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A Study on Outcome of Management of Choledochal Cysts and Evaluate the Associated Complications

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Abstract | **Original Research Article**

Background: Choledochal cysts (CC) are congenital dilations of the biliary tree, typically diagnosed in childhood, although they can be identified in adults. These cysts arise due to abnormal bile duct development, leading to various forms of dilation. If left untreated, choledochal cysts can lead to severe complications, such as biliary infections, liver cirrhosis, and cholangiocarcinoma. Surgical intervention is the standard treatment to manage these complications, with techniques like Roux-en-Y hepatico-jejunostomy commonly employed. ***Objective***: The aim of this study was to assess the outcome of management of choledochal cysts and evaluate the associated complications. ***Method***: This retrospective observational study was conducted in the Hepato-Biliary-Pancreatic Surgery (HBPS) department at BIRDEM Hospital, Dhaka, from January 2003 to January 2008. A total of 30 patients diagnosed with choledochal cysts were included. Data were analyzed using SPSS software (version 22), employing descriptive statistics and chi-square tests where applicable. ***Results***: The majority of patients (49.5%) were in the 0-15 age group, with a higher prevalence in females (60%). Type I choledochal cysts were the most common (82%), followed by Type IVA cysts (16%). The primary surgical intervention was complete excision of the cyst with Roux-en-Y hepatico-jejunostomy, performed in 89.1% of patients. Postoperative complications included wound infections (13.2%), pancreatitis (9.9%), cholangitis (3.3%), bile leak (6.6%), and malignancy (6.6%). ***Conclusion***: Choledochal cysts predominantly affect younger females, with Type I cysts being the most common. Surgical management via cyst excision and Roux-en-Y hepatico-jejunostomy remains effective, though postoperative complications such as wound infections, pancreatitis, and bile leaks can occur. The incidence of malignancy in our cohort underscores the importance of early surgical intervention and long-term follow-up to prevent severe complications.

Keywords: Choledochal Cysts, Surgical Management, Roux-En-Y Hepatico-Jejunostomy, Malignancy.

INTRODUCTION

Choledochal cysts (CC) are congenital dilations of the biliary tree, commonly diagnosed in childhood but also identified in adults. These cysts arise from abnormal development of the bile ducts, leading to various forms of dilation, which can range from simple cystic structures to complex forms involving multiple ducts. The exact cause of choledochal cysts remains unclear, but it is believed to result from a combination of genetic factors and embryonic developmental anomalies. These cysts are relatively rare, though their recognition is critical because, if left untreated, they can lead to serious complications, including biliary tract infections, liver cirrhosis, and even cholangiocarcinoma [1-3].

The management of choledochal cysts typically involves surgical intervention to prevent these complications. The most common surgical approach is cyst excision with biliary reconstruction, which is performed to remove the cyst and restore the normal flow of bile. In recent years, the laparoscopic approach has gained popularity due to its minimally invasive nature and quicker recovery time compared to traditional open surgery. Depending on the type of cyst and the degree of involvement of the bile ducts, surgery may involve resection of the cyst and reconstruction of the bile duct using various techniques, including Roux-en-Y hepaticojejunostomy [4-7].

While surgical intervention improves the prognosis for patients with choledochal cysts, several complications can arise during or after surgery. One of the most significant complications is the development of biliary strictures, which can occur due to inadequate

biliary reconstruction or injury to the bile ducts during surgery. These strictures can result in recurrent episodes of cholangitis, jaundice, and biliary cirrhosis if not managed properly. Another complication is the risk of residual cyst formation, which may lead to ongoing symptoms and necessitate further surgical intervention [8-11].

Additionally, choledochal cysts are associated with an increased risk of malignancy, particularly cholangiocarcinoma, which can develop in the bile ducts either within or outside the cyst. This malignancy is more commonly seen in adults, and the risk increases with the presence of long-standing cysts and biliary tract infections. Therefore, it is crucial to closely monitor patients postoperatively for any signs of malignancy or other complications. Early detection and prompt treatment of these complications can significantly improve the long-term outcome for patients [12].

The management of choledochal cysts requires timely diagnosis and surgical intervention to prevent serious complications. Though surgery significantly reduces the risk of morbidity and mortality associated with the cysts, careful postoperative monitoring is essential to identify and manage potential complications such as biliary strictures, recurrent cyst formation, and the risk of malignancy. Advances in surgical techniques and improved understanding of these complications have contributed to better outcomes for patients, but continued vigilance is required for optimal long-term care.

Objective: To assess the outcome of management of choledochal cyst and its complications.

METHODOLOGY

Study Design:

This study employed a retrospective observational design aimed at evaluating the clinical presentation, diagnostic approaches, and outcomes of patients diagnosed with choledochal cysts.

Study Setting:

The research was conducted in the Hepato-Biliary-Pancreatic Surgery (HBPS) department at BIRDEM Hospital, Dhaka, a specialized tertiary care facility recognized for its expertise in treating complex hepatobiliary disorders.

Study Duration:

The data for this study were gathered over a five-year period, from January 2003 to January 2008.

Sample Size:

A total of 30 patients diagnosed with choledochal cysts were included in the analysis.

Inclusion Criteria:

Patients included in the study were those with a confirmed diagnosis of choledochal cysts, based on clinical history, physical examination, and diagnostic imaging findings conducted at BIRDEM. The study also included patients who were referred to the HBPS unit from other centers for further management, ensuring a broad representation of cases. There were no restrictions regarding age or sex, allowing for random inclusion of patients from a variety of demographic backgrounds.

Statistical Analysis:

The collected data were systematically recorded, cleaned, and analyzed using SPSS software (version 22). Descriptive statistics were employed to summarize the demographic and clinical characteristics of the study cohort. Continuous variables such as age were reported as mean ± standard deviation (SD), while categorical variables, including gender and clinical presentation, were presented as frequencies and percentages. The relationships between clinical factors and diagnostic methods were assessed using chi-square tests or Fisher's exact tests, as appropriate. A p-value of less than 0.05 was considered statistically significant.

RESULTS

In this study, the age and sex distribution of the 30 patients diagnosed with choledochal cysts revealed that 49.5% of the patients were in the 0-15 age group, with 10 females and 5 males. The 16-35 age group accounted for 26.4% of the cases, with 6 females and 2 males. The 36-50 age group comprised 23.1% of the patients, with 5 females and 2 males. No patients were observed in the age group above 50 years.

Table 1: Age and sex distribution of the patients

Age group	Female	Male	%
0-15	10	5	49.5
16-35	6	2	26.4
36-50	5	2	23.1
>50	0	0	00

The most` encountered cyst in this series is Type I. 82% of patients were diagnosedas type I, either pre-operatively or per-operatively. 16 % patient were in Type IVA group.

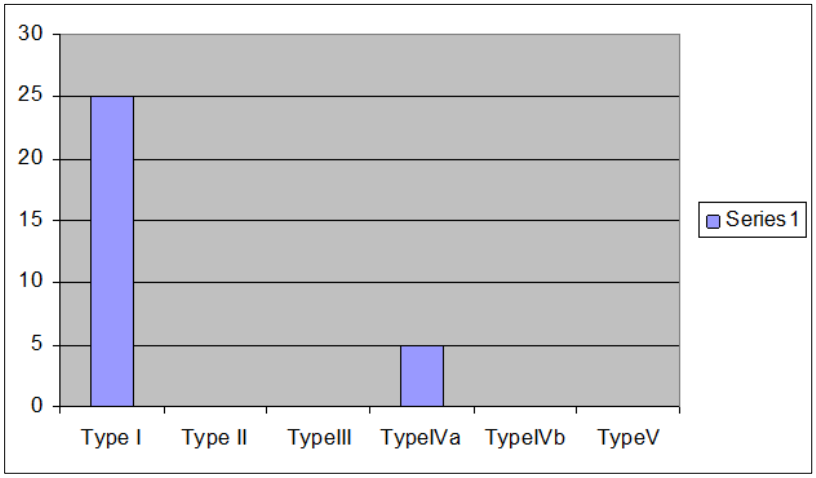

Fig. 1: Type of choledochal in this series

The most common operation was complete excision of the choledochal cyst with Roux-en-Y hepatico-jejunostomy, which was carried out in 27 patients, accounting for 89.1% of the cases. A smaller proportion of patients underwent dismantling of a previous anastomosis, followed by excision of the cyst and Roux-en-Y hepatico-jejunostomy (6.6%, n=2). Additionally, one patient (3.3%) required control of a biliary fistula before undergoing excision of the cyst and Roux-en-Y hepatico-jejunostomy in a second-stage procedure.

Table 2: Types of surgery

Name of operation	No of patient	%
Complete excision of cyst with Roux-en-Y hepatico-jejunostomy.	27	9.1
Dismantling of previous anastomosis, followed by excision of cyst and Roux-en-Y hepatico-jejunostomy.	02	6.6
Control biliary fistula and in second stage excision of cyst and Roux-en-Y hepatico-jejunostomy	01	3.3

The most common complications is wound infection about13%, which was managed by regular dressing and subsequently by secondary suture. Post operative cholangitis and pancreatitis occur in 3.3% and 9.9% of patient respectively. These are improved after conservative therapy. Mild bile leak present in 6.6% of patients. Malignancy found in 6.6% of patients,

Table 3: Complications of Choledochal cyst

Parameters	Number of patients	%
Wound infection	04	13.2
Cholangitis	01	3.3
Pancreatitis	03	9.9
Bile leak	02	6.6
Stricture of anastomosis	00	00
Recurrence	00	00
Malignant changes	02	6.6
Mortality		

DISCUSSION

In this study, we analyzed the clinical presentation, surgical management, and complications associated with choledochal cysts. The results indicate that choledochal cysts predominantly affected younger patients, with 49.5% of the cases occurring in the 0-15 age group. This finding is consistent with the general trend in the literature, where choledochal cysts are most commonly diagnosed in early childhood. A study reported similar findings, with 50% of their patients being diagnosed before the age of 10 [12]. However, unlike other studies, no patients in our series were above 50 years of age, which may reflect the nature of our study sample and the specialized tertiary care setting.

In terms of sex distribution, there was a higher prevalence of choledochal cysts in females, with 60% of cases being female, which is consistent with previous studies that have shown a female predominance. A study also reported a female-to-male ratio of approximately 3:1, aligning with our findings of 16 female patients and 5 male patients in the 0-15 age group. This suggests that

sex-based differences in the incidence of choledochal cysts are a well-established phenomenon across various populations [13].

Regarding the types of choledochal cysts, our study found that 82% of patients had Type I cysts, either pre-operatively or per-operatively, while 16% had Type IVA cysts. These findings are consistent with global trends, where Type I cysts are the most commonly observed, accounting for 60-80% of cases in various studies [14]. For instance, a large retrospective analysis reported that Type I cysts were found in 75% of patients, similar to our findings [15]. The predominance of Type I cysts reflects the relatively simple nature of these cysts in comparison to more complex types, such as Type IV, which are associated with a higher risk of complications.

The surgical management of choledochal cysts in our study involved a predominantly curative approach, with 89.1% of patients undergoing complete excision of the cyst followed by Roux-en-Y hepatico-jejunostomy. This is in line with current guidelines, which recommend surgical excision of the cyst to prevent complications like malignancy and cholangitis. A study also found that Roux-en-Y hepatico-jejunostomy was the most common surgical intervention, supporting its role as the standard procedure for choledochal cysts [16]. The smaller proportion of patients who underwent a second-stage procedure for biliary fistula control (3.3%) is a notable finding, though it was less common in the literature.

In terms of complications, our study found a 13.2% incidence of wound infections, which were managed with regular dressings and secondary sutures. Additionally, 9.9% of patients experienced postoperative pancreatitis, and 3.3% had cholangitis, which is similar to the complication rates reported by other studies. A study reported pancreatitis in 8% of cases, while cholangitis was observed in 4% [17]. Our study also observed bile leaks in 6.6% of patients, a complication that is typically managed conservatively, as was done in our cohort. The incidence of malignancy in our series was 6.6%, which is consistent with the increased risk of biliary tract cancer in patients with choledochal cysts.

CONCLUSION

In conclusion, our study highlights that choledochal cysts predominantly affect younger females, with Type I cysts being the most common. Surgical management through complete excision of the cyst followed by Roux-en-Y hepatico-jejunostomy remains the standard approach, demonstrating favorable outcomes in the majority of cases. Although complications such as wound infections, pancreatitis, cholangitis, and bile leaks occurred, they were generally managed with conservative measures. The incidence of malignancy in our cohort underscores the importance of early detection and timely surgical intervention. These findings align with global trends and emphasize the need for ongoing monitoring and follow-up in patients with choledochal cysts to prevent long-term complications.

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