شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

# بسم الله الرحمن الرحيم

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# جامعة عين شمس

## التوثيق الإلكتروني والميكروفيلم

## قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

## يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

# Introduction

Gall stone can affect any age group. As the age increases, the chances of gall stone disease increases. The prevalence of gall stone disease is around 25% in women aged above sixty years of age. Now a day, the gall stone disease is becoming more and more common. **(Vakili, & Pomfret, 2008)** Symptoms are generally not seen in most of the cases of the gall stone disease. But it has been estimated that 10-20% of the cases will show symptoms after 5-20 years of development of the gall stones. Thus it is clear that the risk of becoming symptomatic in the case of gall stone disease is less and estimated at about 2-2.6% per year. **(Friedman, Raviola & Fireman, 2009)**

The use of laparoscopic cholecystectomy started in the year of 1987. It proved to be a boon to the patients it has many advantages compared to open cholecystectomy. **(Paajanen et al., 2001)**. The patient has less hospital stay, less morbidity, better cosmoses laparoscopic cholecystectomy compared to open cholecystectomy. There are few or very minimum changes in the biochemical and physiologic responses. But the major disadvantages of the laparoscopic cholecystectomy are the increased chances of bile duct injury. **(Mohanty, 2017)**

To reduce the complications and conversion rate among the patients undergoing laparoscopic cholecystectomy, preoperative scores have been developed based upon the experience of surgeons. Certain pre-operative factors are thought to predict the difficult or extremely difficult laparoscopic cholecystectomy. Studies have shown the utility of the pre-operative scoring to predict the difficult or extremely difficult laparoscopic cholecystectomy. **(Sudhir, 2018)**

Hence present study was carried out to evaluate the accuracy of Randhawa and Pujahari of pre-operative scoring in predicting the difficult and extremely difficult laparoscopic cholecystectomy.

# Aim of the Work

to evaluate the accuracy of Randhawa and Pujahari preoperative scoring system in prediction of difficult laparoscopic cholecystectomy in Egyptian population.

# Surgical Anatomy of the Biliary Tree

## Anatomy of Intrahepatic Biliary Tract

**Intrahepatic bile ducts** compose the outflow system of exocrine bile product from the liver. They can be divided into: Lobar ducts (right and left hepatic ducts) - stratified columnar epithelium, Interlobar ducts (between the main hepatic ducts and the interlobular ducts) – pseudo-stratified columnar epithelium, Interlobular bile ducts (between the inter-lobar ducts and the lobules) - simple columnar epithelium, Intra-lobular bile ducts (cholangioles or Canals of Hering) - simple cuboidal epithelium, then by hepatocytes, and Bile canaliculi - two half-canaliculi formed by the hepatocytes facing the perisinusoidal space **(Channa, 2007).**

**Bile canaliculi** unite to form segmental bile ducts which drain each liver segment. The segmental ducts then combine to form sectional ducts with the following pattern: segments VI and VII: **right posterior sectoral duct (RPSD)**, coursing more horizontally, segments V and VIII: **right anterior sectoral duct (RASD)**, coursing more vertically, right posterior and anterior sectoral ducts unite to from the **right hepatic duct (RHD)**, and segmental bile ducts from II-to-IV unite to form the **left hepatic duct (LHD)**. **(Roderick & MacSween, 2017)**

Average length of the LHD is 1.7 cm and diameter is 3.0 mm (±1.08). Right lobe is divided into anterior and posterior sections or sectors, each of which is further divided into superior and inferior segments. The right anterior sectoral duct (RASD) drains segments V and VIII and the right posterior sectoral duct (RPSD) drains segments VI and VII **(Channa, 2007).**

The RPSD passes horizontally and generally curves round the RASD to join its medial side to form the right hepatic duct (RHD). Average length of RHD is 0.9 cm and diameter is 2.6 mm (±1.2). Both right and left hepatic ducts drain the caudate lobe (segment I). This pattern of formation of RHD is observed in 57% and LHD in 67% population. **(Vakili and Pomfret 2013).**

The left and right hepatic ducts unite to form the **common hepatic duct (CHD)**. Bile duct(s) from segment I drain into the angle of their union. The ducts of the left hepatic lobe are more anterior than those of the right lobe; it is important particularly when contrast cholangiogram is performed because contrast may not opacify nondependent ducts. (**Dandekar, 2016)**

## Extrahepatic bile ducts

The common hepatic duct is joined by the cystic duct (from the gallbladder) to form the common bile duct. The common bile duct travels initially in the free edge of the lesser omentum, then courses posteriorly to the duodenum and pancreas to unite with the main pancreatic duct to form the ampulla of Vater, which drains at the major duodenal papillae on the medial wall of the D2 segment of the duodenum. Its length varies from 1.0 cm to 7.5 cm and average diameter is 4.0 mm. Cystic duct, 3-4 cm long with a mean diameter of 4.0 mm, runs posteroinferiorly and to the left to join the right border of CHD to form the CBD. Common Bile duct (CBD), 6.0-8.0 cm long, is generally divided into supraduodenal, retroduodenal, retropancreatic and intraduodenal segments **(McMinn, 2013)**.

The supraduodenal CBD lies in the right border of lesser omentum (hepato-duodenal ligament) anterior to portal vein and to the right of hepatic artery proper. Its mean external diameter is 9 mm (range 5-13 mm) and mean internal diameter is 8 mm (Range 4-12.5). **(Kwon, et al., 2015)**

The retroduodenal part passes behind the superior part of duodenum to the right of gastroduodenal artery (GDA) and in front of portal vein. Posterior superior pancreaticoduodenal artery (PSPDA), branch of GDA, crosses the CBD anteriorly. Retropancreatic part (more appropriately intrapancreatic) runs downwards and to the right behind the head of the pancreas to reach the medial border of second part of duodenum. In this course CBD may sometimes groove the head of pancreas or course intrapancreatically. In 83% cases a part of pancreatic tissue covers both surfaces of the duct and only in 17% cases the CBD is truly retropancreatic. **(Friedman, Raviola & Fireman, 2009)**

Near the middle of medial border of descending duodenum, the CBD and the main pancreatic duct (of Wirsung) pierce the duodenal wall and unite to form the hepatopancreatic ampulla (of Vater) which opens on the major duodenal papilla 8 cm distal to pylorus. The formation of this common channel occurs in 85% cases and in the rest 15% cases, the two ducts either open separately or form a V junction before opening. A sheath of circular muscle fibers, the sphincter of Oddi, surrounds the ampulla and terminal parts of CBD and main pancreatic duct. The mean internal diameter of CBD near the ampulla is only 4.0 mm. **(Renz et al., 2017)**

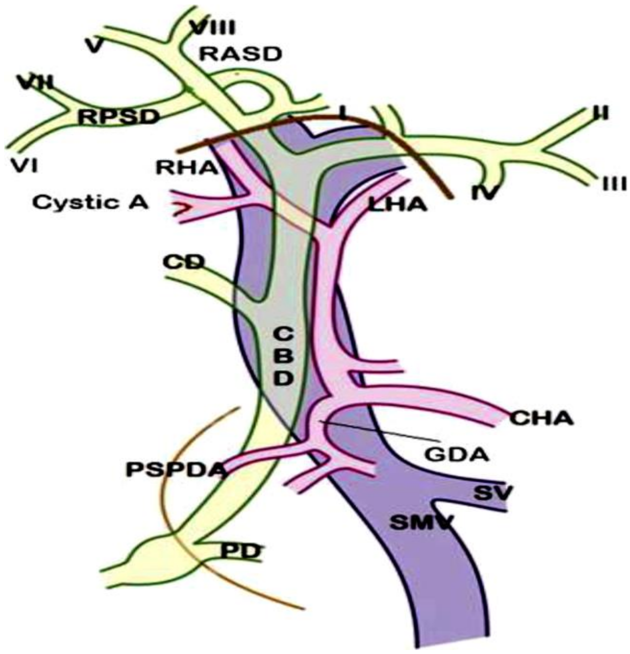


**Figure (1):** Normal anatomy of biliary tract: Extrahepatic and intrahepatic segmental bile ducts along with branches of hepatic artery and portal vein are shown. I - VIII are segmental ducts. CHA = Common hepatic artery; RHA = Right hepatic artery; LHA = Left hepatic artery; GDA = Gastroduodenal artery; PSPDA = Posterior superior pancreatico-duodenal artery; CD = Cystic duct; CBD = Common bile duct; PD = Pancreatic duct; RASD = Right anterior sectoral duct;RPSD = Right posterior sectoral duct; SMV = Superior mesenteric vein; SV = Splenic vein. Thick brown line - outline of porta hepatis. Thin orange line - outline of second part of duodenum . **(Dhiman et al, 2014)**

## Anatomy of the gall bladder:

The **gallbladder** is a gastrointestinal organ located within the right hypochondrial region of the abdomen. This intraperitoneal, pear-shaped sac lies within a fossa formed between the inferior aspects of the right and quadrate lobes of the liver **(Ahmad et al., 2016)**. The primary function of the gallbladder is to concentrate and store **bile** which is produced by the liver. As part of the gustatory response, the stored bile is then released from the gallbladder in response to cholecystokinin. The gallbladder is entirely surrounded by **peritoneum**, and is in direct relation to the visceral surface of the liver. It lies in close proximity to the following structures:

- **Anteriorly and superiorly** – inferior border of the liver and the anterior abdominal wall.
- **Posteriorly** – transverse colon and the proximal duodenum.
- **Inferiorly** – biliary tree and remaining parts of the duodenum.

The gallbladder is 7-10 cm long has a storage capacity of 30-50ml and, in life, lies anterior to the first part of the duodenum. It is typically divided into three parts:

- **Fundus** – the rounded, distal portion of the gallbladder. It projects into the inferior surface of the liver in the mid-clavicular line.

- **Body** – the largest part of the gallbladder. It lies adjacent to the posteroinferior aspect of the liver, transverse colon and superior part of the duodenum.
- **Neck** – the gallbladder tapers to become continuous with the cystic duct, leading into the biliary tree.
    - The neck contains a mucosal fold, known as Hartmann's Pouch. This is a common location for gallstones to become lodged, causing cholestasis. **(Skandalakis et al., 2014**)

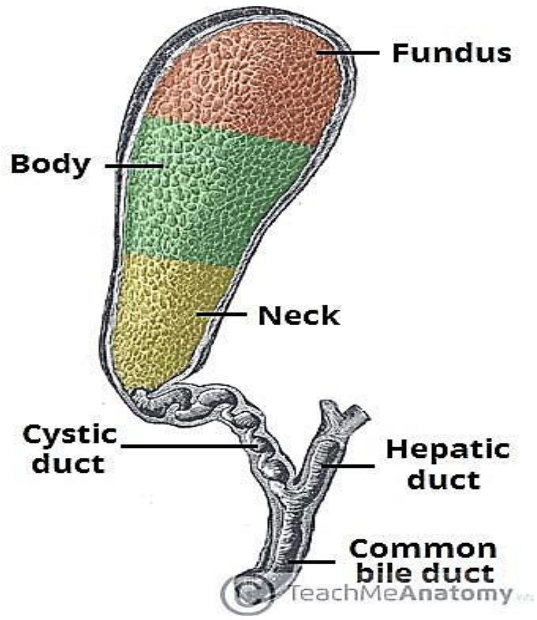


**Figure (2):** The parts of the gallbladder and proximal biliary tree.

## The Biliary Tree

The **biliary tree** is a series of gastrointestinal ducts allowing newly synthesised bile from the liver to be concentrated and stored in the gallbladder (prior to release into the duodenum). Bile is initially secreted from hepatocytes and drains from both lobes of the liver via canaliculi, intralobular ducts and collecting ducts into the left and right hepatic ducts **(Mohanty, 2017)**.

These ducts amalgamate to form the **common hepatic duct**, which runs alongside the hepatic vein. As the common hepatic duct descends, it is joined by the **cystic duct** – which allows bile to flow in and out of the gallbladder for storage and release. At this point, the common hepatic duct and cystic duct combine to form the common bile duct. The common bile duct descends and passes posteriorly to the first part of the duodenum and head of the pancreas. Here, it is joined by the main pancreatic duct, forming the **hepatopancreatic ampulla** (commonly known as the ampulla of Vater) – which then empties into the duodenum via the major duodenal papilla. This papilla is regulated by a muscular valve, the sphincter of Oddi **(Li et al., 2015).**

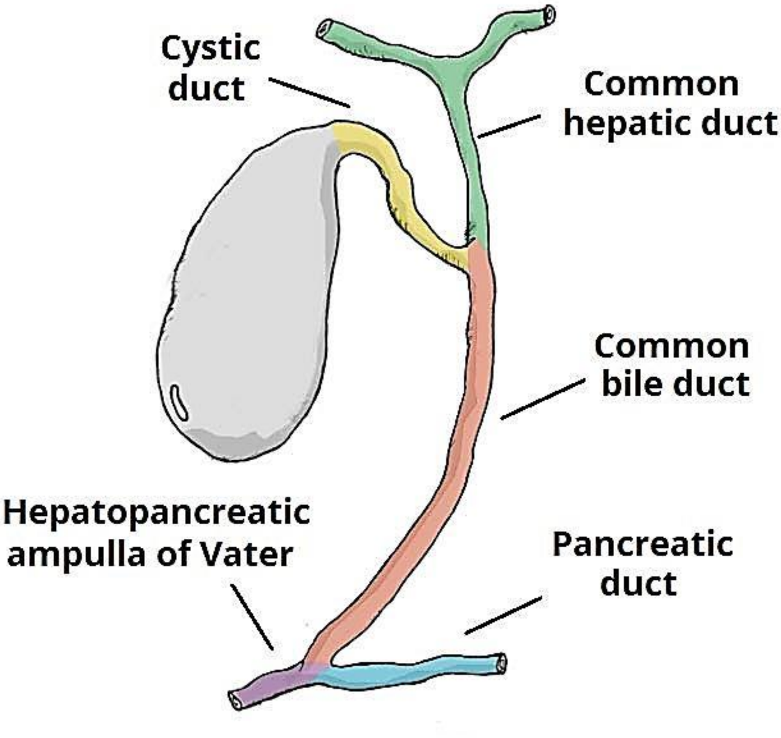


**Figure (3):** Overview of the biliary tree.

## Vasculature

The arterial supply to the gallbladder is via the **cystic artery** – a branch of the right hepatic artery (which itself is derived from the common hepatic artery, one of the three major branches of the coeliac trunk). Venous drainage of the neck of the gallbladder is via the **cystic veins**, which drain directly into the portal vein. Venous drainage of the fundus and body of the gallbladder flows into the hepatic sinusoids. The cystic artery is the chief source of blood supply to