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A Retrospective Study of Choledochal Cysts: Surgical Treatment Modalities and Outcome in Children at Our Institution: A Five Year Experience

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Abstract:

A retrospective study of surgical treatment modalities and outcomes in children with Choledochal cysts was carried out. 15 cases of Choledochal cysts were operated between December 2014 and January 2020 at our institution. All children in the study group were below 16 years of age.

Various procedures[7,8] like complete cyst excision with Porto-Duodenostomy, Hepatico- jejunostomy with Roux-en-Y loop, with or without interpositioning valve in jejunal loop (Lillie's modification), Partial cyst excision with cysto-duodenostomy or cysto-jejunostomy have been described in the treatment of Choledochal Cysts. Laparoscopic and Robotic procedures,[5] ERCP and sphincterotomy and Liver transplantation[6] are the newer treatment modalities also described in literature.

Our experience over a 5 year period is presented in this article.

We recommend complete cyst excision with Porto-Duodenostomy or Hepatico-jejunostomy with Roux-en-Y loop as the procedures of choice.

Keywords: Choledochal Cyst; Portoduodenostomy, Hepaticojejunostomy.

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Introduction

The very nomenclature of Choledochal Cysts is debatable as to whether they should be called as cysts per say or Choledochal malformations, the aim of this study is to present our humble experience over a 5 year period at our institution.

Methods and Material

Between December 2014 and January 2020, 15 cases of Choledochal Cysts underwent surgery at our institution. Baseline pre-operative investigations like complete Haemogram, urine routine examination, Renal function tests, Liver function tests and Coagulation profile were documented. Imaging modalities like Ultrasound abdomen, CT scan abdomen, MRCP, Laparoscopic cholangiogram, ERCP, Tc99 Liver scan have all been described to identify the pancreatico- biliary anatomy.[9] Cases of biliary calculi, CBD dilatation, pancreatic cysts, other intra-abdominal cystic lesions like biliary leaks Anomalous Pancreatico-Biliary Dysjunction (APBDJ) with forme fruste cysts and pseudo-cysts were excluded from our study. A combination of triple antibiotics was used. Data on surgical modalities and treatment outcome was analysed.

Results

15 patients underwent surgery at our institution over a 5 year period from December 2014 to January 2020.

Cyst excision with Porto-duodenostomy was performed in 6 cases in our study. The rest all underwent Cyst excision with Hepatico-jejunostomy using a Roux -en-Y loop. One child who had CBD dilatation from biliary calculi underwent ERCP with sphincterotomy and CBD stenting.

One child had Left Portal venous obstruction, Portal Hypertension and Biliary Peritonitis secondary to a Biliary leak, arising from a dilated CBD with sludge at its lower end. (?? Forme fruste Choledochal cyst with perforation). Both these cases were not included in our study.

As per Todani (4) Classification, 12 cases (80%) were found to be Type 1. 2 cases (13.33%) were Type 4. 1 case (6.67%) was Type 2.

Type 5 cases and one case of Type 3 cyst have been excluded from this study.

The mean age at presentation was 4.12 years +/- SD. Male to female ratio was 1:1.

There were no deaths pre- or post operatively in our study.

Mean time to initiate oral intake, after surgery was 5 +/-1 day.

Mean in hospital stay was 11 +/- 3 days

Mean duration of drains was 5 days.

Mean duration of antibiotic therapy was 7 +/- 2 days

Only one patient developed anastomotic leak in the post-operative period and was managed conservatively. This was the only one patient who developed surgical site infection.

Complications like haemorrhage, intestinal obstruction due to adhesions, kinking of Roux-en-Y loop, intussusception or (mesenteric) internal herniation; pancreatic injury, pseudo- aneurysm were not seen in our study.

None of our patients had to undergo re-operation due to complications like haemorrhage or sub-acute intestinal obstruction. None of our patients complained of post-operative dyspepsia, cholangitis, biliary calculi, pancreatitis, liver failure or malignancy.

Table 1: Indicative age wise distribution and incidence of choledochal cysts.

Age	Number of cases	Incidence (Percentage)
Less than 1 year	**7**	46.68%
2 to 5 years	4	26.66%
6 to 10 years	2	13.33%
11 to 16 years	2	13.33%

Table 2: Todani-classification-of-choledochal-cyst.

Types	Imaging Description	Incidence (%)
I	Dilatation of extrahepatic bile duct only	80-90
	IA: Cystic	
	IB: Saccular	
	IC: Fusiform	
II	Diverticulum	2
III	Choledochocoele involving intraduodenal portion of CBD	4-5
IV	Intra and extrahepatic duct dilatation	
	IVa: Intra and extrahepatic cysts	
	IVb: Multiple extrahepatic cysts	10
V	Caroli's disease	

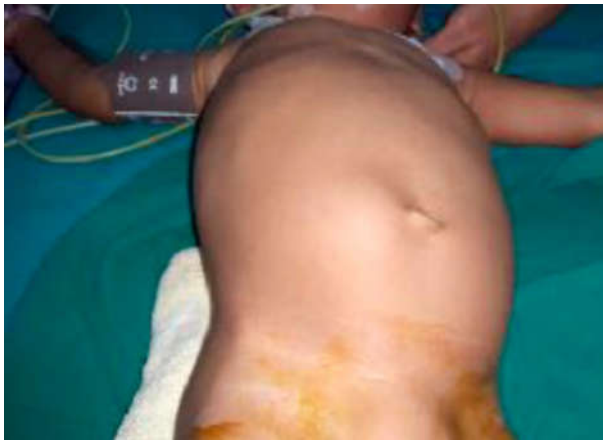

Fig. 1: Clinical Photograph.

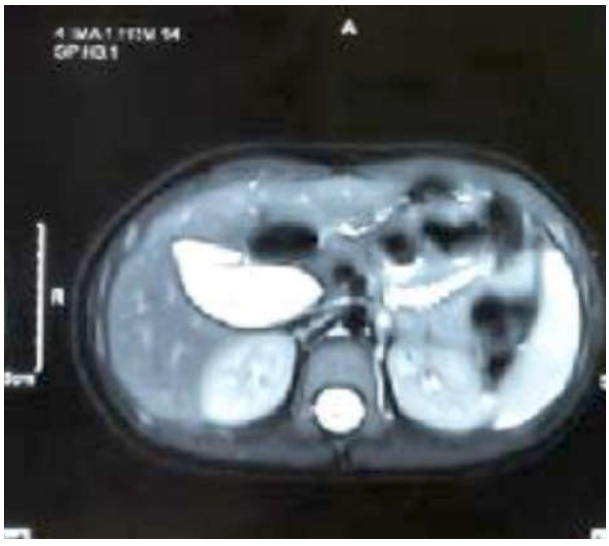

Fig. 2: CT Scan.

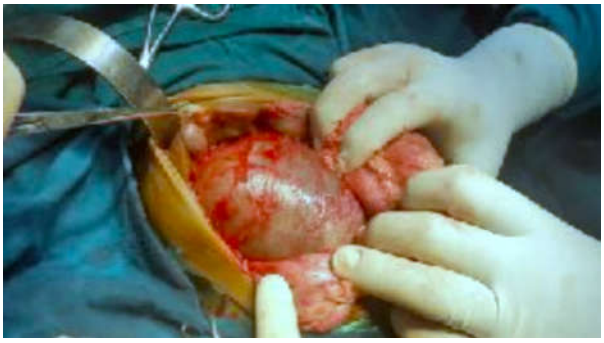

Fig. 3: Intra-operative Photograph.

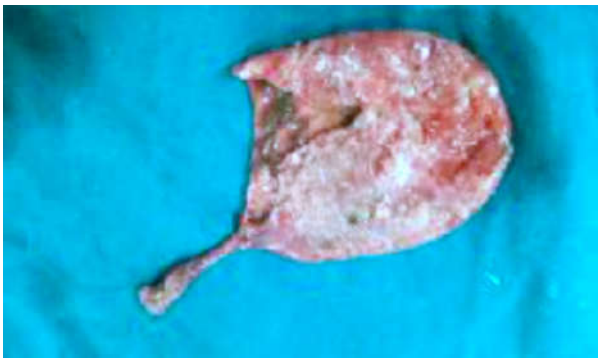

Fig. 4: Excised surgical specimen of Choledochal cyst with gall bladder.

Discussion

Choledochal cysts are more commonly seen in older children between 2 to 10 years of age. At our institution, the mean age at presentation was 4.12 years +/- S.D.

The sex distribution was equal in our study with no female pre-ponderance as is commonly described in literature (10).

Early surgery is advisable. Spontaneous cyst rupture, stone formation in cyst/gall bladder have been documented and reported.

Cyst wall inflammation, fibrosis and infection is associated with poor anastomotic healing, anastomotic leakage and stricture at site of repair.

Following surgical principles should be followed in choledochal cysts:

1.Early surgery.

2.Complete excision of cyst or cyst mucosa.

3.Absorbable sutures with knots on the outside.

4.Wide and adequate drainage at the anastomosis.

Complete cyst excision is the procedure of choice. In cases where the cyst cannot be excised completely owing to previous infection and fibrosis, excessive bleeding, or a hazardous dissection, every attempt should be made to excise the mucosa or inner cyst lining completely. Cyst wall biopsy has shown changes of metaplasia, atrophy, polyps in gall bladder, carcinoma (adenocarcinoma) and therefore, the cyst wall mucosa should never be left behind at the time of surgery.

Porto-duodenostomy (PD) is more appealing. The bile enters directly into the duodenum which is more physiological. Biliary reflux into stomach can cause dyspepsia, alkaline gastritis and erosions(2).

Hepatico-jejunostomy (HJ) using Roux -en-Y loop seems to offer a better protection from biliary pancreatic reflux and pancreatitis. The sphincter of Oddi bypassed due to surgery is non-functional. There is a lesser chance of pancreatico-biliary refux which may lead to consequent stricture at the site of anastomosis, recurrent attacks of cholangitis, fever and jaundice in the operated patient. However, the bile enters much later into the jejunum making the procedure less physiologic from digestion point of view.The gall bladder is removed in HJ as well as PD anyway, so storage of bile and its subsequent release after stimulation by Cholecystokinin-Pancreozymin (1), (3) CCK-PZ enzyme, when chyme enters the duodenum is hampered in both the surgical procedures described above.

Conclusions

Early surgery is advisable. Complete cyst excision remains the procedure of choice. In our study, Porto-duodenostomy and Hepatico-jejunostomy were found to be equally effective in treating the condition. Post-operative complications were not encountered in either of the groups of patients who underwent complete cyst excision with Porto-duodenostomy PD or HJ Hepatico-jejunostomy with Roux en Y loop.

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