

THE VALUE OF ENDOSCOPIC RETROGRADE  
CHOLANGIOGRAPHY AND PANCREATOGRAPHY IN  
THE INVESTIGATION OF BILIARY SYSTEM

W 9 M



A THESIS PRESENTED

TO

THE FACULTY OF MEDICINE,

AIN-SHAMS UNIVERSITY

IN PARTIAL FULFILLMENT FOR THE  
DEGREE OF M.D. RADIODIAGNOSIS

BY

616. 0757

*Tharwat*  
SARWAT MOHAMED SELIM

*S.M.*

M.B., B.CH., D.S., D.M.R.  
( CAIRO )

M.D

AL 6-1



1 9 8 0



ACKNOWLEDGEMENT

I wish to express my sincere thanks to Prof. A.M. ABOU SINNA , M.D., Prof. and head of department of Radiology, Faculty of Medicine, Ain-Shams University for his supervision and decisive influence on the performance of this work. He gave me a lot of his time, read kindly every word and guided me all the time. I am greatly indebted to him.

I would like also to express my gratitude to Prof. M.S. SALEM, M.D., chief radiologist in the armed forces, Consultant and head of department of Radiodiagnosis Maadi Armed Forces Hospital. He encouraged me, allowed all the facilities to complete the work and was very kind when offering his advice, criticism and views.

I cannot sufficiently express my thanks to Prof. Z.M. ABDULLAH M.D., Assistant professor of Radiodiagnosis, Ain-Shams University, for her great kind help.

I was fortunate to carry out this thesis under the guidance of Prof. MANIALAWY, M.R.C.P., Head of Department of Gastro-enterology, Maadi Armed Forces Hospital. He is a pioneer in the field of endoscopy and one of the best endoscopist in our country. He examined kindly all of our patients and helped so much through his unlimited experience.



My thanks to dear colleague Dr. G. ELSHEHABY, for his great effort in performing the photographic part of this work.

Finally, thanks to every body who gave me a hand whatever simple to finish this work.

SARWAT MOHAMMED SELIM

(1980)

C O N T E N T S

	<u>Page</u>
. INTRODUCTION AND AIM OF WORK	
. ANATOMY OF THE BILIARY SYSTEM AND PANCREAS.	1
. PATHO - PHYSIOLOGY	14
. MATERIAL AND METHODS	24
. RESULTS	36
. DISCUSSION	68
. SUMMARY	89
. REFERENCES	92
. ARABIC SUMMARY	

INTRODUCTION AND AIM OF WORK

Radiographic evaluation of patients with jaundice has long provided a source of trouble to physicians and radiologists.

With raised levels of serum bilirubin, the conventional radiologic techniques usually fail to visualise the biliary system.

As well, it was suggested that no case of undiagnosed jaundice should be operated on for at least two weeks after the symptoms presented. However, jaundice of unknown cause persisting for more than six weeks has been considered to require laparotomy. This delay inevitably causes great harm to the patient and makes surgical intervention more dangerous. Irreversible liver failure may also be precipitated by surgical intervention on patients with hepatitis, and the post operative mortality in jaundiced cases is relatively high and directly related to the degree of jaundice.

Radio - active isotope scanning was used in distinguishing between obstructive and non obstructive jaundice, but the scan may not indicate the level of obstruction as it provides no anatomical detail and consequently cannot indicate the cause of obstructive jaundice.

Biochemical tests may produce equivocal results and fail to differentiate decisively between obstructive and non obstructive jaundice.

Accordingly it is obvious that clinical assessment, biochemical investigation and conventional radiological examinations may fail to solve completely the diagnostic problems of many patients with pancreatic and biliary diseases.

The pancreas as well is an organ which is not readily accessible, and therefore difficult to assess for diagnostic measures of disease.

The great advances introduced on fiber-optic endoscopy by the Japanese and others had opened a new wide field for investigating biliary and pancreatic diseases.

This work was carried out for the first time in EGYPT aiming to solve diagnostic problems met with in jaundiced patients and to demonstrate the value of endoscopic retrograde cholangiography and pancreatography in investigating the biliary system.

-----

7

ANATOMY OF THE BILIARY SYSTEM  
AND PANCREAS

## THE DUODENUM:

It is the shortest, widest and most fixed part of the small intestine; it has no mesentry, and is only partially covered with peritoneum. Its course present a remarkably constant curve, somewhat of the shape of an incomplete circle, which encloses the head of the pancreas. It begins at the pylorus, passes backwards, upwards and to the right for 2.5 cm., under cover of the quadrate lobe of the liver, to the neck of the gall-bladder; varying slightly in direction according to the degree of distension of the stomach; it then makes a sharp curve (superior duodenal flexure) and descends for about 7.5 cm. in front of the medial part of the right kidney, generally to the level of the lower border of the body of the third lumbar vertebra. Here it makes a second bend (inferior duodenal flexure), and passes almost horizontally from right to left across the vertebral column having a slight inclination upwards; it then ascends in front, or to the left, of the abdominal aorta for about 2.5 cm., and ends apposite the second lumbar vertebra in the jejunum. At its junction with the jejunum, it turns abruptly forwards, forming the duodenojejunal flexure. For descriptive purposes it is divided into first, second, third and fourth parts.

The first part is about 5 cm. long, and is the most movable of the four portions; it begins at the pylorus, and ends at the neck of the gall-bladder. It is in relation above and in front with the quadrate lobe of the liver and the gall-bladder; behind, with the gastroduodenal artery, the bile duct and the portal vein, and below and behind, with the head and neck of the pancreas. The second part, from 8 cm. to 10 cm. long, descends from the neck of the gall-bladder along the right side of the vertebral column. It is in relation, in front, from above downwards, with the duodenal impression on the right lobe of the liver, the transverse colon and the root of the transverse mesocolon, and the small intestine; behind, it has a variable relation to the front of the right kidney in the neighbourhood of its hilum. Its medial side is related to the head of the pancreas and the bile duct. Sometimes a small part of the head of the pancreas is actually embedded in the wall of the second part of the duodenum. The bile duct and the pancreatic duct come into contact at the medial side of this part of the duodenum. The two ducts enter the wall of the gut obliquely and there unite to form a short, dilated duct which is named the ampulla of the bile duct. The narrow, distal end of this ampulla opens on the summit of a papilla, termed the duodenal papilla, which is situated within the second part of

the duodenum at the junction of its medial and posterior walls, from 8 cm. to 10 cm. distal to the pylorus. The accessory pancreatic duct, when present, opens about 2cm. proximal to the duodenal papilla.

The third part, about 10 cm. long, begins at the right side of the lower border of the third lumbar vertebra and ends in the fourth part in front of the abdominal aorta. The upper surface is in relation with the head of the pancreas; the lower with the coils of the jejunum.

The fourth part, about 2.5 cm. long, ascends on or immediately to the left of the aorta, as far as the level of the upper border of the second lumbar vertebra, where it turns abruptly forwards (duodenojejunal flexure) and is continuous with the jejunum. Above, it is related to the body of the pancreas.

With the exception of the first part, which possesses a range of movement, the rest is relatively fixed, and is bound down to the neighbouring viscera and the posterior abdominal wall.

Vessels and Nerves of Duodenum:

The superior part receives small branches from the hepatic (supraduodenal), right gastric, right gastroepiploic, and gastroduodenal (retroduodenal) arteries. In most cases these are small, anastomose poorly with each other, and are said not to anastomose across the pylorus with the gastric vessels. The remainder of the duodenum is supplied by the superior and inferior pancreaticoduodenal arteries. These anastomose with each other and form arcades anterior and posterior to the head of the pancreas on the duodenum. The lymph vessels drain to nodes that lie between the duodenum and pancreas. These send efferent vessels to nodes around the origin of the coeliac trunk and the superior mesenteric artery. The nerves reach the duodenum on the arteries, and originate in the coeliac and superior mesenteric plexus.

The Excretory System of the Liver

The excretory system of the liver consists of (1) the common hepatic duct, formed by the junction of the right and left hepatic ducts, which leave the liver at the porta hepatis; (2) the gall-bladder, which serves as a reservoir for the bile; (3) the cystic duct, and (4) the bile duct,

formed by the union of the common hepatic and cystic ducts.

The common hepatic duct:

Two main ducts (right and left hepatic) issue from the liver and unite near the right end of the porta hepatis to form the common hepatic duct, which passes downwards for about 3 cm., and is joined on its right side and at an acute angle by the cystic duct forming the bile - duct.

The gall-bladder is a conical or pear-shaped sac lodged in a fossa on the under surface of the right lobe of the liver and extending from near the right extremity of the porta hepatis to the inferior border of the liver. Its upper surface is attached to the liver by connective tissue; its under surface and sides are covered with peritoneum continued from the surface of the liver. Occasionally, it is completely invested with peritoneum and may be connected to the liver by a short mesentery. It is from 7 cm. to 10 cm. long, 3 cm. broad at its widest part, and holds from 30 cc. to 60cc. It is divided into a fundus, body and neck.

The fundus, or expanded end, is directed downwards, forwards and to the right. It projects beyond the inferior border of the liver, and comes into relationship with the posterior surface of the anterior abdominal wall below the

ninth right costal cartilage, and behind the point where the lateral edge of the right Rectus abdominis crosses the costal margin; posteriorly the fundus is in relation with the transverse colon, near its commencement. It is entirely covered with peritoneum. The body is directed upwards, backwards and to the left; near the right end of the porta hepatis, it is continuous with the neck. It is in relation by its upper surface, with the liver; by its under surface with the commencement of the transverse colon; and farther back with the first part of the duodenum and the upper end of the second part. The neck is narrow; it curves upwards and forwards, and then, turning abruptly backwards and downwards, becomes continuous with the cystic duct; at its point of continuity with the cystic duct there is a constriction. The mucous membrane which lines the neck projects into its lumen in the form of oblique ridges, forming a sort of spiral valve; when the neck is distended, this valve causes the surface of the neck to present a spiral constriction. From the right wall of the neck of the gall-bladder a small pouch may project downwards and backwards towards the duodenum. This pouch, is often termed Hartmann's pouch. When the pouch is well marked, the cystic duct arises from its upper and left wall and not from what appears to be the apex of the gall-bladder.

Vessels and Nerves of gall-bladder:

The gall-bladder is supplied by the cystic artery (from the Rt. hepatic artery) and vein; and its lymph vessels pass to nodes on the cystic duct and in the porta hepatis.

Nerves reach it along the artery from the coeliac plexus (sympathetic), the right vagus (parasympathetic), and the right phrenic nerve (sensory).

The cystic duct, from 3 cm. to 4 cm. long, passes backwards, downwards and to the left from the neck of the gall-bladder, and joins the common hepatic duct to form the bile-duct; it runs parallel with and adheres to the common hepatic duct for a short distance before joining with it. The junction is usually situated immediately below the porta hepatis; but it may be at a considerably lower level. The mucous membrane lining its interior is thrown into a series of crescentic folds, from five to twelve in number, similar to those found in the neck of the gall-bladder. They project into the duct in regular succession, and are directed obliquely round the tube, presenting much the appearance of a crescentic, spiral valve. When the duct is distended, the spaces between