MANAGEMENT OF BILIARY STONES

Essay

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By

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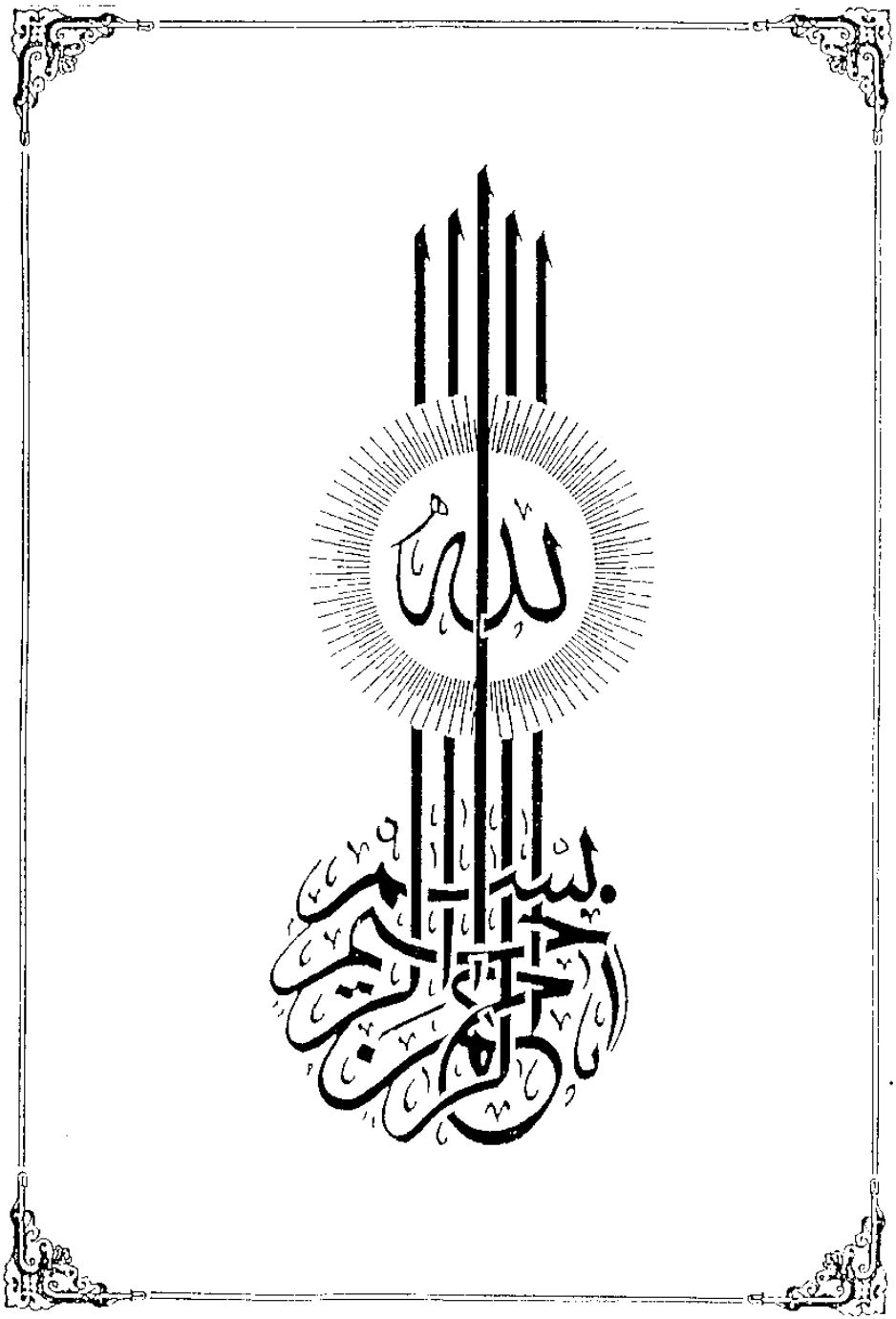

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Introduction

INTRODUCTION

Biliary stone disease is a common problem nowadays all over the world. It has been estimated from epidemiologic studies that gallstones are present approximately in 15-20% of adults.

Biliary stones are formed within the biliary tract under certain pathologic conditions. They give rise to many symptoms which may lead to dangerous complicatins. Investigations of this disease include laboratory and imaging techniques in addition to the use of endoscopy which shows a great advance in this respect.

For the management of biliary stone disease, it is essential to provide a comprehensive review of the literature about the anatomy of the biliary system with its congenital anomalies, physiology of bile secretion and the pathophysiology of the disease, clinical picture and complications and the different methods of investigations.

Concerning the definitive treatment of the disease which is the aim of this work, the uptodate controversy between physicians and surgeons is discussed here with particular attention to the indications, advantages, and drawbacks of both the non surgical and surgical management of these biliary stones.

SURGICAL ANATOMY AND CONGENITAL ANOMALIES

SURGICAL ANATOMY OF THE BILIARY SYSTEM

The anatomy of the biliary system has been the subject of extended research for many years. The biliary tract includes both intra and extra hepatic biliary ducts.

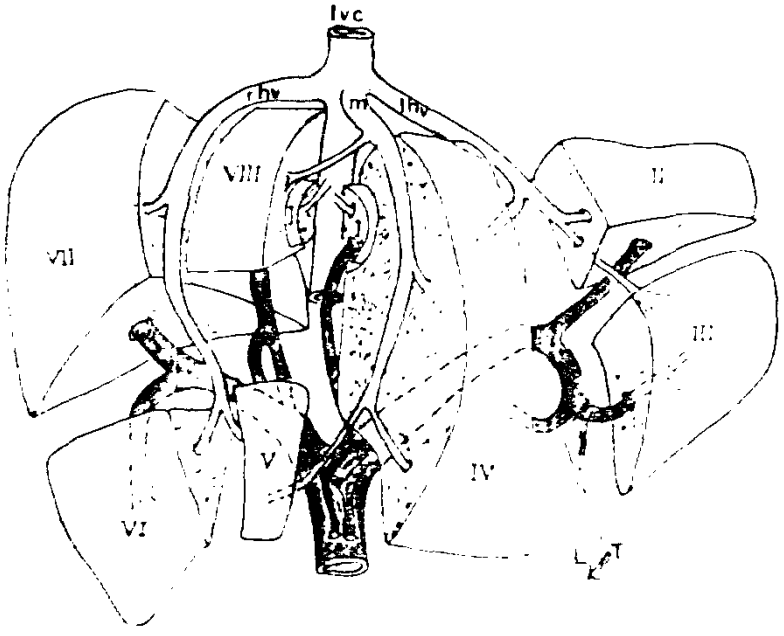
Intra hepatic biliary ducts:

The intrahepatic ducts are enclosed with the portal vein and hepatic artery and their branches in a connective sheath derived from the fibrous capsule (Glisson) of the liver. The ducts run with other components of the hepatic pedicle to drain the different 8 segments of the liver.

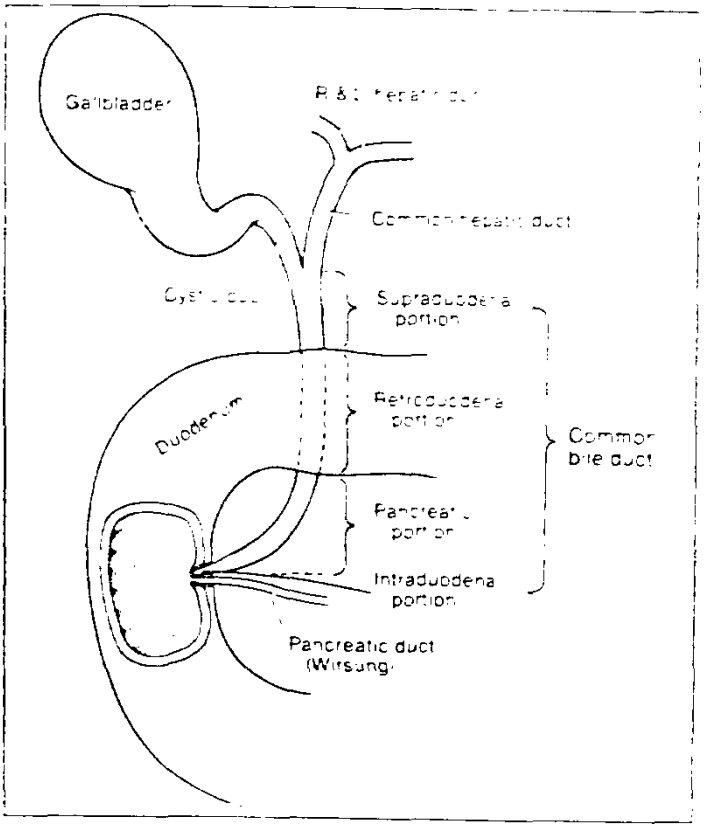
Thus, on the right, segments V and VIII are drained by anterior descending and ascending branches, and segments VI and VII by posterior descending and ascending branches which join to form the right hepatic duct.

On the left, segments II and III are drained by two lateral branches and segment IV by one medial branch. The two lateral ducts unite at the porto-umbilical fissure, the duct so formed being joined by the medial branch to form the left hepatic duct.

The caudate lobe drains by one duct, and the process by two ducts into the right and left hepatic ducts (Ger, 1989).



Segmental anatomy of the liver (Ger 1989).



The extrahepatic biliary tract and the four portions of the common bile duct (Source: From Skandalakis JE, Gray SW, eds. 1983

Extrahepatic biliary ducts:

Extrahepatic ducts consist of the hepatic or excretory duct of the liver, the gall bladder, a reservoir in which bile accumulates and is concentrated before passing through the cystic duct which is the continuation of the gall bladder and the common bile duct which is the union of the hepatic and cystic ducts (McVay, 1984).

The hepatic ducts:

The intrahepatic segmental bile ducts unite to form lobar ducts, which in turn, coalesce to form the right and left ducts that represent the beginning of the extrahepatic biliary system.

The right hepatic duct:

It measures approximately 1 cm and enters the liver with a sharp curcve which accounts for the fact that extrahepatic biliary calculi are less commonly found in this segmenst.

The left hepatic duct:

It is longer than the right and its average length is 2.5 cm which makes it more accessible because it has a more transverse course prior to entering the liver (Schwartz, 1990).

The common hepatic duct:

It is formed in the depth of the transverse fissure of the liver by the union of the right and left hepatic ducts. The resulting trunk runs downwards, backwards and medially in the lesser omentum. At the liver hilus, the duct crosses the portal vein and the branches of the hepatic artery. As it leaves the hilus, it lies over the anterolateral aspect of the portal vein and maintains that position to its termination. The length of duct averages 4 cm but may vary considerably depending upon the level at which it is joined by the cystic duct. The hepatic duct is related to the hepatic artery proper which sometimes runs closely along its left margin but usually lies some distance from it. From the right branch of the hepatic artery, the cystic artery runs dorsal to the hepatic duct to ramify over the anterior surface of the neck of the gall bladder (McVay , 1984).

The gall bladder:

The gall bladder is a thin walled, pear shaped sac about 8 to 10 cm with a capacity of about 50 cc. It lies in a fossa in the inferior surface of the liver which separates the right lobe from the quadrate lobe. Loose connective tissue and the peritoneum reflected from its sides, attach the gall bladder to the liver. It is divided into 3 parts (Skandalakis et al., 1983).

The fundus:

It represents the rounded, blind end that occupies the cystic notch in the margin of the liver and exceeds it for a distance of 1 cm or more. It is directed downwards, forwards and to the left and is partly covered with peritoneum. When the gall bladder is full, it comes in contact with the anterior abdominal wall opposite the angle of the ninth costal cartilage with the right rectus muscle (McVay, 1984).

The body:

It is the major storage area of the gall bladder. It is covered extrahepatically by peritoneum, while there is no peritoneum between it and the liver fossa but occasionally it is attached so loosely, as to be freely mobile and is suspended from the liver as, by a mesentery. Small blood vessels and small biliary channels may connect the two (McVay, 1984).

The neck:

It is funnel shaped lying in the free border of the lesser sac. It presents sinus or S-shaped curve downwards to reach a termination in the cystic duct. The convexity of the neck may be distended into a dilatation known as the infundibulum or hartman's pouch (Skandalakis et al., 1983).

Histologically, The wall of the gall bladder is made up of smooth muscle and fibrous tissue and the lumen is lined with high columnar epithelium that contains cholesterol and fat globules. The mucus secreted into the gall bladder originates in the tubular alveolar glands and the globular cells of the mucosa lining the infundibulum and the neck (Schwartz, 1990).

The cystic duct:

The gall bladder enters the common duct system by means of the cystic duct that has a variable length averaging 4 cm. It runs usually some distance beside the hepatic duct before joining it at an acute angle. The right branch of the hepatic artery resides immediately behind it and cystic artery accompanies it usually running on the left side (McVay, 1984).

The common bile duct:

Although regarded as the union of the cystic and hepatic ducts, rarely the common bile duct is the direct continuation of the hepatic duct. It is approximately 8.5 cm in length and the normal external diameter averages between 4 and 10 mm. It is divided into 4 portions with average lengths of 2, 1.5, 3 and 1 respectively (Schwartz, 1990).

1-The supraduodenal portion:

It extends along the right margin of the lesser omentum to the right of the hepatic artery anterior to the portal vein. It may be crossed anteriorly by one or more of the following: right gastric, right hepatic, supraduodenal or even gastroduodenal artery (Skandalakis et al., 1983).

2-The retroduodenal portion:

It descends behind the first part of the duodenum anterior to the inferior vena cava and to the right of the portal vein.

Downwards pressure on the duodenum and division of the hepatocolic ligament, if it is present, expose the supraduodenal and retroduodenal parts of the duct. The presence of impacted stones can be recognized by putting the left index finger into the epipolic foramen and the thumb on the anterolateral aspect of the first part of the duodenum (McVay, 1984).

3-The pancreatic portion:

It begins on the right margin of the head of the pancreas grooving or tunneling its posterior surface then passes downwards and terminates by piercing the posteromedial aspect of the descending duodenum at about its middle. It is separated from the inferior vena cava by connective tissue alone or by a thin layer of pancreas. It

has no direct relations with the portal vein which approaches it obliquely from below and from the left. On its left side, the duct is accompanied by the gastroduodenal artery, which a variable distance down its course, gives off the superior pancreaticoduodenal trunk that crosses either anterior or posterior to the common duct. The presence of this trunk, together with interlacing branches and a vein issuing from the posterior aspect of the head of the pancreas and running upwards along the medial aspect of the bile duct to join the portal vein, explains the hemorrhage which occurs in exposure of the third portion of the duct (Mc Vay, 1984).

4-The intraduodenal portion:

It begins when it enters the wall of the duodenum obliquely and is joined on the left by the pancreatic duct. However, this junction may be in or outside the duodenal wall. The short common reservoir or channel formed by the two ducts, partly within the duodenal wall, is the ampulla of Vater which becomes constricted and opens into the duodenum on the summit of the major duodenal papilla. However, the common bile and pancreatic ducts may open independently into the duodenum, each on the summit of the major duodenal papilla or in a depth of a slight depression, into the duodenum at separate points (Skandalakis et al., 1983).