.035-inch guidewire was subsequently introduced, and an 8-Fr pigtail drainage catheter was positioned with its distal loop and side holes in the dilated right intrahepatic biliary system. The catheter was secured to the skin and connected to an external drainage bag. Technical success was achieved without immediate bleeding, hemodynamic instability, or other documented intraprocedural complication.

Outcome and follow-up

The patient was monitored for hemorrhage, infection, worsening abdominal pain, bile leakage, and catheter dysfunction. At 24

hours, abdominal pain had decreased. She remained afebrile and hemodynamically stable, with a blood pressure of 120/70 mmHg, heart rate 79 beats/min, respiratory rate 20 breaths/min, and body temperature 36.4°C. No puncture-site hematoma was observed, and the catheter had drained approximately 80 mL of bile. She was discharged with the catheter in situ and advised to undergo follow-up imaging. Longer-term laboratory, imaging, catheter-management, and definitive surgical outcomes were not available.

DISCUSSION

Adult choledochal cyst disease often becomes clinically apparent through complications rather than the complete classic triad (Brown et al., 2023; Bloomfield et al., 2024). The present patient had choledocholithiasis, pancreatitis, recurrent intra-abdominal infection, suspected biliary infection, and persistent marked biliary dilatation. This combination is compatible with prolonged bile stasis in an anatomically abnormal biliary system.

Type IVA cysts involve both the intrahepatic and extrahepatic ducts. Cholecystectomy treated the gallbladder pathology in this patient but did not remove the abnormal dilated bile ducts or correct biliary stasis. Definitive management generally requires excision of the abnormal extrahepatic bile duct with Roux-en-Y hepaticojejunostomy; type IV disease may also require liver resection when the intrahepatic component is localized and clinically consequential (Brown et al., 2023; Ghotbi et al., 2023). Long-term surveillance remains important because malignancy, anastomotic stricture, and stone or debris formation can occur after resection (Ghotbi et al., 2023).

The rationale for definitive excision also includes malignancy prevention. Ten Hove et al. reported malignancy in 10.7% of

choledochal malformations, with type I and type IV disease accounting for most cases and subsequent malignancy occurring more often after cystic drainage than after complete excision (ten Hove et al., 2018). PTBD does not remove abnormal biliary epithelium and cannot eliminate the long-term risks of stone formation, recurrent infection, stricture, or malignant transformation. It should therefore be framed as a temporizing or staged intervention rather than treatment of the congenital lesion itself.

PTBD is supported by evidence-based interventional radiology guidance as an image-guided route for biliary access and decompression in selected patients with obstruction, cholangitis, or leakage (Ahmed et al., 2016; Madhusudhan et al., 2021). When acute cholangitis is present and transpapillary access is feasible, endoscopic drainage is generally preferred; percutaneous drainage is an alternative when endoscopic drainage fails, is unavailable, or is not appropriate (Miura et al., 2018). In this case, the complex postoperative abdomen, persistent biliary dilatation, and suspected infection led the treating team to select PTBD. The available records did not document an attempted endoscopic retrograde cholangiopancreatography or a formal contraindication to endoscopic drainage. Consequently, this report cannot establish superiority of PTBD over an endoscopic approach and should be interpreted as a technical account of a context-specific drainage strategy.

Evidence for PTBD specifically in choledochal cysts is sparse because surgery is the definitive treatment for most type I and type IV cysts. Wang et al. described percutaneous transhepatic drainage as a preoperative decompressive step in a giant choledochal cyst before definitive surgery (Wang et al., 2025). Although their anatomy

and operative sequence differed from the present case, the report supports a staged role for percutaneous decompression when cyst distension, infection, or clinical complexity makes immediate definitive surgery difficult.

The principal novelty of the present case lies not in the use of PTBD itself, but in its application as right-sided external biliary decompression under local anesthesia in an adult with type IVA choledochal cyst, persistent bilateral intrahepatic and extrahepatic dilatation, suspected infected biliary contents, and a complex postoperative abdomen following cholecystectomy and laparotomy. Unlike previously reported use of percutaneous drainage as a planned preoperative step for a giant choledochal cyst, the present case illustrates a context-specific temporizing strategy in a previously operated patient in whom immediate definitive biliary reconstruction was clinically challenging.

A right intercostal approach was chosen because a dilated right intrahepatic duct was clearly visualized and accessible. Dilated ducts generally facilitate access. Pedersoli et al. found similar overall complication rates in dilated and nondilated systems but greater procedural complexity and more bleeding in nondilated ducts (Pedersoli et al., 2021). Ultrasonography enabled real-time targeting of the duct, whereas fluoroscopy defined the biliary anatomy and supported guidewire and catheter placement. Open-access single-center and multicenter studies support the feasibility and safety of this combined image-guided approach, although their heterogeneous populations should not be interpreted as choledochal cyst-specific evidence (Giurazza et al., 2019; Park et al., 2022).

Cholangiography opacified both intrahepatic systems, the common hepatic

duct, and the common bile duct but did not show contrast passage into the duodenum during observation. No transpapillary contrast passage was observed during cholangiography; however, this finding did not establish complete distal biliary obstruction. The preceding MRCP showed anatomical continuity of the common bile duct to the ampulla of Vater. Delayed drainage, sphincteric resistance, inflammatory edema, intraluminal sludge or stones, an incompletely characterized distal narrowing, or technical factors related to contrast injection and observation time may explain this discrepancy. Because the guidewire was not advanced across the ampulla, an external rather than internal–external catheter was placed. External drainage established immediate bile diversion but requires catheter care and carries risks of fluid or electrolyte loss, pericatheter leakage, obstruction, migration, dislodgement, and infection.

Technical success in this case was defined as successful percutaneous access to the intended biliary duct, appropriate placement of the external drainage catheter, and subsequent bile output. These technical objectives were achieved. The catheter drained approximately 80 mL of bile within 24 hours, abdominal pain decreased, and no immediate procedure-related complication was documented. Clinical success, however, requires more than successful catheter placement and early bile output. It would require sustained symptomatic improvement, resolution or control of biliary infection, improvement in cholestatic and inflammatory laboratory parameters, objective radiological reduction of biliary dilatation, and the absence of recurrent complications. Because follow-up was limited to 24 hours and serial bilirubin, alkaline phosphatase, gamma-glutamyl transferase, inflammatory markers, and

postprocedural imaging were unavailable, clinical success and durable biliary decompression could not be established. The decrease in leukocyte count from $19.1 \times 10^3/\mu\text{L}$ to $7.9 \times 10^3/\mu\text{L}$ occurred before PTBD and therefore should not be interpreted as a response to the drainage procedure. Large observational series have reported substantial technical success rates for PTBD, although clinical outcomes vary according to the indication, access segment, anatomy, operator experience, and definition of success (Kokas et al., 2021; Hsu et al., 2023).

PTBD complications include cholangitis, bacteremia or sepsis, abscess, hemorrhage, hemobilia, bile leakage, biloma, catheter obstruction, migration, and pleural events (Molina et al., 2021; Turan et al., 2022). Hemorrhage may result from injury to portal or hepatic arterial branches and can require catheter repositioning, tract tamponade, angiography, or transarterial embolization (Pulappadi et al., 2021). A right intercostal route also introduces potential pleural risks. In this case, no immediate complication was documented.

This report has several limitations: follow-up was restricted to 24 hours; serial bilirubin, alkaline phosphatase, gamma-glutamyl transferase, and inflammatory markers were unavailable; bile culture was not documented; and no postprocedural imaging quantified decompression. The reason for absent transpapillary contrast passage was not determined. The records did not document endoscopic drainage assessment, later catheter exchange or internalization, delayed complications, or definitive surgical management. These limitations restrict the conclusion to technical feasibility and short-term external drainage. Although percutaneous biliary interventions continue to evolve, they do not

resolve the underlying type IVA cyst (Riaz and Salem, 2021).

The main clinical lesson from this case is that successful catheter placement and early bile output should be interpreted as technical success rather than evidence of definitive clinical resolution. PTBD may provide temporary biliary decompression in carefully selected adults with complicated type IVA choledochal cysts and complex postoperative conditions, but it does not correct the underlying anatomical abnormality. Definitive surgical assessment, appropriate catheter follow-up, and long-term surveillance remain necessary; therefore, multidisciplinary management involving interventional radiology, hepatobiliary surgery, and gastroenterology is essential (Brown et al., 2023; Ghotbi et al., 2023).

Right-sided external PTBD was technically feasible in this adult with complicated Todani type IVA choledochal cyst and a complex postoperative abdomen. The procedure established functioning external drainage under local anesthesia without immediate complication. PTBD may be used as a temporizing intervention in carefully selected patients, but it neither constitutes definitive treatment nor removes the need for long-term multidisciplinary evaluation, definitive surgical planning, and surveillance.

INFORMED CONSENT

Informed consent was obtained from the patient for publication of the case details and any accompanying anonymized clinical and radiological images.

ETHICS STATEMENT

This report describes the routine clinical management of a single patient and did not involve an experimental intervention. Ethical approval was not required under the institutional policy for case reports. Written

informed consent for publication was obtained from the patient.

AUTHOR CONTRIBUTIONS

Prasetyo Sarwono Putro contributed to the conceptualization of the case report, interventional and clinical management of the patient, supervision, interpretation of the procedural findings, validation of the manuscript content, and critical revision of the manuscript.

Wisniardhy Suarnata Pradana contributed to data collection, medical record review, radiological image evaluation, literature review, preparation of the figures and tables, and drafting of the original manuscript.

Both authors reviewed and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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