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Type I Choledochal Cyst in a Pediatric Patient: A Case Report of Excision and Roux-en-Y Hepaticojejunostomy

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ABSTRACT

Background: Choledochal cysts are relatively rare congenital anomalies of the biliary system but may lead to serious complications if not diagnosed and managed appropriately. Type I cysts are the most common form and generally require complete cyst excision followed by biliary reconstruction. Case: A 3-year-old girl was diagnosed with a type I choledochal cyst at Dr. Sardjito Hospital, Yogyakarta. The anatomy of the biliary system was assessed using intraoperative cholangiography. Based on the intraoperative findings, complete cyst excision was performed while preserving the surrounding anatomical structures, followed by biliary reconstruction using a Roux-en-Y hepaticojejunostomy. Postoperative evaluation showed that the patient remained clinically stable without significant complications. On postoperative day 10, the surgical wound was healing well, and the patient was discharged for outpatient follow-up. Conclusion: Type I choledochal cysts in children require accurate diagnosis and definitive management to prevent long-term complications. Complete cyst excision followed by Roux-en-Y hepaticojejunostomy resulted in a favorable early outcome in this case. Nevertheless, long-term follow-up remains necessary to detect potential complications following biliary reconstruction.

1. INTRODUCTION

Choledochal cysts are congenital anomalies of the biliary system characterized by abnormal dilatation of the bile ducts. Although relatively rare, they have important clinical implications, particularly in the pediatric population (Simmons et al., 2024). Based on the Todani classification, choledochal cysts are categorized into several types according to the location and pattern of biliary dilatation. Type I is the most common form, accounting for approximately 80–90% of cases, and is characterized by cystic or fusiform dilatation, predominantly involving the common bile duct (CBD) (Cazares, Koga and Yamataka, 2023). Although choledochal cysts may be detected prenatally, most patients develop clinical manifestations during infancy, childhood, or adulthood, which may result in delayed diagnosis (Brown et al., 2023).

Choledochal cysts exhibit considerable variation in their epidemiological characteristics and clinical manifestations. The condition has been reported more frequently in Asian populations and shows a female predominance (Cazares, Koga and Yamataka, 2023). In children, clinical manifestations may include jaundice, abdominal pain, vomiting, fever, or signs of cholangitis, whereas the classic triad of abdominal pain, jaundice, and an abdominal mass is observed in only a small proportion of patients (Brown et al., 2023; Simmons et al., 2024). Variations in clinical presentation according to age may cause choledochal cysts to mimic other hepatobiliary disorders in children. Therefore, a high index of clinical suspicion and appropriate selection of imaging modalities are essential for achieving an early diagnosis.

Delayed diagnosis and treatment may result in significant complications. Biliary stasis and pathological changes in the bile ducts can lead to cholangitis, pancreatitis, cholelithiasis or choledocholithiasis, impaired liver function, portal hypertension, and cyst rupture, which may subsequently cause peritonitis (Brown et al., 2023; Tüysüz, 2022). In addition to these short-term complications, unresected choledochal cysts are associated with an increased risk of malignant

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transformation within the biliary system. This risk represents an important rationale for definitive treatment once the diagnosis has been established (Brown et al., 2023; Inggas et al., 2025).

The management of choledochal cysts is principally aimed at removing the pathologically altered ductal segment while maintaining adequate biliary drainage. For type I cysts, complete cyst excision followed by biliary reconstruction is a commonly used approach because it eliminates the source of biliary stasis and inflammation while reducing the risk of long-term complications (Brown et al., 2023). Roux-en-Y hepaticojejunostomy is one of the reconstructive techniques used following cyst excision. This procedure connects the hepatic ductal system to the jejunum through a Roux limb, thereby establishing a new route for bile drainage. It is considered one of the main surgical options for type I choledochal cysts because it enables definitive removal of the lesion while maintaining biliary drainage (Brown et al., 2023; Simmons et al., 2024).

Although the principles of diagnosis and management of choledochal cysts have been widely reported, pediatric cases remain clinically relevant because of variations in presentation, diagnostic challenges, and the need to tailor surgical strategies to the anatomy of the biliary system. A case involving a 3-year-old child with a type I choledochal cyst provides an opportunity to describe the diagnostic confirmation process, intraoperative assessment of biliary anatomy, complete cyst excision, and biliary reconstruction using Roux-en-Y hepaticojejunostomy. Such a case is relevant in demonstrating the relationship between disease characteristics, selection of definitive treatment, surgical technique, and early patient outcomes.

Based on these considerations, this case report aimed to describe the clinical characteristics, diagnostic process, management considerations, surgical technique, and early outcome of a type I choledochal cyst in a 3-year-old child who underwent complete cyst excision and biliary reconstruction using Roux-en-Y hepaticojejunostomy.

2. METHOD

Case Report

This study employed a case report design to describe the diagnostic process and management of a pediatric patient with a type I choledochal cyst. The case was reported in accordance with the CARE (CAse REport) and SCARE (Surgical CAse REport) guidelines to enhance the completeness and transparency of clinical and surgical case reporting. These guidelines emphasize the systematic presentation of patient characteristics, diagnostic evaluation, therapeutic interventions, clinical course, outcomes, and follow-up. The subject of this case report was a 3-year-old girl diagnosed with a type I choledochal cyst who received treatment at Dr. Sardjito Hospital, Yogyakarta. Clinical data were obtained from the patient's medical records during the hospitalization episode, including clinical information, diagnostic findings, intraoperative findings, surgical procedures, postoperative condition, and evaluations performed during the hospital stay.

Diagnostic evaluation was based on the clinical presentation and available ancillary examinations to determine the presence of biliary system abnormalities and characterize the cyst. The cyst type was determined according to the location and characteristics of biliary dilatation based on the Todani classification. Intraoperative cholangiography was performed to delineate the biliary anatomy and assist in confirming the characteristics of the cyst before definitive surgical treatment.

The patient underwent surgery with the objectives of achieving complete cyst excision and restoring biliary drainage. Following identification and mobilization of the cyst, the cystic segment was excised with careful attention to the surrounding anatomical structures, including the common bile duct (CBD), pancreas, portal vein, and associated vascular structures. Biliary reconstruction was performed using a Roux-en-Y hepaticojejunostomy. The jejunum was used to create a Roux limb, which was then brought toward the hepatic hilum. Hepaticojejunostomy was performed between the hepatic duct and jejunum, ensuring a tension-free anastomosis with an adequate lumen to maintain biliary drainage. Intestinal continuity was subsequently restored through a jejunojejunostomy.

Postoperative evaluation was performed clinically throughout the hospital stay to assess the patient's general condition, surgical wound, potential biliary leakage, and other postoperative complications. The patient's clinical progress was documented until her condition stabilized and she was considered suitable for outpatient follow-up. The early outcomes assessed included clinical condition, occurrence of postoperative complications, surgical wound status, and readiness for discharge.

This case report used clinical data obtained during the patient's medical care. Patient confidentiality was maintained, and no personally identifiable information was included in the manuscript. Consent for publication of the case report and the patient's clinical data should be obtained in accordance with institutional requirements and the policies of the target journal. If the journal requires ethical clearance or written informed consent from the patient's parent or legal guardian, the relevant documentation should be obtained and stated in the manuscript before publication.

3. RESULT AND DISCUSSION

Result

A 3-year-old girl was treated at Dr. Sardjito Hospital, Yogyakarta, with a diagnosis of a type I choledochal cyst. Based on the evaluation, the lesion was classified as a type I choledochal cyst according to the characteristics of dilatation involving the common bile duct (CBD). The diagnosis was further evaluated intraoperatively using cholangiography to delineate the biliary anatomy and confirm the characteristics of the lesion. The patient underwent surgery to remove the pathologically dilated segment of the bile duct and restore biliary continuity. Based on the intraoperative findings, complete cyst excision was performed. During the excision, the anatomical structures surrounding the biliary system, including the vascular structures and pancreas, were preserved to minimize the risk of injury. Following cyst excision, biliary drainage was reconstructed using a Roux-en-Y hepaticojejunostomy.

Reconstruction was performed by creating a Roux limb from the jejunum and connecting it to the hepatic ductal system through a hepaticojejunostomy. The anastomosis was constructed with attention to adequate luminal patency and the absence of tension at the anastomotic site. A jejunojejunostomy was subsequently performed to restore intestinal continuity. At the end of the procedure, a drain was placed around the anastomotic area to facilitate monitoring for potential biliary leakage during the early postoperative period. The postoperative course showed a favorable early outcome. No significant complications were reported during the postoperative period. On postoperative day 10, the patient's general condition was stable, the surgical wound was healing well without signs of significant complications, and the patient was considered suitable for outpatient follow-up.

Discussion

Choledochal cysts are congenital anomalies of the biliary system with a broad spectrum of clinical manifestations in children. In this case, a type I choledochal cyst was diagnosed in a 3-year-old girl. Type I is the most common form of choledochal cyst and predominantly involves cystic or fusiform dilatation of the common bile duct (CBD). This characteristic is consistent with the classification described in the literature and provides an important basis for determining the surgical approach (Cazares, Koga and Yamataka, 2023; Brown et al., 2023).

The patient's age is also clinically relevant. Choledochal cysts may be detected prenatally, but postnatal presentation varies considerably. In older children, symptoms may include abdominal pain, jaundice, vomiting, cholangitis, or pancreatitis. Such variability may contribute to delayed diagnosis if the condition is not considered in the differential diagnosis of pediatric hepatobiliary disorders. Pediatric literature indicates that patients with choledochal cysts may present across a wide age range, with type I representing one of the predominant forms in children (Cazares, Koga and Yamataka, 2023; Simmons et al., 2024).

In this case, intraoperative cholangiography was performed to evaluate the biliary anatomy and help confirm the characteristics of the cyst before definitive treatment. Careful anatomical assessment is important because the relationships between the cyst and the CBD, hepatic ducts, pancreas, and vascular structures may influence the surgical strategy. During choledochal cyst surgery, adequate identification of the biliary anatomy is essential to achieve complete excision while minimizing the risk of injury to adjacent structures.

A key finding in this case was the complete excision of the cyst followed by Roux-en-Y hepaticojejunostomy. This approach is consistent with the principles of definitive management of choledochal cysts, which involve removal of the abnormal cystic tissue and establishment of a new route for biliary drainage. Current literature indicates that cyst excision followed by biliary reconstruction is the definitive treatment for pediatric choledochal cysts, with hepaticojejunostomy being one of the most widely used reconstructive techniques (Brown et al., 2023). Pediatric studies have also demonstrated that cyst excision with Roux-en-Y hepaticojejunostomy can achieve favorable clinical outcomes across different age groups (Mandelia et al., 2025).

The use of Roux-en-Y hepaticojejunostomy in this case also has anatomical and physiological considerations. This technique allows bile from the hepatic ducts to drain directly into the jejunum through a Roux limb. Compared with other reconstructive techniques, hepaticojejunostomy has long been used following choledochal cyst excision and remains an important option in pediatric surgery. Recent reviews indicate that both hepaticojejunostomy and hepaticoduodenostomy can be performed following cyst resection, although each technique has specific technical considerations and potential complications that should be taken into account (Brown et al., 2023).

The technical success of the procedure in this case was reflected by the patient's stable condition on postoperative day 10 without significant complications. This finding is consistent with reports on the management of pediatric choledochal cysts, which indicate that cyst excision followed by hepaticojejunostomy generally results in favorable early outcomes. In a series of 33 pediatric patients who underwent cyst resection and Roux-en-Y hepaticojejunostomy, most patients had an uncomplicated postoperative course, although complications such as biliary fistula and pancreatitis could still occur (Liu et al., 2024; Li et al., 2024).

Although the early outcome in this patient was favorable, short-term recovery cannot be interpreted as evidence of long-term treatment success. Following biliary reconstruction, patients require continued surveillance for complications such as anastomotic stenosis, cholangitis, intrahepatic stones, intrahepatic duct dilatation, and impaired liver function. Larger pediatric series have reported postoperative complications, including biliary leakage and anastomotic strictures, although most patients have demonstrated satisfactory long-term outcomes (Liu et al., 2024).

Another important consideration is the risk of malignancy associated with choledochal cysts that are not definitively treated (Tuyzuz, 2022). Complete excision is important not only for relieving symptoms and improving biliary drainage but also for removing tissue that may undergo pathological changes and malignant transformation (Miyano & Koga, 2026). Therefore, complete cyst excision in this case served both therapeutic and preventive purposes. This principle is consistent with modern management recommendations that consider cyst excision followed by biliary reconstruction to be the definitive approach for choledochal cysts (Brown et al., 2023; Cazares, Koga and Yamataka, 2023; Wael et al., 2025).

This case demonstrates that the diagnosis of a type I choledochal cyst in children requires integration of clinical assessment, ancillary investigations, evaluation of biliary anatomy, and careful surgical planning. Successful management depends not only on complete cyst excision but also on biliary reconstruction that provides adequate and durable bile drainage. In this patient, complete excision followed by Roux-en-Y hepaticojejunostomy resulted in a favorable clinical condition during the early postoperative evaluation. However, long-term follow-up remains necessary to assess the durability of the biliary reconstruction and detect potential late complications.

4. CONCLUSION

Type I choledochal cyst in children is a biliary system anomaly that requires accurate diagnosis and definitive management to prevent long-term complications. In this case, evaluation of the biliary anatomy using intraoperative cholangiography supported the characterization of the lesion, followed by complete cyst excision and biliary reconstruction using a Roux-en-Y hepaticojejunostomy. The procedure resulted in a favorable early outcome, with the patient remaining clinically stable and without significant complications through postoperative day 10. Nevertheless, long-term follow-up remains necessary to detect potential complications following biliary reconstruction, including anastomotic stenosis, cholangitis, intrahepatic stones, and impaired liver function.

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