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Original Research Article

Study of distal arrangement of common bile duct and pancreatic duct according to distal classification in choledochal cyst

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ABSTRACT

Background: Most widely accepted classification for choledochal cyst was Todani classification. In which, Distal extent of choledochal cyst and its resection was not clearly defined. So, this distal classification may be supplementary in guiding distal extent of cyst and its resection in various types of choledochal cysts.
Methods: This was a prospective observational study done in surgical gastroenterology at Nizams Institute of Medical Sciences, Hyderabad. All patients radiologically diagnosed as choledochal cysts were included. Patients with malignant distal bile duct stricture, refused to participate were excluded. Distal arrangement of all patients were interpreted in magnetic resonance cholangiopancreatography (MRCP) and classified distally.
Results: In the present study of 44 patients, median age was 39 years with female preponderance. Median cyst diameter was 20.5 mm. Most common types were Todani I and distal I followed by other subtypes.
Conclusions: Distal type I was the most common arrangement. So, extensive intrapancreatic dissection may be avoided to prevent dreadful complications like pancreatic fistula. Studies with larger sample and correlation with postoperative pancreatic complications should be done further.

Keywords: Choledochal cyst, Distal classification, Todani, MRCP

INTRODUCTION

Choledochal cyst is a pathological dilatation of the biliary tract without biochemical, radiological evidence of obstruction.[1] They were common in children but 20-30% reported in adults.[2] They are common in Asian than western population.[3]

In 1959, Alonso Lej classified extrahepatic choledochal cyst.[4] Later in 1977, Todani modified classification to include intrahepatic choledochal cyst.[5] It was most widely accepted classification for choledochal cyst. In which, distal extent of choledochal cyst and its resection was not clearly defined. Distal extent was important to guide the extent of resection of cyst completely and to avoid injury to pancreas and pancreatic duct thereby avoiding life threatening complications like acute pancreatitis, postoperative pancreatic fistula. A distal classification proposed by Liu et al may be used as adjunct.[6] No Indian data analysing distal arrangements in choledochal cysts were present.

The aim of this study was to study the distal classification of choledochal cyst.

METHODS

This was a prospective, observational study done in the department of surgical gastroenterology, NIMS, Hyderabad from 01 October 2018 to 30 April 2020.

The diagnosis of choledochal cyst was made by the following criteria.

Major criteria

It included asymmetrical dilatation of extrahepatic biliary system without intra hepatic dilation, presence of APBDJ, and persistent dilatation of biliary system following biliary drainage.

Minor criteria

It included dilated gall bladder with patent cystic duct, and non-impacted stones or sludge in bile duct without gallstones.

Presence of one or more major criteria with or without minor criteria was consistent with diagnosis of choledochal cyst.

All patients who met criteria were included. Patients with malignant distal CBD stricture and other causes of dilated CBD (postcholecystectomy, advanced age) were excluded.

Patients history (pain abdomen, jaundice, fever), comorbidities (diabetes, hypertension, tuberculosis), history of ERCP intervention and biliary stenting were documented. Signs like icterus, tenderness, abdominal lump, ascites elicited were recorded. All patients underwent MRCP (heavily weighted T2 images). Distal arrangement of bile duct and pancreatic duct in MRCP were interpreted and classified according to distal classification as shown in Figure 1 given.

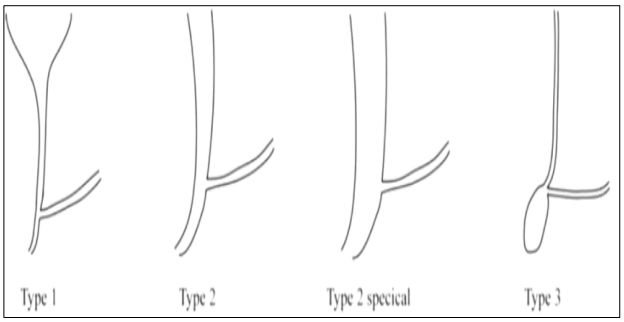

Figure 1: Distal classification - type 1 – no relation between choledochal cyst and pancreatic duct; type 2 – close relation between choledochal cyst and pancreatic duct; type 2s – pancreatic duct converges with cylindrical cyst; and type 3 – like Todani type III.

In some cases, CBD and pancreatic duct opened separately documented as type-s, some of them were unclassified in this study. Choledochal cyst excision and roux en Y hepaticojejunostomy was done for the patients with choledochal cysts. Postoperative complications were analysed according to Clavien dindo grades.[7]

Statistical analysis was performed using Medcalc 19.1.3. Continuous data was represented in median (interquartile range – IQR). Categorical data was represented in proportion. This study was approved by Institute Ethics Committee.

RESULTS

In this study total 44 patients were reported, of which 3 having forme fruste, 2 having secondary biliary cirrhosis. Only 39 patients underwent choledochal cyst excision. Results are tabulated in Table 1.

Table 1: Demographic and clinical profile (n=44).

Variables	Values
Age in years, median IQR)	39 (24-58)
Female: male	25:19 (1.3:1)
Clinical presentation, n (%)	
Abdomianl pain	34 (82.9)
Jaundice	19 (43.2)
Cholangitis	15 (34.1)
Symptoms of liver failure	2 (4.5)
Pancreatitis	1 (2.2)
h/o ERCP and biliary stenting	17 (38.5)
Complications (%)	
Cholangitis	34
Cystolithiasis	27
Perforation	4.54
Biochemical parameters, median (IQR)	
Total bilirubin	0.65 (0.4-3.4)
Alkaline phosphatase	122.5 (75-235)
Albumin	4.1 (3.6-4.3)
Cyst size in mm	20.5 (14-28.5)
Todani classification (n=39), n (%)	
Type 1	23 (58.9)
Type 2	1 (2.5)
Type 3	-
Type 4a	11 (28.2)
Type 4b	4 (10.2)
Type 5	-
Distal classification, n (%)	
Type 1	16 (41)
Type 2	9 (23.1)
Type 2s	7 (17.9)
Type 3	-
Type S	4 (10.3)
Unclassified	3 (7.7)
Postop complications , n (%)	11 (28.2)
Clavien Dindo grade I	6 (15.3)
Clavien Dindo grade II	4 (10.25)
Clavien Dindo grade IIIb	1 (2.5)
Histopathology, n (%)	
No inflammation	8 (20.5)
Nonspecific inflammation	23 (58.9)
Ulceration	6 (15.4)
Metaplasia	2 (5.2)

Distal type 1 is more commonly seen in 39.1 % of Todani type 1 and 54.5 % of Todani type 4a. But not statistically significant (p value 0.49 by Fischer's exact test).

Rate of complications were similar across all types of distal arrangements (p value 0.653 by Fischer's exact test) as shown in Table 2.

Table 2: Comparison of post-operative complications in various types of distal arrangement (n=39).

Type of distal arrangement	No. of complications, N (%)	P value
Type 1	04 (36.4)	0.653
Type 2	02 (18.2)	
Type 2S	02 (18.2)	
Type S	01 (09.1)	
Unclassified	02 (18.2)	

DISCUSSION

Choledochal cyst is a rare clinical condition which is common in Asian than western population. Majority were diagnosed during infancy but choledochal cysts in adults are not uncommon. We limited our study in adult patients only. Choledochal cyst were common in females correlated with our study, exact reason was not known.

Clinical presentation in adults is vague and nonspecific. Most common presenting symptom is abdominal pain (82%), jaundice seen in 43%, cholangitis in 34%, cystolithiasis in 27%. Cirrhosis and portal hypertension was seen in 2 patients. Goals of treatment of choledochal cyst are to relieve symptoms, abolish pancreatic enzyme reflux, restore normal bile flow and minimize the risk of malignancy. Complete excision of extrahepatic bile duct and gallbladder with Roux En Y hepaticojejunostomy, liver resection reserved for intrahepatic stones. Choledochal cyst excision can be done laparotomy / Laparoscopy for less pain, early mobility and return to work.

Todani classification will be standard of care, but distal extent of choledochal cyst and extent of resection were not addressed. So Distal classification can be used as an adjunct to Todani's classification for planning extent of resection in surgery. Distal classification was less frequently studied was interpreted in this study. Distal types incidence in this study vs original study were given in Table 2.

Some difficulties were observed while classifying distal arrangement – proposed distal classification did not include separate opening of CBD and pancreatic duct separately into duodenal lumen, and some had complex distal arrangement which do not fit into any of types.

In this study they were grouped under type S and unclassified type.

In the present study, postoperative complications were bile leak seen in 3 cases (distal 1, 2, 2s each), postoperative pancreatic fistula in 1 patient with distal 1 and bleeding was seen in unclassified distal type. When postoperative complications were interpreted with distal subtypes, no propensity to specific distal type (p value 0.653). As distal type 1 was common, so extensive intrapancreatic dissection may be avoided in most of the cases to prevent injury to pancreatic duct. In this distal anatomy was carefully studied to decrease pancreatic complication rate but couldn't eliminate completely. Detailed study of distal arrangement ensures complete excision of cyst, but its role in decreasing pancreatic complications has not been established in this study because pancreatic fistula rates in this study 2.5% when compared to 2.7% by Srinivasan et al and Senthilnathan et al.[8,9]

Limitations

Limitations of the study was single centre and small sample size.

CONCLUSION

To conclude, further larger sample size studies should aim at distal arrangement of CBD and pancreatic duct in adjunct to Todani classification to ensure complete cyst excision distally with decrease in pancreas related complications (postoperative pancreatic fistula, pancreatitis, and pancreatic bleed).

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