GALL BLADDER STONES NEW METHODS OF DIGANOSIS AND TREATMENT

AN ESSAY

SUBMITTED FOR PARTIAL FULFILMENT

OF THE MASTER DEGREE IN

(GENERAL SURGERY)

BY

Ahmed Mohammed Ahmed El-Hefni

M.B., B.Ch.

Ain Shams University

SUPERVISED BY

Prof. Dr. Abd-el Maguid El-Shinnawy

Prof. of General Surgery

Ain Shams University

Dr. Ibrahim Shamekh

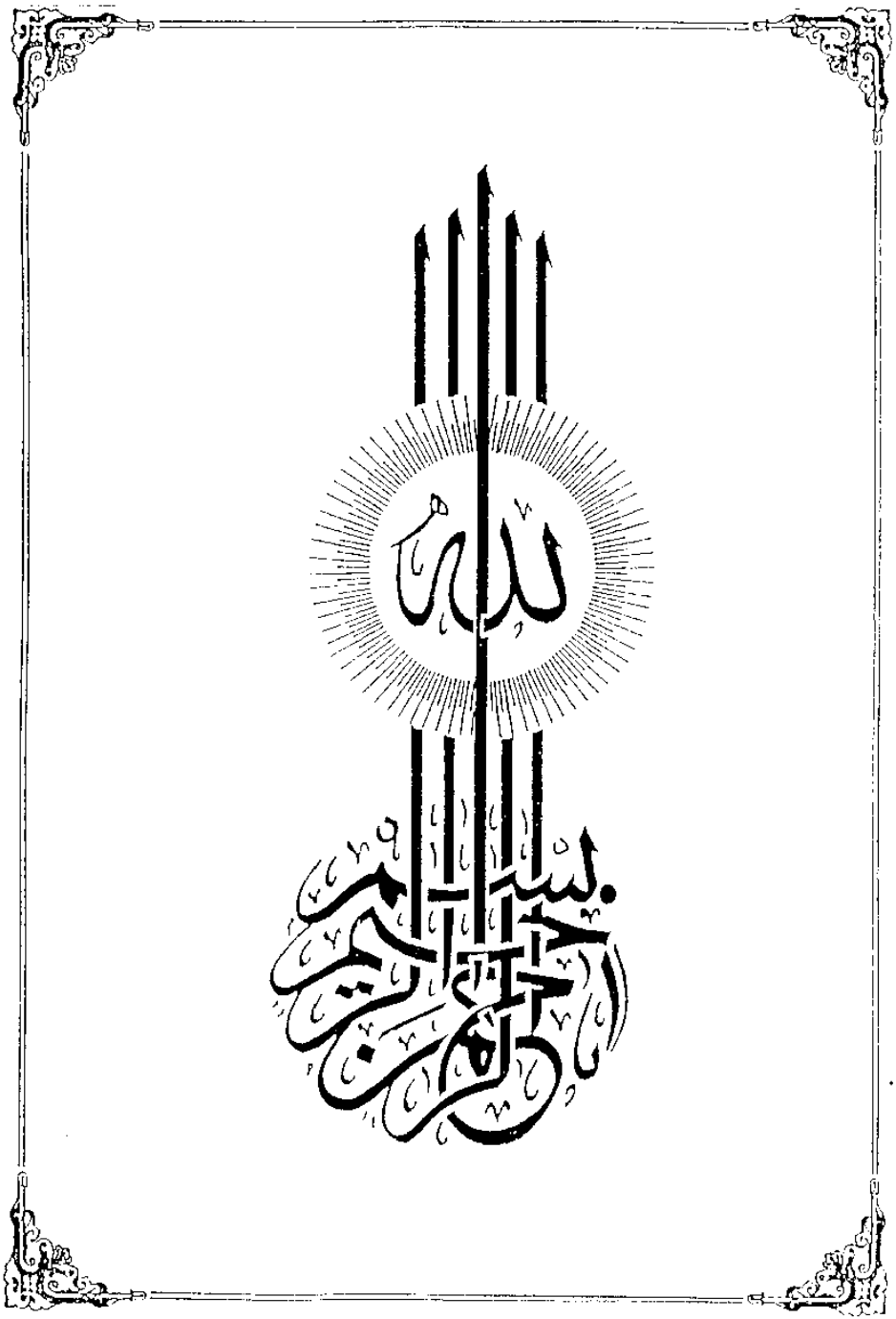
Assist. Prof. of General Surgery

Ain Shams University

1988

C O N T E N T S

-_-_-_-



INTRODUCTION

INTRODUCTION

Stones in the gall bladder are a common disease that faces many surgeons. These stones may remain silent but in most cases they cause major problems and require prompt treatment. Long time ago many procedures were invented to assis, diagnose and follow up the course of gall bladder stones and their complications. These procedures nowadays can diagnose them accurately and in an easy painless manner.

Today, in many countries, cholecystectomy is the second most commonly performed intra-abdominal operation, being marginally exceeded by appendectomy. Cholecystostomy on the other hand, may be and often is a procedure of compromise, but it is frequently life saving.

Medical dissolution of gall stones has been tried long ago. Oral administration of chenodeoxycholic acid in gall stone patients renders the bile unsaturated with cholesterol, giving it the capacity to dissolve stones. Also ultrasonic and laser are used to do fragmentation of the stones successfully. Also with the use of endoscopes a great success in the diagnosis and treatment of stones was performed.

In this essay, we will review the literature to study surgical treatment of gall stones, the efficiency, applications, complications of dissolution, fragmentation and endoscopic therapy, and whether they can replace surgery or not.

ANATOMY OF THE EXTRAHEPATIC BILIARY SYSTEM

ANATOMY OF THE EXTRAHEPATIC BILIARY SYSTEM

The Gall Bladder

Owing to the multiple variation in the anatomical structure of the biliary system, so spot light on this anatomy will be of great importance in evaluation of gall stone diagnosis and treatment.

Embryology of the gall bladder:

In 3 mm embryo a diverticulum appears on the ventral aspect of the foregut. Its cranial portion (pars hepatica) becomes the liver while the caudal bud will form the ventral pancreas. The gall bladder will be developed from the intermediate portion of this diverticulum (pars cystica). The cranial hepatic diverticulum becomes a solid mass of cells which later recanalize to form the ducts. The smallest ducts (bile canaliculi) are first seen as a basal network between the primitive hepatocytes which will expand throughout the whole liver. Then numerous microvilli will appear in these canaliculi which increases the canalicular surface area. The bile secreted here can pass through the interlobular ductules (canals of Hering) and the lobar ducts and then into the hepatic duct in the hilus. In most cases, the common hepatic is formed by union of a single right and left duct, but in 15 % of individuals the anterior and posterior divisions of the right duct join the left duct separately so the

proximal part of pars hepatica forms the common hepatic duct. Rotation of the duodenal loop results in migration of the common bile duct opening to the posteromedial aspects of the second part of the duodenum. The common bile duct also arises from the proximal part of hepatic bud (by Lawerence W. Way 1977).

Anatomy of the gall bladder:

The gall bladder is a conical or pear shaped musculomembraneous sac , lodged in a fossa on the visceral surface of the right lobe of liver and extending from near the right extremity of the porta hepatis to the inferior of the organ. It is from 7 to 10 cm. in length, 2.5 cm in breadth at its widest part, and hold from 30 to 35 c.c. It is divided into a fundus, body and neck.

The fundus or broad extremity is directed Caudal Word, and project beyond the inferior border of the liver. The Bufloud end touches the parietal peritoneum of the anterior abdominal wall at the tip of the ninth costal cartilage, where the transpyloric plane crosses the right costal margin, at the lateral border of the right rectus muscle. The body and neck are directed cranial word and dorsal word to the left of the right end of the porta hepatis. Here, it narrows into a neck from

which the cystic duct lies against the porta hepatis to join the hepatic duct between the two layers of peritoneum that form the free edge of the lesser omentum. The cystic duct lies immediately in front of the right main branch of the hepatic artery. The artery can be caught easily in a clamp placed on the cystic duct (a hazard during cholecystectomy). Hartman pouch lies between body and neck in contact to duodenum where gall stones could be formed (R.J. Last, 1984).

The fundus of the gall bladder lies on the commencement of the transverse colon just to the left of the hepatic flexure, while the body lies behind it, in contact with the first part of the duodenum. The under surface of the liver is sloping so the neck of the gall bladder lies at a higher level than the fundus. It lies against the upper part of the free edge of lesser omentum (Last 1984).

The surface of the gall bladder is attached to the liver by connective tissue and small cystic veins.

The caudal surface is covered by peritoneum, which is reflected on to it from the surface of the liver. Occasionally, the whole of the organ is invested by serous membrane, and is then connected to the liver by

a kind of mesentery (a condition that greatly facilitates cholecystectomy)(Last 1984).

Developmental anomalies of the Gall-bladder:

. Congenital absence of the gall bladder is extremely rare.

. Small ducts may connect the gall bladder with the liver. Usually these become obliterated, but sometimes they may persist. This is why drainage is mandatory after cholecystectomy.

. Persistence of bile duct remenants in the left triangular ligament of the liver which when cut or divided during surgery to gain temporary access to right lobe from the left side, a biliary fistula will occur as a complication.

. Failure of vacuolation of cell mass of gall bladder leads to atresia of extrahepatic bile ducts (McGregor, 1984).

Anomalies of Shape:

1. Bilobed gall bladder:

There are three varieties of bilobed gall bladder:

(1) The cavities may be divided by a septum, "septal type" and the septum may be partial or complete "V shaped type".

(2) There may be two cavities that coalesce at their neck to join a cystic duct that empties into the common bile duct "T shaped type".

(3) There may be two vesicles of about equal size that have their own cystic ducts that unite to form a single common cystic duct, before this drains into the main bile duct "Y shaped type".

2. Diverticulum of the gall bladder:

This may be found in any position along the surface of the organ from the fundus to the neck, the most common site for such a diverticulum is in Hartmann's pouch, these diverticulae vary in size from 0.6 to 9 cm in diameter . True congenital diverticulum containing all three layers of normal gall bladder is a very rare anomaly of the gall bladder.

3. Strictures and dumbbell or hourglass gall bladder:

Various malformations in the contour of the gall bladder such as strictures, dumbbell gall bladder and hour-glass gall bladder are observed. They may be congenital or acquired, but most of them are acquired.

4. Phrygian cap gall bladder:

Phrygian cap gall bladder is a folding-over of the gall bladder fundus.

5. Enlarged Hertmann's pouch:

Hartmann's pouch is simply an asymmetrical bulging or ballooning of the infundibulum and the neck of the gall bladder near the point of exist of the cystic duct. It is a congenital condition but it may be of surgical importance during cholecystectomy if it contains an impacted stone or if it is unduly large and firmly adherent to the cystic or common bile duct or both. The choledochus may be injured leading to a stricture of the common bile duct during liberation of this pouch.

Anomalies of Position:

The finding of a normally formed gall bladder in an abnormal site is very rare but nonetheless important to the surgeon and radiologist. The ectopic gall bladder may be in the following locations:

1. Intrahepatic gall bladder:

The gall bladder is totally embedded in the substance of the liver extending from the porta hepatis superolaterally to the costophrenic angle. When gall stones form in such gall bladder and surgery is recommended, the recommended procedure is not cholecystectomy which would be hazardous but cholecystostomy with evacuation of all calculi. Left-side intrahepatic gall bladder may occur without situs inversus and can cause great diagnostic difficulties.

2. Left-side gall bladder:

The gall bladder lies to the left of the falciform ligament and is partially embedded in the undersurface of the left lobe of the liver. The cystic duct drains into the left hepatic duct or directly into the common hepatic duct.

There are two types of left sided gall bladder:

(i) When the liver and gall bladder are in the left hypochondrum in situs inversus viscerum.

(ii) When there is transposition of the gall bladder to the left in the absence of situs inversus viscerum. In this condition the gall bladder is situated under the left lobe of the liver and to the left of the falciform ligament (Seymour I. Schwartz, 1985).

3. Transverse gall bladder:

The gall bladder lies along the transverse fissure in a more posterior plane than normal. A variation of this anomaly is the transversely lying gall bladder into which both hepatic ducts open and from which the common bile duct arises.

4. Retro displacement of the gall bladder:

The gall bladder passes upwards and backwards to lie under the inferior and posterior surface of theright lobe of the liver.

5. Floating gall bladder:

There are three types of floating gall bladder:

i. The organ is completely invested by peritoneum and possesses no mesentery, in such cases the only attachment between the gall bladder and liver is the cystic duct and cystic artery.

ii. The organ is suspended from the liver by a complete mesentery.

iii. The cystic duct and the neck of the gall bladder have a mesentery in which the cystic artery lies but the fundus and the body are free and ptosed.

This condition is important because of the susceptibility of such a gall bladder to undergo torsion with consequent ischaemia, perforation and biliary peritonitis. (Seymour I. Schwartz, 1985).

6. Other sites:

The gall bladder has been found in the falciform ligament and also embedded in the anterior abdominal wall.

Microanatomical structure of the gall bladder:

The gall bladder is formed of 3 coats:

. The external or serous coat: It is derived from peritoneum, it completely invests the fundus but it covers the body and creeps on the caudal surface.

. The fibromuscular coat: A thin but strong layer forming the framework of the sac. It consists of dense

fibrous tissue, which interfaces in all directions, and is mixed with smooth muscle fibres, disposed chiefly in a longitudinal direction, a few running transversely.

. The internal or mucous coat: Is loosely connected with the fibromuscular layer. It is generally of yellowish-brown colour, and is elevated into minute rugae.

Opposite the neck of the gall bladder the mucous membrane projects inward in the form of oblique ridges or folds, forming a sort of "spiral valve". The mucous membrane is continuous through the hepatic duct with the mucous membrane lining the ducts of the liver and the common bile duct, with the mucous membrane of the duodenum. It is covered with very high columnar epithelium and secretes mucin (McGregor,1984).

In pathological conditions, mucous is secreted by the columnar epithelium itself, the cells becoming goblet cells such as those found throughout the alimentary canal. There is no glands in the gall bladder and so goblet cells are not normally present (R.J. Last, 1984).

Blood supply of the gall bladder:

1. Cystic artery: The main artery to the gall bladder is derived from the right hepatic artery (a branch of the coeliac trunk). Normally the hepatic artery lies to the left of the bile-duct and divides near the liver into right and left branches. The right branch passes behind the