Acknowledgement

First and foremost, I would thank **ALLAH** the most merciful and helpful who gave me the power to accomplish this work.

I would like to express my deepest gratitude and appreciation to **Prof. Dr. Ibrahim M. Hassanin El-Ghazzawy**, Professor of General Surgery, Faculty of Medicine, Ain-Shams University, for his kind support, advices and great help. I really feel great pleasure for working under his kind supervision.

I am greatly indebted to **Dr. Ahmed Abdel Khalek Ahmed**, Assistant Consultant of General Surgery, Faculty of Medicine, Ain-Shams University, for his kind support, help and encouragement during the progress and finalizing this work. I would like to thank him for spending much of his precious time in fulfillment of this work.

My respectful thanks are for **Dr. Mohammed Ahmed Aamer**, Assistant Proffesor of General Surgery, Faculty of Medicine, Ain-Shams University, for giving me much of his experience and time during performing this study and for his great help and support. I will always be grateful for his assistance.

I would like also to thank all my professors, senior staff and my colleagues and special thanks to my family for their help and cooperation throughout the conduction of this work.

List of Abbreviations

A-aPo_2	: Alveolar-arterial oxygen pressure
AIDS	: Acquired immunodeficiency syndrome
AP	: Acute pancreatitis
APACHE	: Acute physiology and chronic health evaluation
APS	: Acute physiology score
AST	: Aspartate transaminase
BISAP	: Bedside index for severity in acute pancreatitis
BMI	: Body mass index
BP	: Blood pressure
BUN	: Blood urea nitrogen
CBC	: Complete blood count
CBD	: Common bile duct
CCK	: Cholecystokinin
CECT	: Contrast enhanced computed tomography
CRP	: C-reactive protein
CT	: Computed tomography
CTSI	: C T severity index
CVP	: Central venous pressure
DIC	: Disseminated intravascular coagulopathy
EN	: Enteral nutrition
ERCP	: Endoscopic retrograde cholangiopancreatography
ES	: Endoscopic sphincterotomy
EUS	: Endoscopic ultrasound
FNA	: Fine needle aspiration
GI	: Gastrointestinal
GRP	: Gastrin releasing peptide
HU	: Houns field unit
ICU	: Intensive care unit
IL	: Interleukin
IPN	: Infected pancreatic necrosis
IV	: Intravenous
LDH	: Lactate dehydrogenase
LTPD	: Laparoscopic transperitoneal debridement
MOF	: Multi organ failure
MRCP	: Magnetic resonance cholangiopancreatography
MRI	: Magnetic resonance imaging
NPO	: Nothing per mouth
PAF	: Platelet activating factor

PEP	: Post ERCP pancreatitis
PN	: Parenteral nutrition
PO_2	: Partial pressure of oxygen
SAP	: Severe acute pancreatitis
SIRS	: Systemic inflammatory response syndrome
TAP	: Trypsinogen activation peptide
TNF	: Tumor necrosis factor
TPN	: Total parenteral nutrition
TUS	: Transabdominal ultrasound
VIP	: Vasoactive intestinal peptide
VS	: Versus
WBC	: White blood cell count

List of Tables

List of Figures

Page

Introduction

The pancreas is a retroperitoneal organ that lies in an oblique position, sloping upward from the C-loop of the duodenum to the splenic hilum .In an adult, the pancreas weighs 75 - 100 gm and is about 15 - 20 cm long ***(William et al., 2010).***

Acute pancreatitis (AP) is an inflammatory disorder of the pancreas which occurs with an estimated incidence of 10 - 40 per 100 000 person per year in the United Kingdom. Mild acute (oedematous or interstitial) pancreatitis accounts for 80% of cases, is self-limiting and usually resolves with simple supportive management in 3 - 5 days. Severe acute pancreatitis (SAP) accounts for the remainder of cases and was defined by the Atlanta Symposium as acute pancreatitis associated with organ dysfunction or local or regional complications. Most of deaths from SAP result from sepsis and multiorgan failure. Mortality in patients with infected pancreatic necrosis is 25 - 30%, compared with 10 - 12% in those with sterile necrosis ***(Simon and Jonathan, 2008).***

The two major causes of acute pancreatitis are biliary calculi, which occur in 50 - 70% of patients and alcohol abuse which account for 25% patients. The remaining causes include (idiopathic, drug induced, hyperparathyroidism, hyperlipidemia and autoimmune) ***(Chang et al., 2003).***

Acute pancreatitis remains the most common complication of endoscopic retrograde cholangiopancreatography (ERCP). The incidence of post ERCP pancreatitis (PEP) varies from 1% to 40% partly as a result of the definition of PEP ***(Li-Ming et al., 2009).***

Diagnosis of acute pancreatitis is based on the following findings: (1) acute attacks of abdominal pain and tenderness in the epigastric region, (2) elevated blood levels of pancreatic enzymes and (3) abnormal diagnostic imaging findings ***(Manes et al., 2006).***

Symptoms of pancreatitis usually include severe constant epigastric pain radiating to the back and flanks and vomiting. Signs may include pyrexia, abdominal distension and peritonism. The classical signs of discoloration of the flanks (Grey-Turner's sign) and peri-umbilicus (Cullen's sign) are not always seen and are a result of retroperitoneal hemorrhage tracking along tissue planes. In addition, symptoms and signs of end-organ involvement may be evident, including respiratory distress, shock, oliguria, jaundice and delirium. It is also possible for SAP to be painless ***(Simon and Jonathan, 2008).***

Amylase, lipase and trypsinogen are all enzymes derived from pancreatic acinar cells; they can be measured with relative ease. Serum amylase is most commonly used in clinical practice. A level of greater than three times the normal upper range (The Normal Upper Range: 300 IU/litre-1) supports the

diagnosis of pancreatitis. Serum amylase tends to rise quickly in the first 12 h, returning to baseline within 3 - 5 days ***(Srivastava et al., 2005).*** Serum lipase has been recommended as the assay of choice when available. Lipase concentrations are increased for up to 14 days after onset of pancreatitis and appear to be more sensitive and specific than serum amylase ***(Matull et al., 2006).***

Imaging tests available for the diagnosis of acute pancreatitis include transabdominal ultrasound (TUS), endoscopic ultrasound (EUS), Computed tomography (CT) scanning, Magnetic resonance imaging (MRI) and Magnetic resonance cholangiopancreatography (MRCP). Imaging tests are performed for various reasons, including detection of gallstones, detection of biliary obstruction, diagnosis of pancreatitis when the clinical situation is unclear, identification of patients with high risk pancreatitis and detection of complications of pancreatitis ***(Bree et al., 2006).***

Treatment of patients with acute pancreatitis is based on the initial assessment of severity. Early staging is based on the presence and degree of systemic failure and on the presence and extent of pancreatic necrosis ***(Ignjatouic et al., 2004).***

Supportive therapy remains the basis of management with attention to the adequacy of the fluid balance and oxygenation are of prime importance and supportive therapy

may include inotropic support, assisted ventilation and renal dialysis ***(Mason and Siriwardena, 2005).***

Therapeutic endoscopic retrograde cholangiopancreatography with endoscopic sphincterotomy in severe biliary pancreatitis, the use of early antibiotics treatment in necrotizing pancreatitis and the demonstration of enteral feeding are able to decrease the inflammatory response ***(Gurusamy et al, 2005).***

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

Aim of the work

This essay aims to review etiology, pathophysiology of acute pancreatitis and to have focus on recent trends in diagnosis and treatment of acute pancreatitis.

Chapter (1)

Anatomy of the Pancreas

The pancreas is a retroperitoneal organ that lies in an oblique position, sloping upward from the C-loop of the duodenum to the splenic hilum. In an adult, the pancreas weighs 75 - 100 gm and is about 15 - 20 cm long ***(William et al., 2010).***

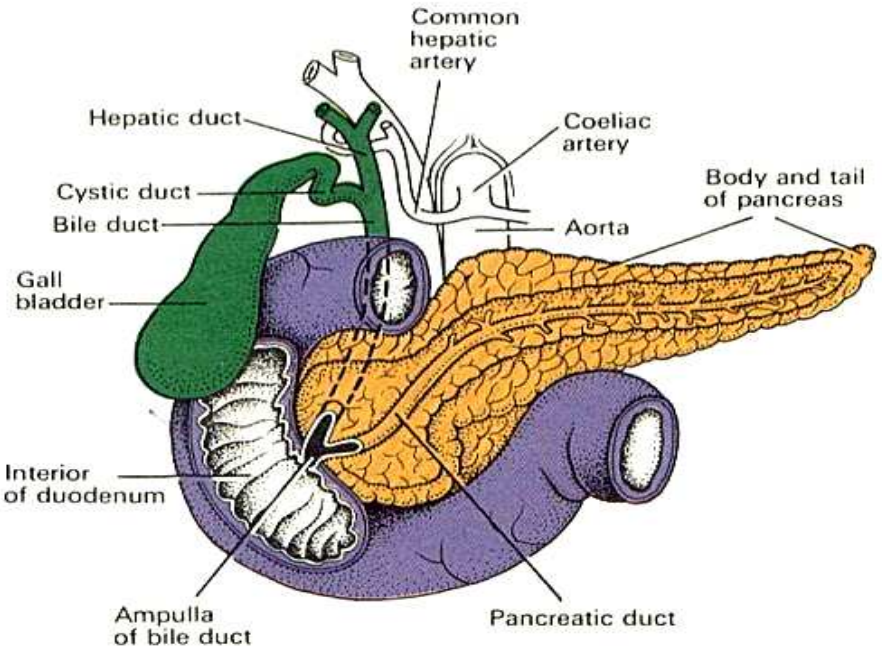

Figure 1: Anatomy of the pancreas ***(Mulholland et al., 2006)***

The pancreas is an elongated, yellow-tan, lobulated, solid organ "figure 1". The anatomical segments of the pancreas are the head, uncinate process, neck, body and tail. The head is encompassed by the duodenum and surround the distal common bile duct. The uncinate process extends from the head posteriorly to lie behind superior mesenteric vein near its union with portal vein. The neck, the narrowest portion of the gland, extends anterior to superior mesenteric vessels and is posterior to the pylorus and first portion of the duodenum. The body continues from the neck obliquely across the retroperitoneum anterior to the first lumbar vertebra. The body merges into the tail, which ends near the hilum of the spleen ***(Mulholland et al., 2006).***

Regions 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. 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 duodenal border of the head is flattened and slightly concave. Occasionally a small part of the head is actually embedded in the wall of the second part of the duodenum. The superior and inferior pancreaticoduodenal arteries lie between the head and the duodenum in this area. The inferior border lies superior to the third part of the duodenum and is continuous with the

uncinate process 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. The anterior surface of the head is covered with peritoneum and is related to the origin of the transverse mesocolon. 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 ***(Jeremiah and Neil, 2008)***.

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. 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 ***(Jeremiah and Neil, 2008)***.

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 and having three borders: Superior border, Anterior border and Inferior border ***(Jeremiah and Neil, 2008)***.

- Anterosuperior surface:

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 "figure 2" ***(Jeremiah and Neil, 2008)***.

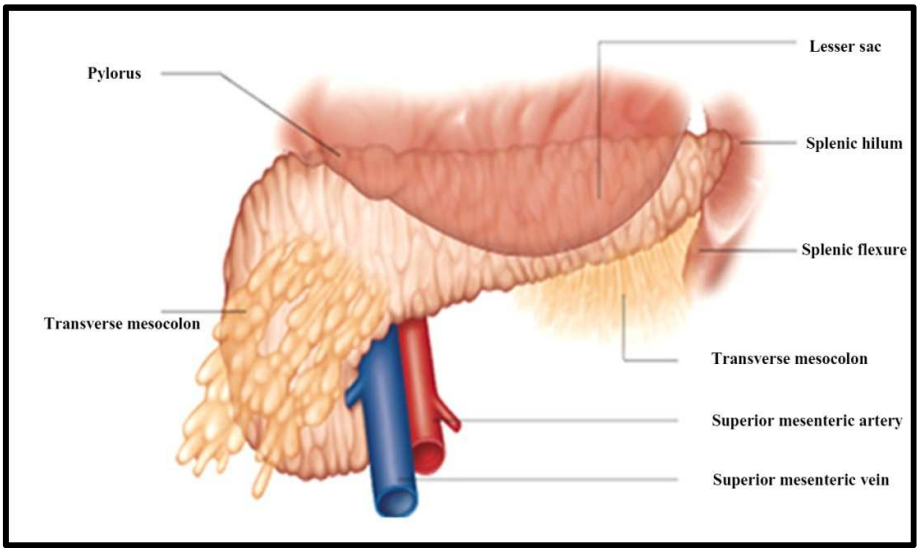

Figure 2: Anterior relations of the pancreas ***(Jeremiah and Neil, 2008).***

- Posterior surface:

The posterior surface of the pancreas is devoid of peritoneum. It lies anterior to the aorta and the origin of the