# Surgical treatment of choledochal cyst: Retrospective review of the operated cases over the past 5 years in Pediatric surgery department of Ain Shams University

*A Thesis*

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***Shady Sherin Shokry***

# Introduction and Aim of the Study

# Introduction

Choledochal cyst is a congenital bile duct anomaly that can involve the extrahepatic biliary radicals, the intahepatic biliary radicals, or both ***(Coppola et al., 2014)***. It is relatively rare in western countries, accounting for 1 every 100000 - 150000 live birth. In Asian population, it is much more common, with a reported incidence of 1 every 1000 live birth. It is 3 to 4 times more prevalent in females than males ***(Singham et al., 2009)***. 5 major classes are present, classified according to the shape and exact site of the dilatation ***(Sawyer et al., 2009)***.

Choledochal cysts are often asymptomatic. 80% of the cases are presented before the age of 10 years old, but presentation can be at any age ***(Singham et al., 2009)***. Although silent, it may be presented by jaundice, colicky abdominal pain, or papable right upper quadrant abdominal mass. However, this triad is found in only 10-20% of patients. Abdominal ultrasonography is usually enough for diagnosis, it can demonstrate a choledochal cyst as early as 12 weeks gestation ***(Clifton et al., 2006)***.

The treatment depends on different types of choledochal cysts. Previously, in the middle of 20$^{th}$ century, they were treated by whether cholecystoduodenostomy or cholecystojejunostomy, but malignancy was a common complication ***(Jordan et al, 2004)***. That's why, nowadays, treatment of choice include cyst excision followed by construction of biliary-enteric anastomosis.

To restore continuity with gastrointestinal tract and ensure proper biliary drainage, some surgeons perform choledocho-duodenostomy, others choledochojejunostomy, as a biliary-enteric anastomosis ***(Coppola et al., 2014)***. Both have advantages and disadvantages.

# Aim of Study

This study is conducted to reassess outcomes of different methods of biliary drainage after choledochal cyst excision in pediatric patients operated at Pediaric surgery department of Ain Shams University hospitals over the past 5 years (from May 2010 to May 2015).

# Review of Literature

# Definition and Epidemiology

# Definition and Epidemiology

Choledochal cysts are congenital anomalies involving bile ducts ***(Coppola et al., 2014)***.

Bile, which is produced in the liver, flows through gradually increasing channels (ducts) within the liver, and finally into even larger ducts that leave the liver, pass through the substance of the pancreas, and then empty into the duodenum ***(Bhavsar et al, 2012)***.

A choledochal cyst is a congenital cyst (hollow outpouching) of theses ducts.

***Topazian (2015)*** stated that these cysts are dilatations that may occur singly or in multiples throughout the biliary tree. They were originally termed choledochal cysts due to their involvement of the exrahepatic bile duct. However, they can involve as well, the intrahepatic biliary radicals.

The incidence is common in Asian population compared with Western counterpart, with more than two third of the cases in Asia being reported from Japan. This high rate reached 1 in 1000 ***(Singham et al., 2009)***. The reason for this Asian predominance is still unclear.

There is also an unexplained female to male predominance, commonly reported as 4: 1 or 3: 1 ***(Tadokoro and Takase, 2012).***

# Anatomy

# Anatomy

## Intrahepatic bile ducts (Fig.1)

The anatomy of the hepatic biliary ducts (intra & extra) was described by several authors ***(Mortele et al, 2006).***

There are more than 2 km of bile ductules and ducts in the human adult liver. These structures are capable of significantly modifying the biliary flow and composition in response to hormonal secretion.

Bile secretion starts at the level of the bile canaliculi, the smallest branches of the biliary tree. They form a meshwork between the hepatocytes, with many anastomotic interconnections. Bile then enters the small terminal bile ductules (canals of Hering) which provide a conduit through which bile may traverse to enter the larger perilobular or interlobular bile ducts ***(Snell, 2014).***

The interlobular bile ducts form a richly anastomosing network that closely surrounds the branches of the portal vein. These ducts anastomose to form the segmental branches.

In 80-85% of individuals, the segmental branches anastomose to form the anterior and posterior sectorial bile ducts in the right hemiliver. These later unite to form the right hepatic duct (9 mm length).

In the left hemiliver, the segmental branches anastomose to form medial and lateral sectorial bile ducts, which unite to form the left hepatic duct in the region of the umbilical fissure.

The caudate lobe is drained by both right and left hepatic ducts ***(Toouli and Bhandori, 2007).***

## Variations of the intrahepatic bile ducts:

The incidence of the right anterior and posterior sectional ducts joining to form the right hepatic duct occurs in only 57% of people. In 12%, the right anterior and right posterior ducts join at the junction with the left hepatic duct without the existence of the right hepatic duct. In 20% of cases, drainage occurs directly into the common hepatic duct ***(Choi et al, 2003)***.

## Extrahepatic bile ducts (Fig.1)

***Snell (2014)*** described the anatomy of the extrahepatic biliary passages. He stated that bile is secreted by the liver cells at a constant rate of about 40 ml per hour. When digestion is not taking place, the bile is stored and concentrated in the gall bladder; later, it is delivered to the duodenum.

The biliary passages of the liver consist of the right and left hepatic ducts, the common hepatic duct, the bile duct, the gallbladder, and the cystic duct.

The smallest interlobular tributaries of the bile ducts are situated in the portal canals of the liver; they receive the bile canaliculi. The interlobular ducts join one another to form progressively larger ducts and, eventually, at the porta hepatis, form the right and left hepatic ducts. The right hepatic duct drains the right lobe of the liver and the left duct drains the left lobe, caudate lobe, and quadrate lobe.

***Standring and Gray (2008)*** described the common bile duct as formed by the junction of the cystic duct with the common hepatic duct. Its course is divided into supraduodenal, retroduodenal, pancreatic and intraduodenal.Its normal size

varies between 4 to 13 mm in diameter. The most common modality to examine the common bile duct diameter is abdominal ultrasound. The bile duct ends below by piercing the medial wall of the second part of the duodenum, about halfway down its length. It is usually joined by the main pancreatic duct, and together they open into hepatopancreatic ampulla (ampulla of Vater), which is a small ampulla in the duodenal wall. The ampulla opens into the lumen of the duodenum by means of a small papilla, the major duodenal papilla. The terminal parts of both ducts and the ampulla are surrounded by circular muscle. Sometimes, the bile and pancreatic ducts open separately into the duodenum.

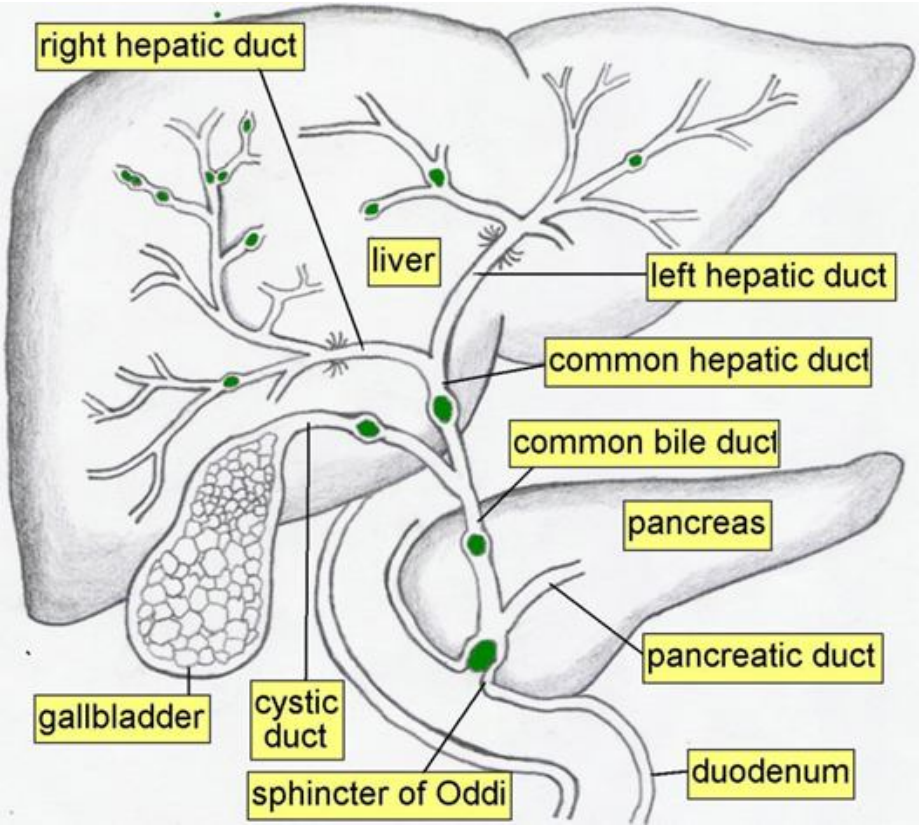


**Fig.(1)** Anatomy of biliary system showing the liver, gallbladder and biliary ducts.