Intensive Care Management of Acute Pancreatitis and New Predictors of Mortality

An Essay

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By

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List of Abbreviations

ABG ..... Arterial blood gases

ANP ..... Acute necrotizing pancreatitis

AP..... Acute pancreatitis

APACHE II . Acute Physiology and Chronic Health Evaluation)

BISAP ..... Bedside index for severity in Acute Pancreatitis

BUN..... Blood urea nitrogen (BUN

CARP ..... Carboxypeptidase

CCK ..... Cholecystokinin

CRP..... C-reactive protein

CT ..... Computed tomography

DHA ..... Docosahexaenoic acid

EPA ..... Geicosapentaenoic acid

ERCP ..... Endoscopic retrograde cholangiopancreatography

EUS ..... Endoscopic ultrasonography

FNAB ..... Fine needle aspiration for bacteriology

GRP..... Gastrin-releasing peptide

GTN ..... Glyceryl Trinitrate

Hct.....Haematocrit

HGF .....Hepatocyte Growth Factor

HPSTI .....Human Pancreatic Secretory TrypsinInhibitor

ICAM-1.....Intercellular Adhesion Molecule-1

IL-1 .....Inter-leukin-1

IL-6 .....Interleukin-6

IL-8 .....Inter-leukin-8

IR.....Infrared

LDH .....Lactate dehydrogenase

MCP-1.....Monocyte Chemotactic Protein-1

MIC.....Minimum inhibitory concentration

MODS .....Multiple organ dysfunction syndrome

MOF.....Multiple organ failure

MR .....Magnatic Resonance

MRCP .....Magnatic Resonance cholangiopancreatography

MRI.....Magnetic resonance imaging

NPV.....Negative predictive value

NSAIDs .....Nonsteroidal Anti-Inflammatory Drugs

PP .....Pancreatic Polypeptides

PUFA .....Polyunsaturated fatty acid

SIRS ..... Systemic inflammatory response syndrome

SOFA ..... Sepsis-related organ failure assessment

SPINK ..... Serine Protease Inhibitor Kazal Type 1

TAP ..... Trypsinogen activation peptide

TNF ..... Tumor Necrosis Factor

TPN ..... Total parenteral nutrition

VIP ..... Vasoactive intestinal peptide

INTRODUCTION

The pancreas is a glandular organ in the upper abdomen, but really it serves as two glands in one: a digestive exocrine gland and a hormone-producing endocrine gland. Functioning as an exocrine gland, the pancreas excretes enzymes to break down the proteins, lipids, carbohydrates, and nucleic acids in food. Functioning as an endocrine gland, the pancreas secretes the hormones insulin and glucagon to control blood sugar levels throughout the day ***(Sinnatamby et al., 1999)***.

Pancreatitis simply means inflammation of the pancreas, which may be acute (new, short-term) or chronic (ongoing, long-term). Either type can be very severe, even life-threatening. Either type can have serious complications ***(Banks et al., 2012)***.

Severe acute pancreatitis is still an alarming condition, which presents many challenges for Critical Care staff ***(Eland et al., 2000)***. Acute pancreatitis covers a wide clinical spectrum that includes the systemic inflammatory response syndrome (SIRS), sepsis, multiple organ failure (MOF) and death. Patients with acute pancreatitis are typically ill for an extended period and require numerous medical, surgical, radiological and nutritional interventions if they are to survive) ***(Nathens et al., 2004)***.

A multitude of predictive models have been developed to predict the severity of acute pancreatitis (AP) based upon clinical, laboratory, and radiologic risk factors, various severity grading systems, and serum markers ***(Windsor et al., 2000)***.

Over the last two decades advances in supportive therapy of failing organs have enabled most patients to survive the early toxaemic phase of pancreatitis and have decreased the overall mortality rate associated with this disease ***(Watson et al., 2008)***.

AIM OF THE ESSAY

The aim of this essay is to discuss clinical picture, recent guidelines of management, scoring and new predictors of mortality of acute pancreatitis in the intensive care unit.

Chapter (1)
ANATOMY, PHYSIOLOGY AND FUNCTION OF THE PANCREAS

The pancreas is a compound racemose gland, analogous in its structures to the salivary glands, though softer and less compactly arranged than those organs. It is long and irregularly prismatic in shape; its right extremity, being broad, is called the head, and is connected to the main portion of the organ, or body, by a slight constriction, the neck; while its left extremity gradually tapers to form the tail. It is situated transversely across the posterior wall of the abdomen, at the back of the epigastric and left hypochondriac regions. Its length varies from 12. 50 to 15 cm. and its weight from 60 to 100 gm.(Fig. 1) ***(Skandalakis et al., 2006)***.

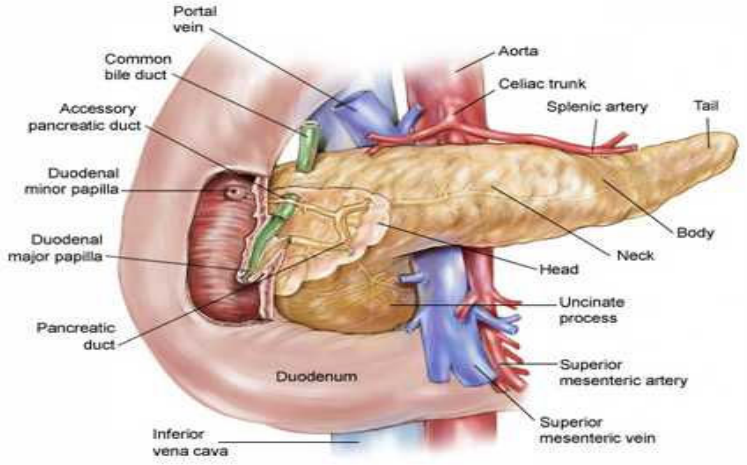

Fig. (1): The pancreas ***(Skandalakis et al., 2006)***

Relations:

The Head is flattened from backward, and is lodged within the curve of the duodenum. Its upper border is overlapped by the superior part of the duodenum and its lower overlaps the horizontal part; it's right and left borders overlap in front, and insinuate themselves behind, the descending and ascending parts of the duodenum respectively. The angle of junction of the lower and left lateral borders forms a prolongation, termed the uncinate process. In the groove between the duodenum and the right lateral and lower borders in front are the anastomosing superior and inferior pancreaticoduodenal arteries; the common bile duct descends behind, close to the right border, to its termination in the descending part of the duodenum ***(Skandalakis et al., 2006)***.

Anterior Surface:

The greater part of the right half of this surface is in contact with the transverse colon, only areolar tissue intervening. From its upper part the neck springs, its right limits being marked by a groove for the gastro duodenal artery. The lower part of the right half, below the transverse colon, is covered by peritoneum continuous with the inferior layer of the transverse mesocolon, and is in contact with the coils of the small intestine. The superior mesenteric artery passes down in front of the left half across the uncinate process; the superior

mesenteric vein runs upward on the right side of the artery and, behind the neck ***(Neil et al., 2008)***.

Posterior Surface:

The posterior surface is in relation with the inferior vena cava. The Neck springs from the right upper portion of the front of the head. It is about 2.5 cm. long, and is directed at first upward and forward, and then upward and to the left to join the body; it is somewhat flattened from above downward and backward. The posterior surface is devoid of peritoneum, and is in contact with the aorta, the lienal vein, the left kidney and its vessels, the left suprarenal gland, the origin of the superior mesenteric artery, and the crura of the diaphragm ***(Susan et al., 2008)***.

Borders of the pancreas

The superior border:

The superior border is blunt and flat to the right; narrow and sharp to the left, near the tail ***(Susan et al., 2008)***.

The anterior border:

Separates the anterior from the inferior surface and along this border the two layers of the transverse mesocolon diverge from one another; one passing upward over the anterior surface, the other backward over the inferior surface.

The inferior border:

Separates the posterior from the inferior surface; the superior mesenteric vessels emerge under its right extremity ***(Susan et al., 2008)***.

The Tail is narrow; it extends to the left as far as the lower part of the gastric surface of the spleen, lying in the phrenicolienal ligament, and it is in contact with the left colic flexure ***(Susan et al., 2008)***.

The Pancreatic Duct extends transversely from left to right through the substance of the pancreas (Fig.2) it commences by the junction of the small ducts of the lobules situated in the tail of the pancreas, and, running from left to right through the body, it receives the ducts of the various lobules composing the gland. Sometimes the pancreatic duct and the common bile duct open separately into the duodenum. Frequently there is an additional duct, which is given off from the pancreatic duct in the neck of the pancreas and opens into the duodenum about 2.5 cm. above the duodenal papilla. It receives the ducts from the lower part of the head, and is known as the accessory pancreatic duct ***(Sinnatamby et al., 1999)***.