PANCREATITIS AFTER BILIARY SURGERY
AETIOLOGY & COMPLICATIONS

THESIS

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BY

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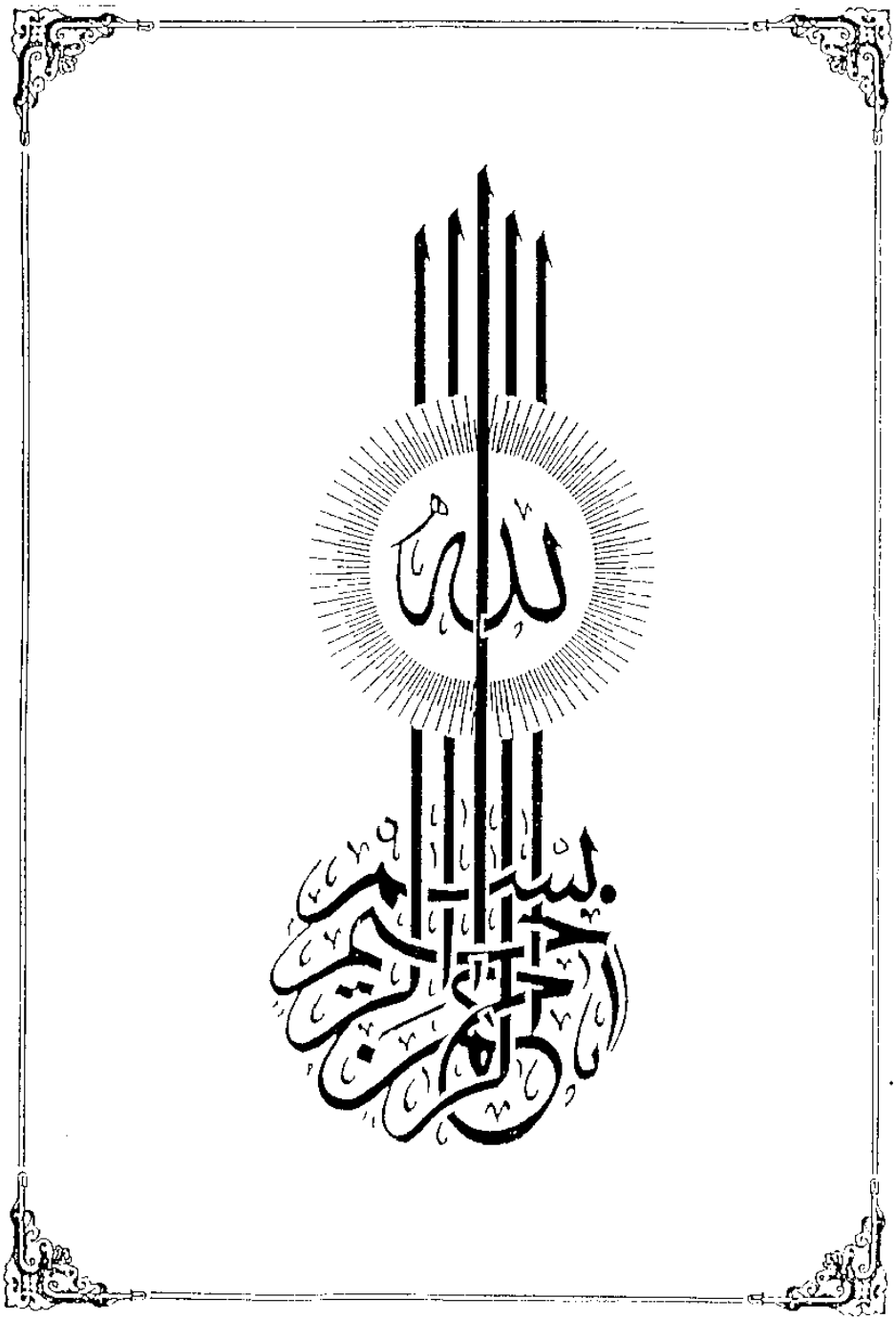

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INTRODUCTION

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Post-operative pancreatitis has been considered a catastrophic and often fatal complication after biliary tract surgery. Several retrospective studies have revealed a high mortality for postoperative acute pancreatitis, especially following procedures to the ampulla of vater.

Much has been written on the aetiology, and complication of pancreatitis after biliary surgery. Great advances have accured recently in the laboratory, radiological and scanning technique. Some of the laters include E.R.CP, intraoperative pancreatography, ultrasonography and C.T.S.

So it has been possible to reach a proper aetiological diagnosis of pancreatitis and its complication and to achieve a valuable management.

This explains the increased incidence of pancreatitis after biliary surgery and the progressive declines in the morbidity and mortality rates.

In the present study pancreatitis after biliary tract surgery and its complication are discussed.

ANATOMICAL RELATIONSHIPES BETWEEN BILIARY AND PANCREATIC PASSAGE

Common bile duct:

Common bile duct is 3 inches long and is best described in three parts.

Its upper third lies in the free edge of lesser omentum in front of portal vien and to the right of hepatic artery.

Its middle third lies behind the first part of the duodenum infront of the inferior vena cava.

The third part slopes down to the right behind the head of the pancreas. It lies in deep groove, sometime in a tunnel on the posterior surface of the pancreas (Last, 1978).

In the majorty of instances the terminal segment of the common bile duct joined in its passage through the submucousa of the second part of duodenum by the main pancreatic duct, giving a common chanal varying in length from 2 to 17 mm called the ampulla of Vater (Maingot, 1980).

Pancreatic Duct:

The pancreatic duct is a continuous tube leading from the tail to the head gradually increasing in diameter as it recieved delicate tributaries. It drains the tail, body, neck and upper part of the head of the pancreas.

The accessory pancreatic duct drains the uncinat process and the lower part of the head of the pancreas and crosses the main

pancreatic duct to open in the duodenum at a small papilla situated 2 cm proximal to the duodenal papilla (Last, 1978).The rule is that both are present and they anastomosis with one another near the neck of the gland in 90% of individuals. The duct of Santorini opens into the second part of duodenum 3.5 cm of the pylorus at a higher level than duct of Wirsung. (Within 5-6 cm of pylorus), which is usually (in over 85% of subject) the larger of the two.

However the duct of Santorini may be quite seperate and larger (in 6% to 10% of cases). In exceptional cases the duct of Wirsung may be obliterated near its termination in which event the common bile duct and the duct of Santorini open by seperat orifices into the duodenum. There are cases in which the duct of Santorini did not communicat with the duodenum (Maingot, 1980).

Rienhoff and Pickrell, (1945) examined the pancreas of 250 adults, both fresh and fixed specimens. In 73 specimens there was no junction between the pancreatic duct and the common bile duct. In 92 specimens the pancreatic duct and the cholodechus were continuous, and the dividing septum end 1-2 mm from the apex of their common orifices. In this group a true ampulla was not present. In 81 instances a true ampulla was present (Maingot, 1980).

The circular muscle around the lower part of the bile duct including the ampulla and the terminal part of the main pancreatic duct is thickened and is called the sphincter of Oddi. The latter

comprises sphincteric musculator at three levels. A-around the lower part of bile, B-sphincter pancreaticas and C-around the ampulla (Maingot, 1980).

Mc Minn and Kugler, 1956 reported that it has been maintained that there is not sphincteric arrangement of musculator around the bile and pancreatic duct into the duodenum, but that the sphincter of Oddi surrounded the bile duct as it passes through the submucous zone of the duodenum wall and is continuous with circular muscle coat of the duodenum which is thickened at this site (Warwick and Willion, 1973).

However subsequent studies suggest strongly that man and other primates has a common sphincteric mechanism surrounding both ducts and that the common bile duct has a second sphincter of the type described above (Warwick and William, 1973).

The terminal part of the united bile and pancreatic duct is packed with villous valvular fold of the mucous membran and the muscle fibres extend into the connective tissue cores of these foldy. Contraction of muscle fibres lead to aggregation of these folds, thus preventing reflux of the duodenal content into the duct (Warwick and William, 1973).

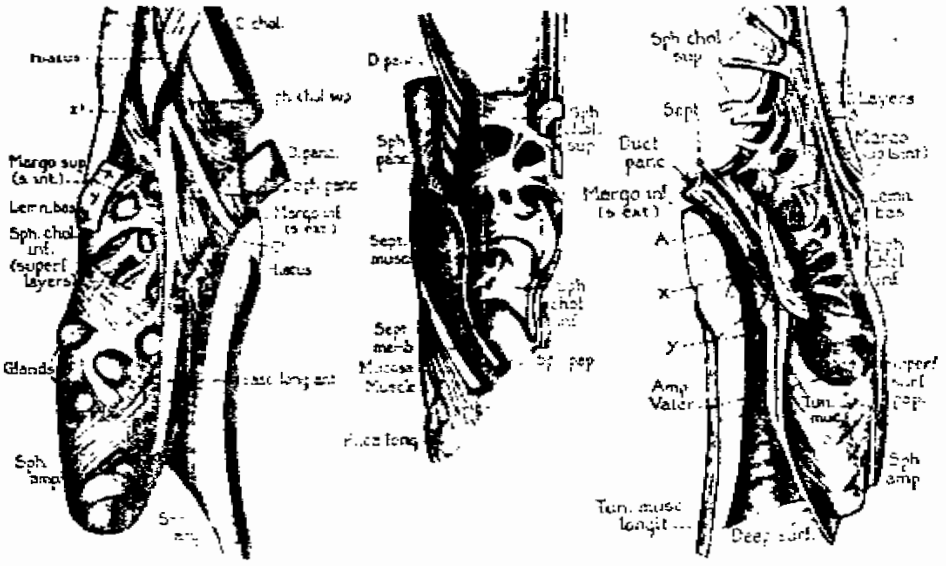

Fig.(I): ***A) Anterior view of choledochoduodenal junction with tunica mucosa removed. Marge sup. and inf., margins of slit in longitudinal muscle of gut. The anterior longitudinal fascicle and fibers connecting the ducts to the gut wall are most conspicuous in views of the surface of the papilla. Yet outer layers of the sphincters are visible. To see the principal bundles of the sphincter choledochus, it is necessary to split the papilla lengthwise and dig out the mucosa of the ducts. B) Bisected papilla of type in which the ducts empty separately. C) Bisected papilla of type in which the ducts empty into an ampulla of Vater. (Surgical Anatomy)(Mcvay C.B. and Anson B.J. 1971 Fifth edition; chapter 15, Page 612 W.B. Sauwder company Philadelphia London Toronto. Igaku Shoin L.T.D. Tokyo).***

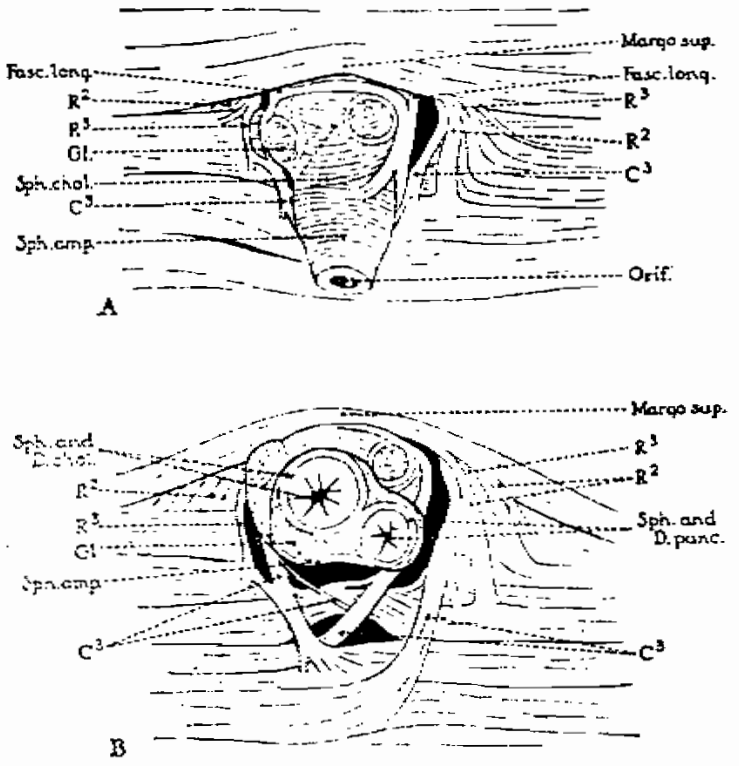

Fig. (II): A) Papilla lying in natural position after removal of mucosa. B) Papilla- elevated, with distal half snipped off, to show underlyign fibers and the relation of sphincters to ducts. Abbreviations: Gl., glandular masses exposed by maceration and dissection; C^2 and R^2, R^3, bands of "connecting" and reinforcing" fibers; Sph. amp. beginning of sphincter ampullae. (Surgical Anatomy) (Mcvay C.B. and A Nson B.J. 1971 Fifth edition; Chapter. 15 page 613 W.B. Saunder company/Philadelphia, London Toronto. IGAKU Shoin L.T.D/ Tokcy).

PHYSIOLOGY OF THE PANCREAS

The external secretion of the pancreas is alkalin in reaction. It is about 1-2 liters per day.

It consists of enzymes Trypsin, chemotrypsin, procarboxy-peptidase A and B, elastase, ribonuclase, deoxyribonuclease, phospholipase, pancreatic lipase and pancreatic amylase. Also it contains cations, Na^{+}, Ca^{++}, *and* Mg^{+}. *Anions as* Hco_3^- Cl^- SO_4^- HPo_4^{--} *also albumin and lecithin (Ganong, 1977).*

These enzymes are proteolytic, lipolytic and amylolytic. The proteolytic and phospholipase are secreted in inactive form which are activated by enterokinase and trypsin respectively. The release of small amount of trypsin into the pancreas lead to chain of reactions which would produce active enzymes capable of digesting the pancreas. Lysolecithin produces damage to cell membran. In acute pancreatitis there is evidence of activation of phospholipase in pancreatic duct with formation of lysolecithin which damage the cell membran and release of proteolytic enzymes (Ganong, 1977).

Three mechanisms prevent autodigestion of the pancreas by its proteolytic enzymes, the enzymes are stored in acinar cell as zymogen granules, the enzymes are secreted in an inactive form and the present of enzyme inhibitor e.g trypsin inhibitor (Reber and Way, 1981).

The endocrin portion of pancreas which represented by the islands of Langerhans secret insulin, glucagon and somatostatin.

Insulin is a polypeptide consisting of 51 amino acid residues. It is secreted by B cell as proinsulin. Its secretion is stimulated by rising or high serum amino acid, glucose and perhapes short chain fatty acid. Cholecystokinin vasoactive intestinal polypeptid and gastrin all of these sensitize the receptor to glucose (Ganong, 1977).

Insulin has not effect on exocrin function. But rather appear to be atrophic hormone for pancreatic acinar tissue.

Atrophy fibrosis and abnormal response of the exocrin pancreatic tissue appear in diabetes (Eliott, 1973).

Glucagon is a polypeptide containing 29 amino acid, secreted by the A cell of the pancreas, stimulat by low glucose level, amino acid, caticolamin, sympathetic discharge and cholecystokinin and suppressed by hyperglycemi and insulin. It inhibit pancreatic water and bicarbonate and enzyme secretion(Dyck, 1971).

The water and electrolytes secretion is formed by the centro-acinar cell and the intercalated duct. It is an active process. The concentration of Na^+ *and* K^+ *as that of plasma while* HCo_3^- *and* Cl^- *vary in concentration according to the rate of secretion with increase rate bicarbonate increase while chlorid decrease (Reber and Way, 1981).*

The secretion of pancreatic juice is under hormonal and neuronal control. Cholecystokinin hormon and secretin hormon secreted by the mucous gland of the duodenum. Secretin hormon causes copious

secretion of a very alkaline pancreatic juice poor in enzymes. Cholecystokinine causes secretion of pancreatic juice rich in enzymes (Ganong, 1977).

Its secretion is stimulated by acetylcholin vagal stimulation and protein product (Ganong, 1977).

Somatostatin is a tetrapeptid, that contain disulphid bridge. It inhibit insulin and glucagon secretion. It also considered as growth hormon inhibitory factor. It regulate synoptic transmision (Ganong, 1977).

MACROSCOPIC PANCREATIC CHANGES IN CASES OF ACUTE PANCREATITIS

The gland is oedematous with varying degrees of inflammation, necrosis and haemorrhage that can be seen macroscopicically and histologically (Douchier, 1980).

The oedema may produce rather glassy appearance and the damage may be localised or generalised. Areas of fat necrosis are recognised as yellow waxy areas usually present in the gland or the lesser sac and omentum, but occasionally the fat necrosis is wide spread and is found on the parietal and visceral peritoneum (Douchier, 1980).

Acute pancreatitis is easly recognized by areas of blue black haemorrhages interspread with area of grey white chalky fat necrosis (Robbin et al., 1981).

Abdominal cavity may contain fluid in which globules of oil can be identified (Robbin et al., 1981).