INTRODUCTION

Acute pancreatitis (AP) is a local inflammatory process involving the patterns with variable local complications (pancreatic necrosis, pseudocyst, and pancreatic abscess) and systematic manifestations (organ failure). In about 80% of cases, AP is a mild self-limiting disease characterized by minimal local and systemic effects and an uneventful recovery. In 15% to 20% of cases, severe AP develops that is accompanied by an exaggerated systemic response characterized by release of inflammatory cytokines and other mediators, also known as the systemic inflammatory response syndrome (SIRS) ***(Bhatia et al., 2005).***

Acute pancreatitis results from the premature activation of proteolytic digestive enzymes within the pancreatic acinar cells, resulting in autodigestion and a severe local and systemic cytokine-generated inflammatory response ***(Abou-Assi and O'Keefe, 2001).***

The two major causes of AP are biliary calculi, which occur in 50%-70% of patients, and alcohol abuse which account for 25%. The remaining cases may be due to rare causes as (idiopathic, drug induced, hyper parathyroidism, autoimmune, pot-ERCP) ***(Chang et al., 2003).***

Acute pancreatitis could be diagnosed:

- Clinically: pain is usually the cardinal symptoms, the pain is agonizing, refractory to usual doses of analgesics, radiating to the back in 50% of patients.
- Laboratory: Serum amylase, lipase could helpful.
- Imaging devices: Ultrasound, pelviabdominal computerized tomography, magnetic resonance image.

(Satyajet et al., 2008)

In patients with clinically severe disease, imaging provides a significant contribution to the diagnosis and identification of local complications and serves as a guide for therapeutic interventions. Conversely, imaging plays only a limited role in patients with mild disease ***(Mofidi et al., 2006).***

Acute pancreatitis could be managed

Conservative: *by:*

- Antibiotic prophylaxes
- Fluid resuscitation
- Nutritional support: comparing enteral nutrition (EN) with parenteral nutrition (PN) have shown that enteral feeding is better than PN or equally effective, is cheaper, and has fewer complications. Enteral

nutrition (EN) is important in restoring and, if provided early, probably preventing morphologic changes in the intestine. However, the ideal route for EN still remains to be established ***(Eatock et al., 2005).***

Surgical:

Pancreatic debridement or drainage in patients with infected pancreatic necrosis and/or abscess confirmed by radiologic evidence of gas or results of fine needle aspirate. The gold standard for achieving this goal is open operative debridement. Minimally invasive technique including laparoscopic and/or percutaneous interventions might be effective in selected patients. Wherever possible, operative necrosectomy and/or drainage may be delayed at least 2 to 3 weeks to allow for demarcation of the necrotic pancreas ***(Thunher et al., 2001).***

Acute pancreatitis (AP) is a potentially lethal disease, especially in its severe form, which accounts for approximately 20% of cases in patients hospitalized with AP. Mortality in severe disease varies from 10% to 20% ***(Kumar et al., 2006).***

AIM OF THE WORK

The aim of this study is to discuss possible causes diagnostic modalities and recent lines of management of acute pancreatitis.

ANATOMY OF THE PANCREAS

The name of Panc is derived from the Grek "Pan" (all) and "Kreas" (Flesh). It was originally though to act as a cushion for the stomach ***(Satyajet et al., 2008).***

Anatomy of pancreas

Introduction

The pancreas is salmon pink in colour with a firm, lobulated smooth surface. The main portion of the pancreas is divided into four parts head, neck, body and tail and it possess one accessory lobe (the uncinate process) ***(Susan et al., 2005)***.

In adults the pancreas measures between 12 and 15 cm long and is shaped as a flattened tongue of tissue, thicker at its medial end (head) and thinner towards the lateral end (tail) ***(Harlod et al., 2005)***.

With age, the amount of exocrine tissue tends to decline, as does the amount of fatty connective tissue within the substance of the gland, and this leads to a progressive thinning atrophy which is particularly noticeable on CT third parts of the duodenum ***(Neil et al., 2005).***

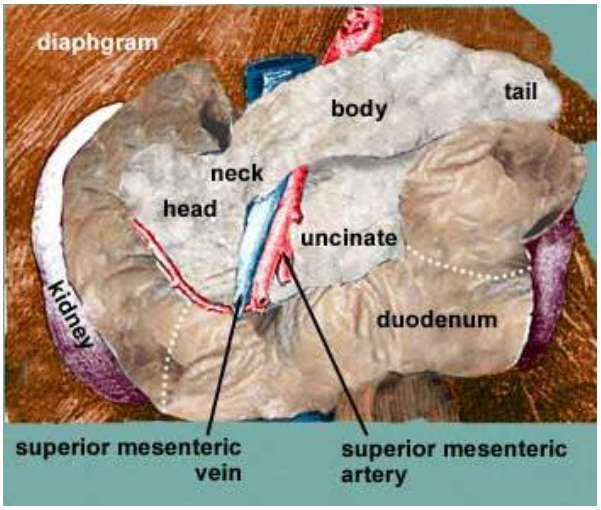

Figure (1): Anatomy of the Pancreas

a) Head of the pancreas

The head of the pancreas lies to the right of the midline, anterior and to the right side of the vertebral column. It is the thickest and broadest part of the pancreas but is still flattened in the anteroposteiror plane. It lies within the curve of the duodenum. Superiorly it lies adjacent to the first part of the duodenum but close to the pylorus the duodenum is on a short mesentery, and here the duodenum lies anterior to the upper part of the head ***(Neil et al., 2005).***

Close to the midline, the head is continuous with the neck. The boundary between head and neck is often marked anteriorly by a groove for the gastroduodenal artery and posteriorly by a similar but deeper deep groove containing

the union of the superior mesenteric and splenic veins to form the portal vein ***(David et al., 2005)***.

Anterior surface of the pancreas

The anterior surface of the head is covered in peritoneum and is related to the origin of the transverse mesocolon ***(Neil, 2005)***.

Posterior surface of the pancreas

The posterior surface of the head is related to the inferior vena cava, which ascends behind it and covers almost all of this aspect. It is also related to the right renal vein and the right crus of the diaphragm ***(Neil, 2005)***.

b) Neck of the pancreas

The neck of the pancreas links the head and body. It is often the most anterior portion of the gland. It is defined as that portion of the pancreas which lies anterior to the portal vein, and is closely related to the upper posterior surface. The lower part of the neck lies anterior to the superior mesenteric vein just before the formation of the portal vein. This is important during surgery for pancreatic cancer since malignant involvement of these vessels may make resection impossible ***(Neil et al., 2005)***.

c) Body of the pancreas

The body of the pancreas runs from the left side of the neck to the tail. It is the longest portion of the gland and

becomes progressively thinner and less broad towards the tail. It is slightly triangular in cross section and is described as having three surfaces: anterosuperior, posterior and anteroinferior ***(Andrew et al., 2005)***.

Anterosuperior surface of the pancreas

The anterosuperior surface of the pancreas makes up most of the anterior aspect of the gland close to the neck. Laterally, it narrows and lies slightly more superiorly to share the anterior aspect with the anteroinferior surface. It is covered by peritoneum, which runs anteroinferiorly from the surface of the gland to be continuous with the anterior, ascending layer of the greater omentum. It is separated from the stomach by the lesser sac ***(Neil, 2005)***.

Posterior surface of the pancreas

The posterior surface of the pancreas is devoid of peritoneum. It lies anterior to the aorta and the origin of the superior mesenteric artery, the left crus of the diaphragm, left suprarenal gland and the left kidney and renal vessels, particularly the left renal vein. It is closely related to the splenic vein which runs from left to right forming a shallow groove in the gland. The splenic vein lies between the posterior surface and the other posterior relations. The left kidney is also separated from the posterior surface by perirenal fascia and fat ***(Neil, 2005)***.

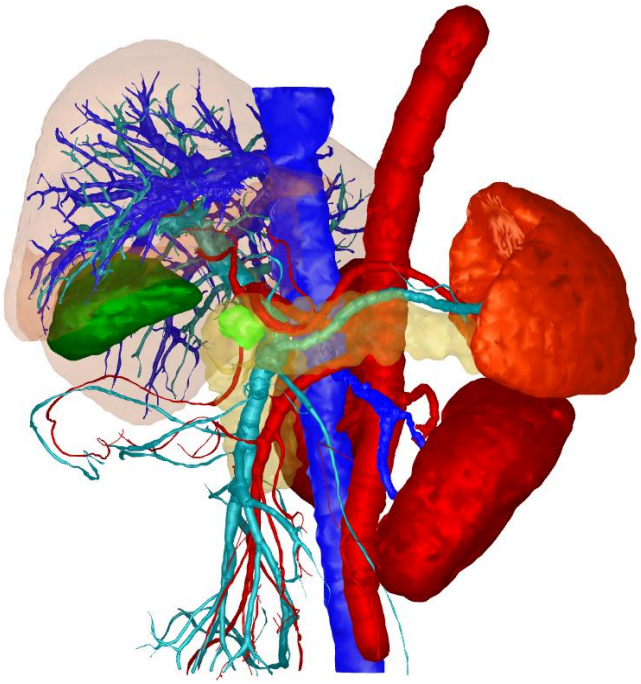

Figure (2): Posterior relations of the pancreas. The posterior surfaces of the pancreas with their relations (viewed from behind).

Anteroinferior surface of the pancreas

The anteroinferior surface of the pancreas begins as a narrow strip just to the left of the neck. As the body runs laterally, it broadens out to form more of the anterior aspect of the body. It is covered by peritoneum which is continuous with that of the posteroinferior layer of the transverse mesocolon. The fourth part of the duodenum, the duodenojejunal flexure and coils of jejunum lie posterior to the splenic flexure ***(Harold et al., 2005)***.

Superior border of the pancreas

On the right side the superior border of the pancreas is initially blunt and somewhat flat. As the gland is followed to the left, the surface changes to become narrower and sharper. An omental tuberosity usually projects from the right end of the superior border above the level of the lesser curvature of the stomach, in contact with the posterior surface of the lesser omentum the superior border is related to the celiac artery. The common hepatic artery runs to the right just above the gland, the splenic artery runs to the left along the superior border ***(Suzan et al., 2005)***.

Anterior border of the pancreas

The anterior border of the pancreas separates the anterosuperior from the anteroinferior surfaces. The two layers of the transverse mesocolon diverge along this border. One passes up over the anterosuperior surface while the other runs downwards and back wards over the anteroinferior surface ***(Neil, 2005)***.

Inferior border of the pancreas

The inferior border of the pancreas separates the posterior from the anteroinferior surfaces. At the medial end of the inferior border, adjacent to the neck of the pancreas, the superior mesenteric vessels emerge from behind the gland. More laterally, the inferior mesenteric vein runs under the border to join the splenic vein on the posterior surface. This is a useful site of identification of the inferior mesenteric vein. During left sided colonic resections and on CT imaging ***(Neil, 2005)***.

d) Tail of the pancreas

The tail of the pancreas is the narrowest, most lateral portion of the gland and lies between the layers of the splenorenal ligament. It is continuous medially with the body and is between 1.5 and 3.5 cm long in adults. It may finish at the base of the splenorenal ligament or extend up nearly as far as the splenic hilum, in which case it is prone to injury at splenectomy during ligation of the splenic vessels. Posterior it is related to the splenic branches of the splenic artery and the splenic vein and its tributaries. The tip of the tail may lie in contact with the splinic hilum ***(Neil, 2005)***.

e) Uncinate process of the pancreas

The uncinate process of the pancreas extends from the inferior lateral end of the head of the gland. It is embryologically separate from the rest of the gland, and as

a consequence of its development it lies posterior to the superior mesenteric vessels. Posteriorly it lies in front of the aorta, and inferiorly it lies on the upper surface of the third part of the duodenum. Tumours of the uncinate process do not cause obstruction to the common bile duct but frequently compress the third part of the duodenum as a result of this close relationship ***(Neil, 2005)***.

f) Pancreatic ducts of the pancreas

The exocrine pancreatic tissue drains into multiple small lobular ducts, which drain into a single main, and usually a single accessory duct ***(David et al., 2005)***.

The main pancreatic duct runs within the substances of the gland from left to right. It tends to lie more towards the posterior than anterior surface. It is formed by the junction of several lobular ducts in the tail. As it runs within the body it increases in caliber as it receives further lobular ducts, which join it almost at right angles to the axis of the main duct to form a herringbone pattern. As it reaches the neck of the gland it usually turns inferiorly and posteriorly towards the bile duct, which lies on its right side. The two ducts enter the wall of the descending part of the duodenum obliquely and unite in a short dilated hepatopancreatic ampulla ***(Neil et al., 2005)***.

A separate accessory pancreatic duct usually drains the lower part of the head and uncinate process. It is much

smaller in caliber than the main duct and forms within the substance of the head from several lobular ducts ***(Andrew et al., 2005)***.

The accessory duct occasionally opens onto a small rounded minor duodenal papilla, which lies about 2 cm anterosuperior to the major papilla. If the duodenal end of the accessory duct fails to develop, the duct drains along the connecting channels into the main duct ***(Andrew et al., 2005)***.

The main and accessory pancreatic ducts demonstrate some variability in their anatomy. Occasionally the accessory duct is absent and the main duct drains the uncinate process directly. The main duct may drain directly into the duodenum and the uncinate process drains via an accessory duct. Rarely the two ducts are conjoined ***(Andrew et al., 2005)***.

Vascular supply and lymphatic drainage of the pancreas

A- Arteries

The pancreas has a rich arterial supply derived from the celiac axis and superior mesenteric arteries via both named vessels and multiple small un-named vessels ***(Neil, 2005)***.

1. Superior pancreaticoduodenal artery

The superior pancreaticoduodenal artery is usually double. The anterior artery is a terminal branch of the gastroduodenal artery and descends in the anterior groove between the second part of the duodenum and head of the pancreas. It supplies branches to the head of the pancreas. It anastomosis with the anterior division of the inferior pancreaticoduodenal artery. The posterior artery is usually a separate branch of the gastroduodenal artery arising at the upper border of the first part of the duodenum. It descends to the right, anterior to the portal vein and common bile duct, where the duct passes behind the first part of the duodenum. The artery runs posterior to the head of the pancreas and then crosses posterior to the common bile duct embedded in the head of the pancreas ***(Neil et al., 2005)***.

2. Inferior pancreaticoduodenal artery

The inferior pancreaticoduodenal artery arises from the superior mesenteric artery or its first jejunal branch, near the superior border of the third part of the duodenum. It usually divides directly into anterior and posterior branches. The anterior branch passes to the right, anterior to the lower border of the head of the pancreas, and runs superiorly to anastomose with the anterior superior pancreaticoduodenal artery. The posterior branch runs posteriorly and superiorly to the right, lying posterior to the

lower border of the head of the pancreas and anastomoses with the posterior superior pancreaticoduodenal artery ***(Neil et al., 2005)***.

3. Pancreatic branches

The pancreas is supplied by numerous small arterial branches which usually run into the gland directly from their arteries of origin. These are particularly numerous in the region of the neck, body and tail. Most originate from the splenic artery as it runs along the superior border of the gland and supply the left part of the body and tail ***(Neil et al., 2005)***.

B- Veins

The venous drainage of the pancreas is primarily into the portal system. The head and neck drian primarily via superior and inferior pancreaticoduodenal veins. The body and tail drain mostly via small veins running directly into the splenic vein along the posterior aspect of the gland or occasionally directly into the portal vein. Small venous channels exist between the gland and the retroperitoneal veins, drainage into the lumbar veins and these may hypertrophy and become clinically significant in cases of portal hypertension ***(Neil, 2005)***.