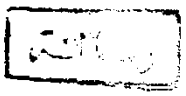
DIAGNOSTIC IMAGING MODALITIES IN VARIABLE PANCREATIC LESIONS



ESSAY

Submitted in partial fulfilment for

Master Degree in **Radiodiagnosis**

By

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1994

(Acknowledgment)

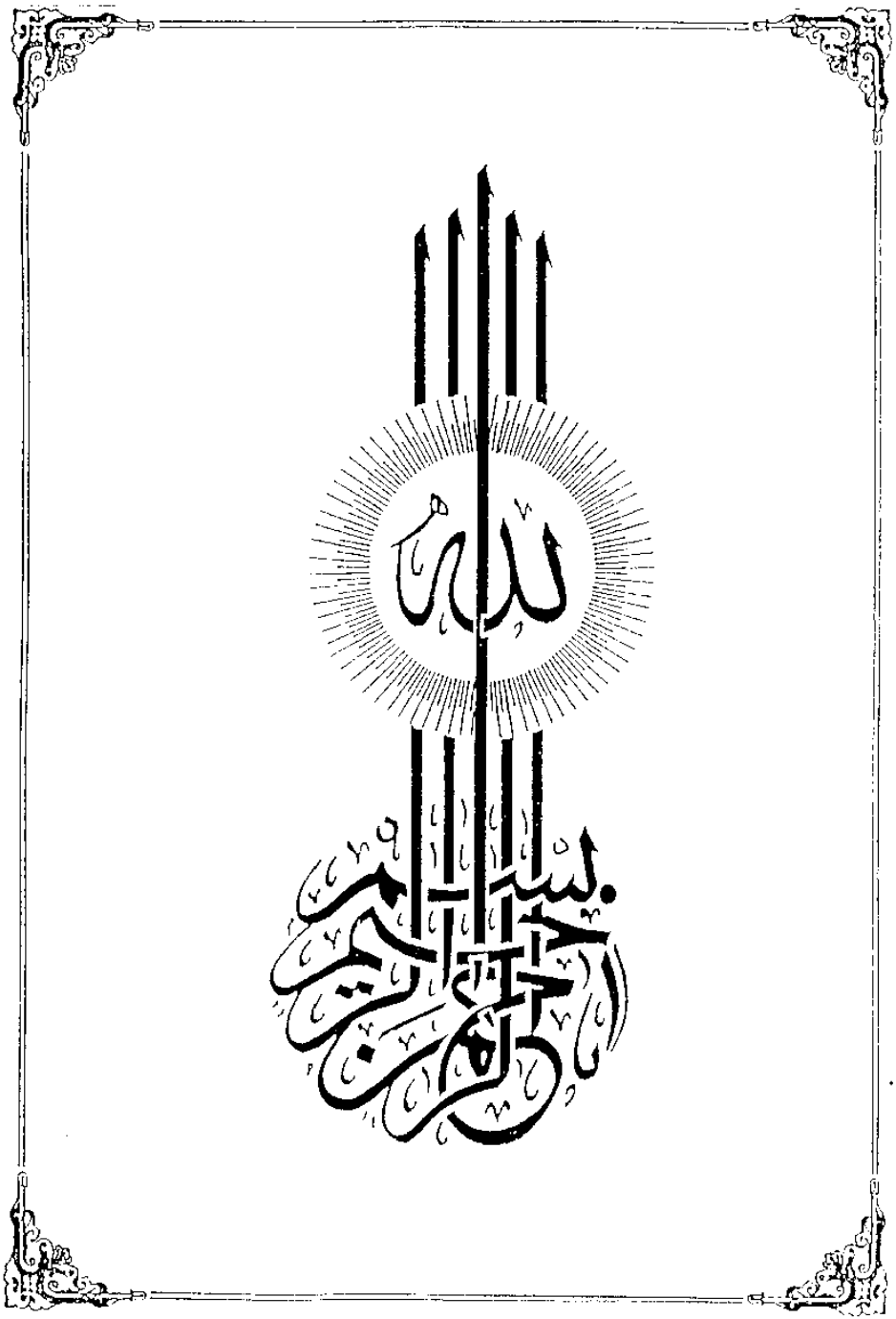
I would like to express my deepest gratitude to my supervisor. **Prof. Dr. Fatma Seddik Mahmoud** . Professor of Radiodiagnosis , faculty of medicine , Ain Shams Universsity for her kind guidance , sincere help , continuous encouragement and careful review of this work .

I am really very grateful and deeply indebted to **Prof. Dr. Zeinab Abdallah** , professor and head of Radiodiagnosis department , Ain Shams University , for her generous help support.

Finaly deep appreciation is expressed to all may professors , teaching staff and colleagues in the Radiodiagnosis Department , Ain Shams University , for their support and kind help .

I herein , offer this work to the members of my family with special imphysis to my beloved great parants and my over understanding devoted wife .

Mohamed El Attar



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. Introduction and Aim of work:

The pancreas is considered as a difficult organ to isualize radiologically. No specific contrast medium could e used for this organ (Lee, et al, 1985).

Methods of investigation which are available for adiological assessment of the pancreas include: plain Abdominal ilm, ERCP, US, CT, Barium study and MRI (David Sutton, 1993).

ERCP was the first effective non-operative pancreatic imaging technique to be introduced into clinical practice (Anthony T.R. Axon, 1989).

U/S and C/T are non-invasive techniques of wide availability that allow direct cross sectional visualization of pancreatic gland (Brooke jeffery, 1989).

MRI has yet to become a first line diagnostic tool for the pancreas. (Murfitt, 1993).

Due to the wide variety of radiological techniques now available, it is important to establish the role of each technique.

The aim of this work is to clarify the diagnostic yeild of each modality and its effectiveness in different panereatic lesions.

Anatomy
Of The Pancreas

ANATOMY OF THE PANCREAS

Developmental Anatomy Of The Pancreas [The Embryolgy]

Knowledge of the embryology is not only of value in the satisfaction of knowing how the adult arrangment comes about , but has the practical advantage of greatly clarifying and understanding the clinical problem , the outcome of the disease and the diagnostic , medical and surgical approach .

The pancreas develops from two outpocktings from the endodermal lining of the gut , these buds arise on opposite sides of the duodenum in embryos of 3 to 4 mm (3weeks) . One pushes out from the dorsal wall , just opposite and cranial to the hepatic diverticulum ; it is the dorsal pancreas .The other , probably originally paired , appears ventrally in the caudal angle between the gut and the hepatic diverticula and consequetly is designated the ventral pancreas . The two primordia meet and unite , producing a joint organ . (Aray , 1974) Fig 1,A .

Grossly the dorsal pancreas forms all of the mature gland except most of the head and the uncinate process which arise from the ventral promordium . (Aray , 1947) Fig. 1,B .

The Ducts - Both pancreatic buds have an axial duct . The dorsal duct arises directly from the dudenal wall , but the base of the ventral duct is carried upward onto the elongating common bile duct and shares a common stem with it . When duodenal torsion brings the two pancreatic primordia side by side , the short ventral duct taps the dorsal duct . (Fig. 1 : C & D)

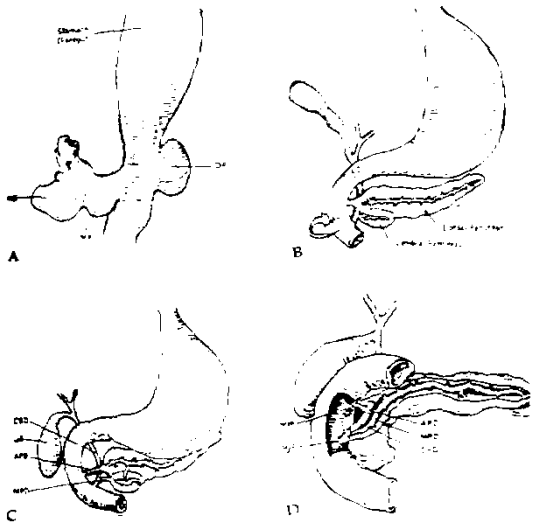

Fig. 1: Diagram of different stages of development of the pancreas till is reaches its mature form

a. Lateral view of the distal stomach and duodenum showing: The dorsal pancreas pointed toward the posterior body wall as it lies in the midline dorsal mesentery. The ventral pancreas and biliary tree lie suspended in the caudal edge of the midline ventral mesentery.

b. Frontal view showing: Rotation and bulging of duodenum to the right to form the C-loop. The common bile duct now lies behind the upper duodenum and the two portions of the pancreas have come into contact.

c. Fusion of the ventral and dorsal pancreas has occurred along with duct anastomosis.

d. The mature relationship of the pancreatic duct and common bile duct. (Quoted from Arey, 1974).

Thereafter the long distal segment of the dorsal duct plus the entire ventral duct will serve as the chief line of drainage . This combined tube is knwn in adult anatomy as the pancreatic duct of Wirsung . The proximal stem segment of the dorsal duct constitutes the accessory duct of santorini . It becomes triburary to the main duct , but it may retain its duodenal outlet as well , (Fig. 1,D)

The occurrence of a permanent common outlet into the duodnum for bile and pancreatic juice is a direct consequence of the close relatioship between the bile and ventral pancreatic ducts. The region of the common outlet is the ampulla of vater which openes at the major duodenal papilla . These joint ducts gain a circular sheath of smooth mucle (sphinter of oddi) in the seventh week . (Gray , 1973)

The Glandular Tissue - secretorey acini begin to appear in the third month as terminal and side buds from the primitive duct. Pancreatic islands of langerhans also are differentiated from the ducts at about the same time . They are composed of distinctive cells , which take the form of single sprouts , but later through growth and union become complex island masses . In all about a million islets are formed some of which retain their original connections with the parent ducts .

No histological distinction exists between the acini of dorsal and ventral pancreatic masses, but probably the pancreatic islands are differentiated only in the dorsal pancreas .

The alpha and beta cells are specialized in the early stage of embryonic development .

Trypsin has been detected at five months and insulin seems to be present still earlier . The mesenchymal bed , in which the gland develops , furnishes a connective tissue capsule and subdivides the organ into lobes and lobules . (Arey , 1974) Fig.(2)

Gross Anatomy Of The Pancreas

The pancreas is a soft , lobulated , greyish - pink gland 12-15cm long , extending transversly across the posterior abdominal wall , behaind the stomach , from the duodenum to the spleen it's broad , right extrenmity . the head , is connected to the main part of the body , by a neck , it's narrow left extremity forms the Tail .

It passes obliquely to the left and slightly upwords , across the posterior abdominal wall in the epigastric and left hypochondriac regions (Gray 1983)

Relations Of The Pancreas (Fig. 2)

*** The Head**

Flattened from before backwards , is sited in the curve of the duodenum. The uncinate process projects from the lower left part of the head of the pancreas , passes upwards and to the left , behind the superior mesentric vessles .

Anterior Surface - the neck arises from the antero superior aspect of the head , passes upwards , forwards and to the left to be continued into the body of the pancreas .

At the neck . There is a groove for gastroduodenal artery anterioly and a deep notch posterioly where the superior mesentric and spleinc veins unite to form the portal vien , below and to the right , the anterior surface of the head is related to the transverse mesocolon and coils of the jejunum .

Posterior Surface

Related to the inferior vena cava , Terminal parts of the renal veins , the right crus of diaphragm and the bile duct which may be embedded in the substance of the head . The uncinate process

pass in front of the aorta . The bile duct lies either in a groove on of the upper and lateral part of the posterior surface of the head the pancreas or in a canal in it's substance .

The Neck (Fig. 3)

It is a constriction , 2 cm long , between the head and the body . It extends upwards , forwards and to the left where it marges imperceptibly into the body .

The anterior surface is coverd with peritoneum and is related to the pylorus , with part of the omental bursa intervening . The gasterodudenal and the anterior superior pancreaticodudenal arteries descend infront of the gland at the right side of the junction of the Neck with the head . The posterior surface is to related the superior mesentric vein and the beginning of the portal vein.

The Body

Almost triangular in section , having three surface anterior , posterior and inferior , separated by 3 borders

A) The anterior surface : is concave directed upwards and forwards , covered with peritoneum and separated from the stomach by the omental bursa .

B) The posterior surface is devoid of peritoneum and is in contact with the aorta and the origin of the superior mesentric artery , the left crus of diaphragm , the left supra - renal gland and the left kidney and its vessels particularly the left renal vien . It is related to the splenic vein which passes from left to right and separate it from the above mentioned structures .

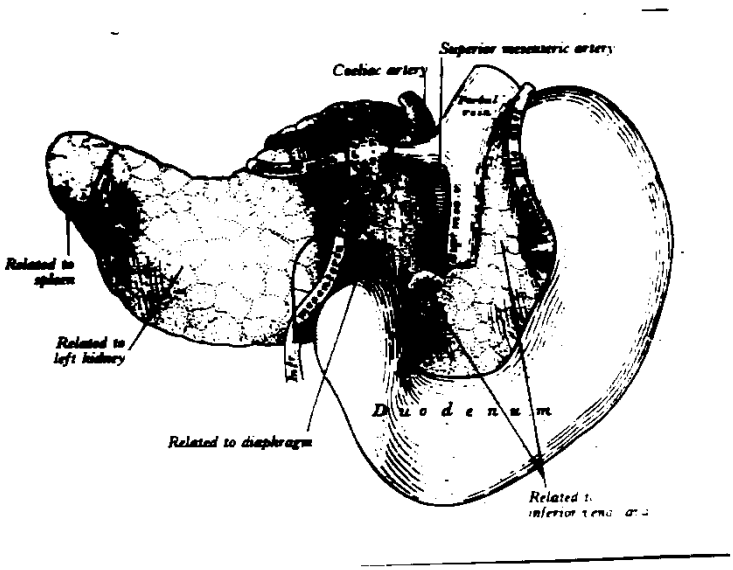

Fig. 3: Posterior aspect of the pancreas and duodenum from behind (Quoted from Meschan, 1976).

C) The inferior surface : coverd by the posterior inferior layer of the transverse mesocolon , related to the duodenojejunal flexure , coils of the jejunum and the left colic flexure .

* The superior Border : Blunt and flat to the right sharp and narrow to the left near the tail , it has an omental tuberosity on the stomach and is in contact with the posterior surface of the lesser omentum and the coeliac trunk from which the common hepatic artery courses to the right , just above the gland , while the splinc artery runs towards the left following a way along this border .

* Anterior Border : Between the anterior and the inferior surfaces , along this , border the two layers of the Transverse mesocolon diverge from each other , one passing upwards over the anterior surface , the other backwards over the inferior surface.

* The inferior Border : Between the posterior and inferior surfaces . The superior mesentric vesseles emerge under it's right extremity .

The Tail

It is the narrow end of the gland . It lies in contact with the inferior part of the gastric impression of the spleen . It is contained within the two layers of the leinorenal ligament together with the splenic vessles , to which it is closely related .

The Main Pancreatic Duct (Fig. 4)

Transvers the pancreas from left to right , lying nearer to its posterior than its anterior surface .