Outcome of Pancreatic Anastomosis after Whipple's Operation, a Cohort Study

Thesis
Submitted for partial fulfillment of the M.D. degree
in General Surgery

By
Sameh Hamdy Abd El Alim Awad
M.B.B.CH., MS General Surgery
Ain Shams University

Supervised by

Prof. Dr./ Fateen Abd El Moniem Anous
Professor of General Surgery
Faculty of Medicine - Ain Shams University

Prof. Dr./ Abdel Ghani Mahmoud Elshami
Professor of General Surgery
Faculty of Medicine - Ain Shams University

Prof. Dr./ Mohamed Kandeel Abd El Fattah
Professor of General Surgery
Faculty of Medicine - Ain Shams University

Dr./ Hani Mohamed El Barbari
Assistant Professor of General Surgery
Faculty of Medicine - Ain Shams University

Faculty of Medicine
Ain Shams University
2014


قَالُوا سُبْحَانَكَ
لاَ عِلْمَ لَنَا
إِلاَّ مَا عَلَّمْتَنَا
إِنَّكَ أَنتَ
الْعَلِيمُ الْحَكِيمُ
صدق الله العظيم
سورة البقرة الآية (32)

Acknowledgment

First, I would like to thank Allah *the merciful and compassionate for making all this work possible and for granting me with the best teachers, family, friends, and colleagues that many people would wish and dream of having.*

I am honored to have Prof. Dr. Faten Abd el Moniem Anous*, Professor of General Surgery, Faculty of Medicine, Ain Shams University, as a supervisor of this work. I am greatly indebted to her for his kind guidance and patience.*

I am honored to have Prof. Dr. Abdel Ghani Elshami*, Professor of General Surgery, Faculty of Medicine, Ain Shams University, as a supervisor of this work. I am greatly indebted to her for his kind guidance and patience.*

I am deeply thankful to Prof. Dr. Mohamed Abd el Fatah Kandel*, Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his great help and effort to make this work possible. I was honored to work with her.*

Words can not express my deep gratitude and sincere appreciation to Dr. Hani Mohamed el Barbari*, Lecturer of General Surgery, Faculty of Medicine, Ain Shams University, who assisted me in most of the work. I am greatly grateful for his generous help, kind advice, and kind guidance.*

Furthermore I would like to convey my special thanks to all my staff members, my colleagues and last but not least my wonderful family.

List of Contents

Page

List of abbreviations

ACTH	Adreno cortico trophic hormone
AIPD	Anterior inferior pancreaticoduedenal
APUD	Amine precursor uptake and decarboxylase
ASPD	Anterior superior pancreaticoduedenal
C amp	Cyclic adenosine monophosphate
C gmp	Cyclic guanosine monophosphase
CBD	Common bile duct
CCK	Cholecystokinin
CHA	Common hepatic artery
DP	Dorsal Pancreatic
ERCP	Endoscopic retrograde cholangiopancreatography
G cells	Gastrin cells
Gda	Gastroduodenal artery
GIT	Gastrointestinal tract
ICU	Intensive Care Unit
IgM	Immunoglobulin m
Kg	Kilograms
L/d	Liter per day
M receptors	muscarinic receptors

mg/dL	Milligram per deciliter
MMC	Migrating motor complex
MR	Magnetic resonance
MRI	Magnetic resonance image
MSH	Melanocyte stimulating hormone
NPY	Neuropeptide Y
PIPD	Posterior inferior pancreaticoduedenal
PM	Pancreatic Magna
PP	Pancreatic polypeptide
PPPD	Pylorus preserving pancreaticoduodenectomy
PSPD	Posterior superior pancreaticoduedenal
PV	Portal vein
PYY	Peptide YY
SMA	Superior mesenteric artery
SMPV	Superior mesenteric portal vein
SMV	Superior mesenteric vein
SS	Somatostatin
TNM	The tumor-node-metastasis
TP	Transverse Pancreatic
VIP	Vasoactive intestinal polypeptide
WDHA	Watery Diarrhea, Hypokalemia & Achlorhydria

LIST OF FIGURES

Figure No. *Page*

LIST OF TABLES

Table No. *Page*

INTRODUCTION

Pancreaticoduodenectomy remains the procedure of choice for tumors of the periampullary region. During the 1980s, many centers reported reduced hospital mortality rates (<5%), and some large series from centers with extensive experience in pancreatic resections reported no mortality.

However, while resectional surgery for pancreatic cancer has reached a new platform in the last decades and the mortality rates have considerably decreased, the morbidity remains considerable even in centers of excellence.

Critical step in pancreatic surgery is no longer the resection itself but the reconstruction of the pancreaticoenteric anastomosis. Complications related to the pancreatic remnant, such as pancreatic fistula, anastomotic dehiscence, abscess formation, and septic hemorrhage are the main causes of morbidity and mortality following pancreatic head resection. Some authors have named the pancreatic anastomosis the "Achilles heel" of pancreatic surgery because it has the highest rate of surgical complications.

Management of the pancreatic remnant after partial pancreaticoduodenectomy is still controversially discussed. More than 80 different methods of pancreatic reconstruction have been proposed, illustrating the complexity of surgical

techniques as well as the absence of a gold standard for all patients.

Simple closure of the pancreatic duct by ligation, fibrin or tissue glue without performing a pancreatic anastomosis resulted in high rates of fistulas, pancreatitis, and postoperative insulin-dependent diabetes, and therefore has been widely abandoned.

Surgeons have attempted to lower leak rates by devising a number of anastomotic techniques such as end to end pacreaticojejunostomy versus (vs) end to side pacreatico-jejunostomy, duct to mucosa anastomosis vs dunking anastomosis, pacreaticojejunostomy versus pacreatico-gastostomy and the use of internal or external stent. The use of pharmachological agents that lower the volume of pancreatic exocrine secretion (somatostatin-like analogues) have been tried but the leak rate remains high.

When choosing between the available methods for reconstruction of pancreaticoenteric continuity the issues to be considered are the ease of operation, the incidence of postoperative complications and the long term effect/changes.

AIM OF THE WORK

Evaluation of the results of different techniques of pancreatic remnant anastomosis in Whipple's procedure including end to end pancreaticojejunostomy, end to side pancreatico-jejunostomy, and pancreatico-gastrostomy to find out the risk factors related to pancreatic remnant searching for selection criteria for each technique to achieve the best results regarding postoperative:

- Pancreatic leakage.
- Pancreatic fistula.
- Septic hemorrhage.
- Abscess formation.

ANATOMY AND HISTOLOGY OF THE PANCREAS

Embryology

The pancreas is developed in two parts, a dorsal and a ventral. The former arises as a diverticulum from the dorsal aspect of the duodenum a short distance above the hepatic diverticulum, and, growing upward and backward into the dorsal mesogastrium, forms a part of the head and uncinate process and the whole of the body and tail of the pancreas **(Polak et al., 2000)**.

The ventral part appears in the form of a diverticulum from the primitive bile-duct and forms the remainder of the head and uncinate process of the pancreas. The duct of the dorsal part (accessory pancreatic duct) therefore opens independently into the duodenum, while that of the ventral part (pancreatic duct) opens with the common bile-duct **(Boerma et al., 2000)**.

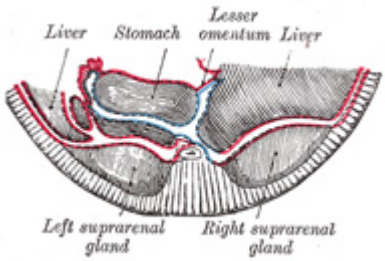

Figure (1): Schematic and enlarged cross-section through the body of a human embryo in the region of the mesogastrium. Beginning of third month. (Toldt.)

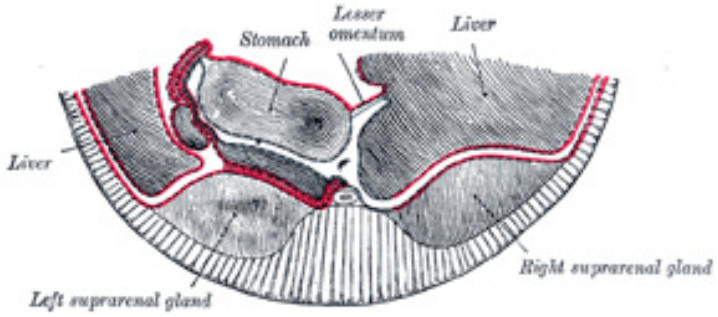

Figure (2): cross-section through the body of a human embryo in the region of the mesogastrium at end of third month

About the sixth week the two parts of the pancreas meet and fuse and a communication is established between their ducts. After this has occurred the terminal part of the accessory duct, i. e., the part between the duodenum and the point of meeting of the two ducts, undergoes little or no enlargement, while the pancreatic duct increases in size and forms the main duct of the gland. **(Ertan, 2000)**

The opening of the accessory duct into the duodenum is sometimes obliterated, and even when it remains patent it is probable that the whole of the pancreatic secretion is conveyed through the pancreatic duct. **(Neblett and O'Neill., 2000)**