NEW INVASIVE AND NON-INVASIVE PROCEDURES FOR TREATMENT OF GALLBLDDER STONES

ESSAY

SUBMITTED IN PARTIAL FULFILMENT FOR THE REQUIREMENT
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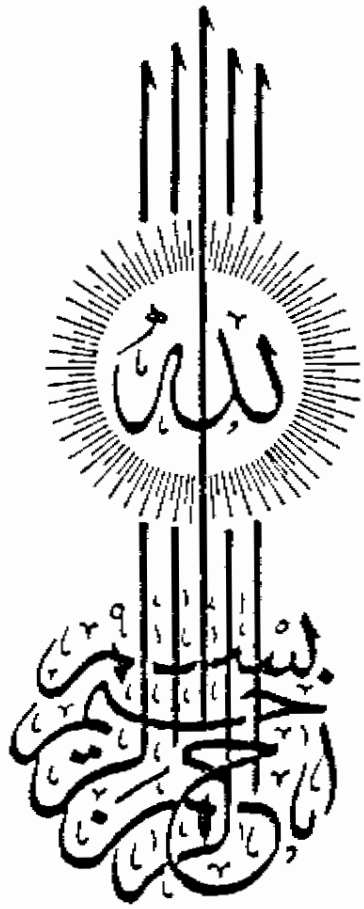

بسم الله الرحمن الرحيم

قالوا سبحانك لا علم لنا إلا ما
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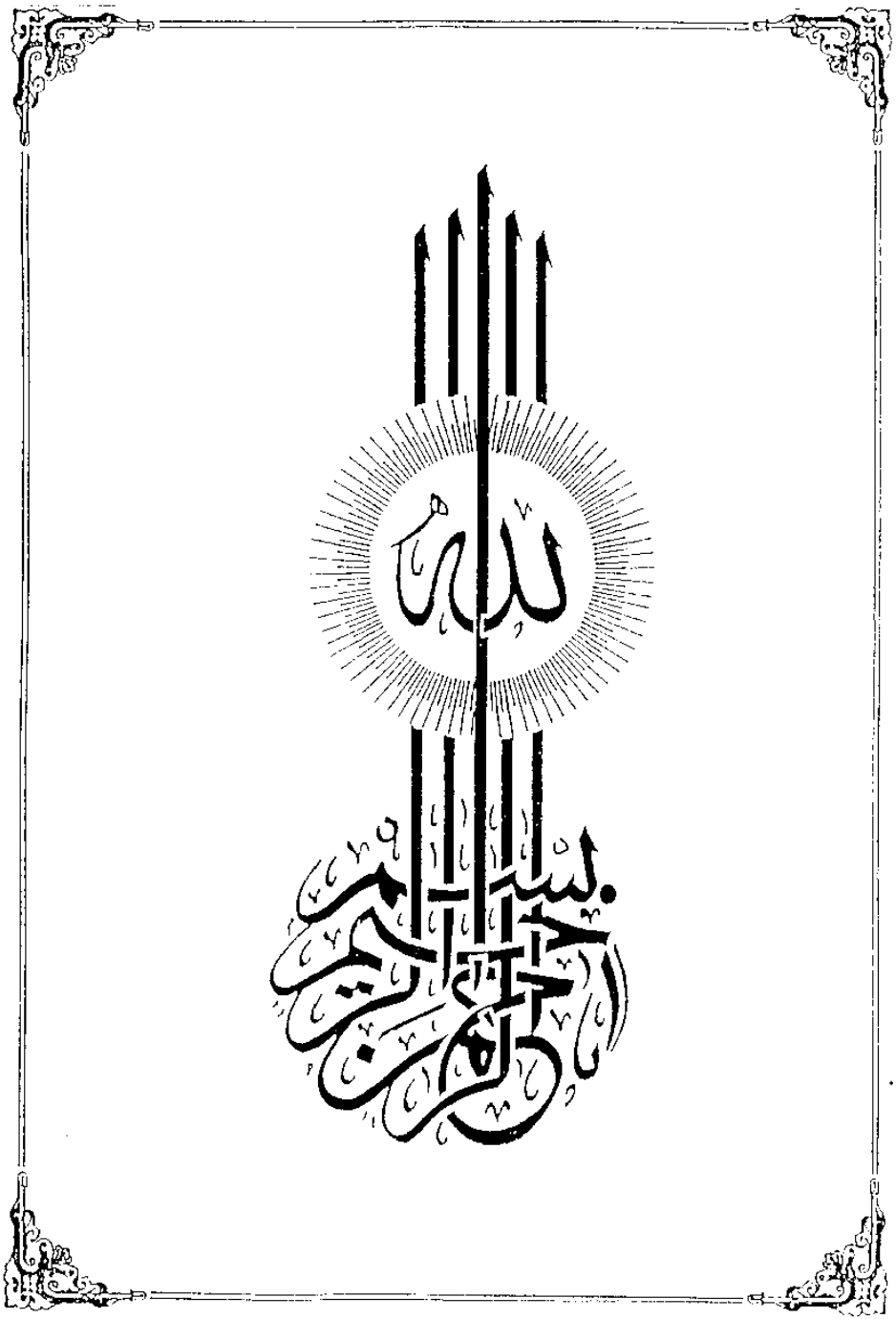

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CONTENTS

INTRODUCTION

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The aim of this work is to study the newer invasive as well as non-invasive procedures for gallbladder stones.

These procedures include.

1- Laparoscopic cholecystectomy.

2- Percutaneous cholecystolithotomy.

3- Extracorporeal shock wave lithotripsy.

4- Oral dissolution therapy for gallstones.

5- Direct contact gallstone dissolution therapy.

ANATOMY OF GALLBLADDER

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** Embryology. (Fig. 1)

The hepatic diverticulum arises from the ventral wall of the foregut and elongates into a stalk to form the choledochus. A lateral bud is given off, which is destined to become the gallbladder and cystic duct. The embryonic hepatic duct sends out many branches which join up with the canaliculi between the liver cells. As is usual with embryonic tubular structures hyperplasia obliterates the lumina of this ductal system, but normally recanalization occurs subsequently and bile begins to flow. During early foetal life the gallbladder is entirely intrahepatic (Thompson, 1986).

** Anatomy.

* Gallbladder.

The gallbladder stores and concentrates the bile secreted by the liver. It is a globular or pear-shaped viscus with a capacity of about 50 ml, and consists of three parts-fundus, body and neck. It lies in the gallbladder fossa on the visceral surface of the right lobe of the liver, adjacent to the quadrate lobe. The

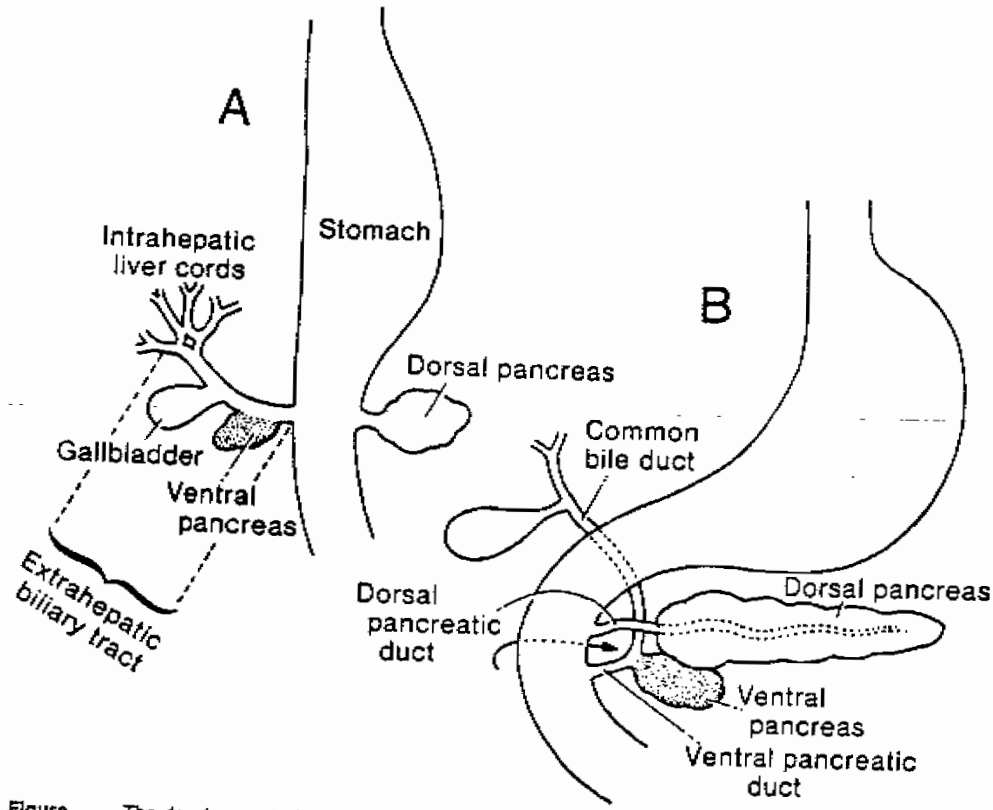

Figure The development of the extrahepatic biliary tract. **A.** The hepatic diverticulum, from which are formed the hepatic cords and intrahepatic ducts, the extrahepatic ducts, the gallbladder and the ventral pancreas. **B.** Rotation of the duodenum, bringing the common bile duct posterior to the duodenum and the two pancreatic primordia together.

(Fig. 1) The development of extrahepatic biliary tract. (Skandalakis, et al., 1983)

liver is thus its main anterior relation. Its other important clinical relations are the anterior abdominal wall, duodenum and transverse colon.

Its bulbous blind end, the fundus, projects a little beyond the sharp lower border of the liver and touches the parietal peritoneum of the anterior abdominal wall at the tip of the ninth costal margin, at the lateral border of the right rectus sheath. This is the surface marking for the fundus and the area of the abdominal tenderness in gallbladder disease. (The fundus of the normal gallbladder is not palpable but may become so if distended by biliary tract obstruction).

The fundus lies on the commencement of the transverse colon, just to the left of the hepatic flexure. The body passes backwards and upwards towards the right end of the porta hepatis and is in contact with the first part of the duodenum. The upper end of the body narrows into the neck which, when the liver is in its normal position (not retracted upwards), lies at a higher level than the fundus and against the free edge of the lesser omentum. The neck continues into the cystic duct,

which is 2-3 cm long and 2-3 mm in diameter. It runs towards the porta to join the common hepatic duct (So forming the common bile duct) between the two layers of peritoneum that form the free edge of the lesser omentum, about 1 cm above the duodenum and usually in front of the right hepatic artery and its cystic branch (but variations are common). The wall of the neck where it joins the cystic duct may show a small diverticulum (Hartmann's pouch) which may become the site of impaction of a gallstone. However, this is not a feature of the normal gallbladder and is always associated with a pathological condition. (Mc Minn, 1990).

The fundus and body of the gallbladder are firmly bound to the under surface of the liver by connective tissue and many small cystic veins that pass from the gallbladder into the liver substance. The peritoneum covering the liver passes smoothly over the gallbladder. However, (in about 4% of cadavers) the gallbladder hangs free on a narrow mesentery from the under surface of the liver, a condition that greatly facilitates the operation of cholecystectomy. (Dowdy et al., 1962).

* Structure.

The gallbladder is a fibromuscular sac which, histologically, shows a surprisingly small amount of smooth muscle in its wall. Its mucous membrane is a lax areolar tissue lined with a simple columnar epithelium. It is projected into folds which produce a honeycomb appearance in the body of the gallbladder, but are arranged in a more or less spiral manner in the neck (the spiral valve of Heister) just short of the cystic duct. (Wood, 1979). Mucus is secreted by the columnar epithelium but there are no goblet cells, and mucus-secreting glands are present only in the neck.

* Blood Supply.

The gallbladder receives many small vessels from its hepatic bed, but there is also cystic artery, usually a branch of the right hepatic. It passes behind the cystic duct to reach the neck of the gallbladder and then branches out over the surface of the viscus. The artery should be found running towards the gallbladder in the triangle formed by the liver, common hepatic duct and cystic duct (Calot's triangle). (Wood, 1979). Variations in the origin of the artery are common. (Fig. 2). It may

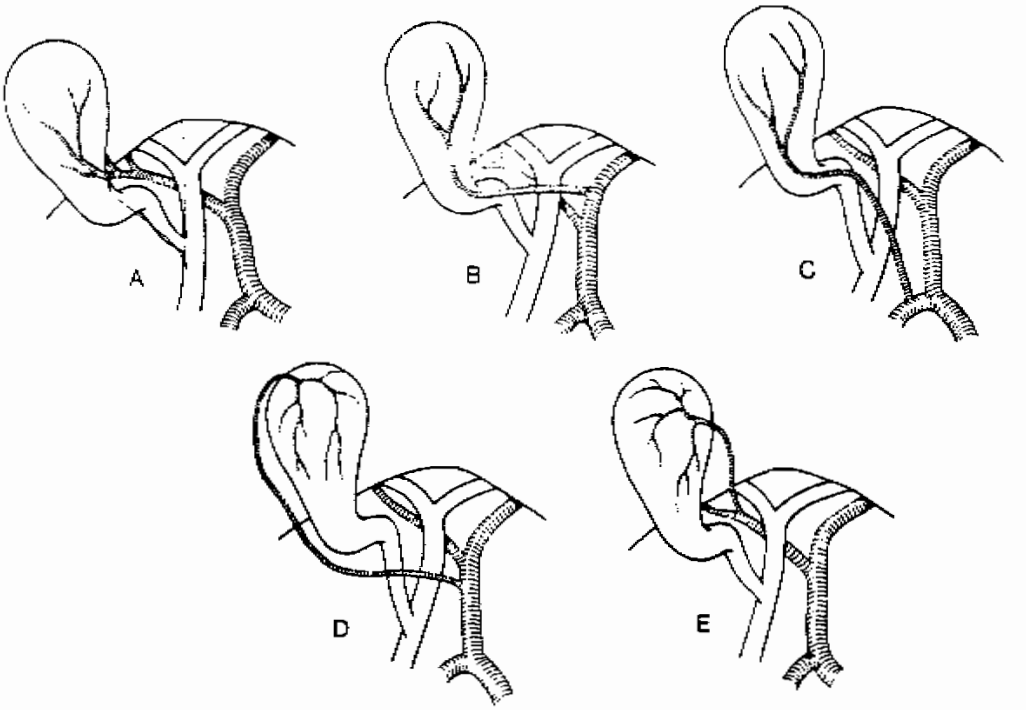

Figure Some possible origins of the cystic artery. A, usual pattern (74.7 percent) from the right normal or aberrant hepatic artery. B, origin from the common hepatic artery, its bifurcation or from the left hepatic artery and crossing in front of the common hepatic duct (20.5 percent). C, origin from the gastroduodenal artery (2.5 percent). (D and E) Very rarely the cystic artery reaches the gallbladder at the fundus or body ("recurrent" cystic artery)

(Fig. 2) Some possible origins of the cystic artery. (Skandalakis, et al., 1983)

arise from the main trunk of the hepatic artery, from the left branch of that vessel or from the gastroduodenal artery, and in either case may pass in front of the cystic and bile ducts. Thrombosis of the cystic artery does not usually lead to ischemia of the gallbladder because the supply from the gallbladder bed is adequate.

Venous return is by multiple small veins in the gallbladder bed into the substance of the liver and so into the hepatic veins. One or more cystic veins may be present but these are uncommon; they run from the neck of the gallbladder into the right branch of the portal vein. (Fig. 3) Note that cystic veins do not accompany the cystic artery (Mc Minn, 1990).

* Lymph drainage.

Lymphatic channels from the gallbladder drain to nodes in the porta hepatis, to the cystic node of Lund (the sentinel lymph node in Calot's triangle at the junction of the common hepatic and cystic ducts), and to a node situated at the anterior border of the epiploic foramen. From these nodes lymph passes in the free edge of the lesser omentum to the coeliac group of preaortic nodes. (Thompson, 1986).