Clinical Analysis of 65 Patients with Pancreatic Fistula and Wound Infection after Pancreatoduodenectomy (PD) with Duct-to-Mucosa Pancreaticojejunostomy: A Single-Center Report

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Abstract

Objective: The study sought to analyze Whipple procedure in 65 patients' in-hospital evaluation of morbidity and mortality rate after pancreatoduodenectomy (PD) with adjusted duct-to mucosa pancreaticojejunostomy.

Methods:A retrospective study of 65 consecutive patients that underwent (PD) at 'The First Affiliated Hospital of Anhui Medical University teaching Hospital during the period of December 2008 to December 2015 was done. A two-layered duct-to-mucosa pancreaticojejunostomy over an internal transanastomotic stent was performed in all 65 patients.

Results: The in-hospital morbidity and mortality rate in the study was 47.6% and 1.5%, respectively. One patient died as a consequence of mesenteric ischemia. Pancreatic fistula occurred in one patient (1.5%) and was treated

A) The left lobe portions are-I, II, III, and IV.

B) The right lobe portions are -V, VI, VII and VIII.

The section I is the caudate lobe and it has autonomous blood

His theory took almost hundred years to be veriẐed as during 1996, Prof. Whitcomb and his associates discovered the cause of hereditary pancreatitis to be hereditary mutations in the genes coding for trypsinogen with over activity of enzyme trypsin.

HXe most common non-malignant pathologies of the pancreas are acute inẑammation that leads to acute pancreatitis or chronic inẑammation that leads to chronic pancreatitis respectively. HXe progression of acute to chronic pancreatitis with resultant Ẑbrosis (scarring) is depicted in Figure 3.

Figure 3: A Demonstrates adequate acinar cells in the normal section while B and C shows progressive loss of acinar cells and later islet cells (marked as*) in the inẑamed cells that can be replaced by Ẑbrosis in chronic inẑammation.

Chronic pancreatitis leads to loss of acinar cells leding to maldigestion of nutrients, inẑammation and injury to nerves,

Benign	Borderline	Malignant
Serous cyst adenoma	Mucinous cystic tumor with moderate dysplasia	Ductal adenocarcinoma
Mucinous cyst adenoma		

Additionally pancreatic lesions like Intraductal Papillary Mucinous Neoplasms (IPMNs) and Pancreatic Intraepithelial Neoplasia (PanIN) are considered to be precursors of pancreatic cancer.

in some instances of pancreatitis. PD is a major procedure that demands surgical competency and a specialized care [1-5].

The chief reason that makes this procedure hypercritical is the occurrence of pancreatic fistula during pancreatic anastomosis creation. It has been found that even in standard specialized critical specialties the occurrence of pancreatic fistula ranges from 0-2% [3,6-8] to more than 20% in some cases [9-12].

Besides this dreaded complication that adds to significant morbidity and mortality, the anastomosis reconstruction procedure may lead to local abscess formation, sepsis, delayed gastric emptying and postoperative intra-stomach bleeding due to autolytic activity of the pancreatic juice [1-5].

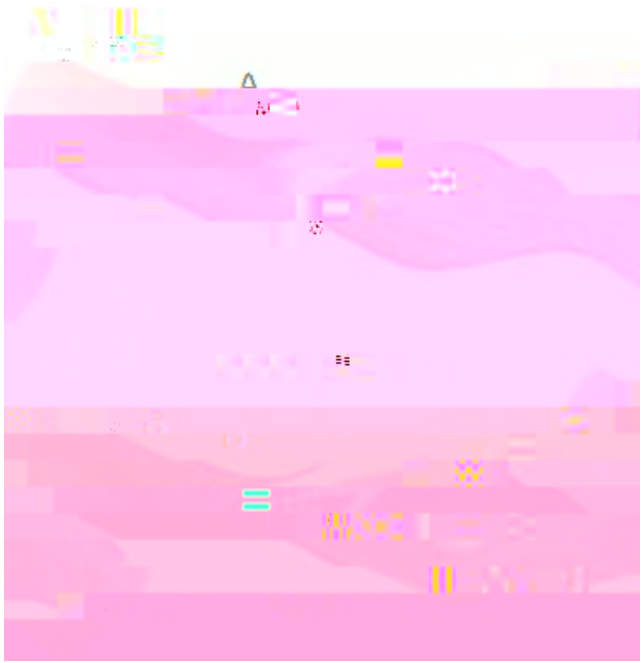

Figure 7: Demonstrated the method employed in creating an opening in the jejunum. Figure A shows blunt dissection by the back side of the scalpel while Figure B shows the use of Ẑne forceps.

Grade	Definition
I	Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic, and radiological interventions. Allowed therapeutic regimen are: drugs as antiemetics, antipyretics, analgesics, diuretics, electrolytes, and physiotherapy. This grade also includes wound infections opened at the bedside.
II	Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parental nutrition are also included
III	Requiring surgical, endoscopic or radiological intervention
IIIA	Intervention not under general anesthesia
IIIB	Interventions under general anesthesia
IV	Life- threatening complication (including CNS complications)* requiring IC/ICU management
IVA	Single organ dysfunction
IVB	Multiorgan dysfunction
V	Death of patient
Suffix ‘d’	If the patient suffers from a complication at the time of discharge, the suffix ‘d’ (for disability) is added to the respective grade of complication. This label indicates the need for a follow up to fully evaluate the complication.

*

6 and again aнer 1 day of performing re-laparotomy. HX is patient was placed with an abdominal drain until no ûuid drained out that was for about 29 aнer which the drain was taken out. Unfortunately, the patient developed tight biliary stricture at the anastomosis site at 12 months and is still in continuous follow up and is being treated with percutaneous trans-hepatic biliary drainage procedure. He is well till now. He still has the trans-anastomotic biliary channel at 30 month of follow-up.

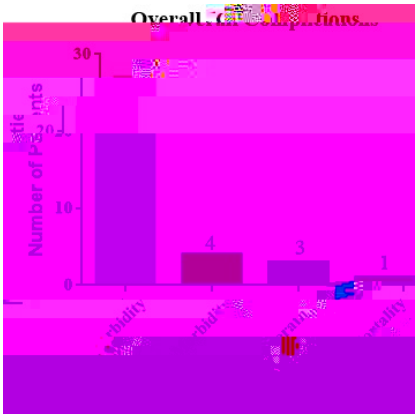

Figure 9: Overall Complications of PD.

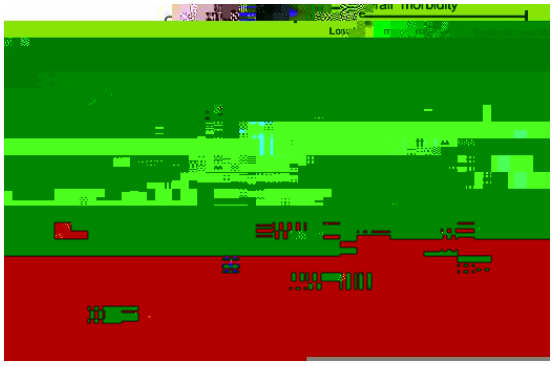

Figure 10: Overall morbidity of the PD procedure.

Among the local complications, wound infection was most common that occurred in 20% (13/65) of the cases. 41.7% of these patients (10/24) had endoscopically implanted biliary stent preceding surgery while 7.3% of the patients (3/41) did not have biliary stents before surgery (P<0.0001). Pathological reports obtained from the laboratory revealed that wound infection was chieŷy caused by bacterial infections with Escherichia coli and Enterococcus faecium which were successfully treated with antibiotics.

Pancreatic anastomotic leakage was observed in 1 patient (1.5%)

many causes of pancreatic Ẑstula formation, surgical causes or iatrogenic causes chieẑy revolves around per procedural causes. HXe diseased pancreatic tissue is very fragile with soн texture and excising the tissue as well as suturing the tissue becomes diẌcult. Tying the knot around the pancreatic remnant primarily determines whether there will be any leakage or Ẑstula in the future or not.

HXe stability and viability of the knot still depends on the amount of texture and fatty inẐltration on the gland which are the main risk factors for knot stability and development of pancreatic Ẑstula [25-30]. Besides, the delicate diseased pancreas may produce large amount of pancreatic juice compared to Ẑbrosed pancreas. HXis has been validated by studies that have demonstrated lower occurrence of anastomosis based complications in Ẑbrosed pancreatic tissue (chronic pancreatitis) compared to friable soн textured pancreatic tissue [31]. HXus numerous researches have aimed at Ẑnding a suitable agent or a suitable method to address this issue of anastomotic leakage and recently trans-pancreatic U-sutures have also been suggested so as to avoid or minimize tangential sheer forces during knot tying so as to avoid the extra stress in the tissue by the knot [28,32].

In this study, we observed that the occurrence of pancreatic anastomotic leakage aнer PD was signiẐcantly lower (1.5%) with modiẐed duct to-mucosa pancreaticojejunostomy procedure. HXis Ẑnding of ours was in lieu with previous Ẑndings of some studies conducted earlier [3,33,34]. However, this Ẑnding was also contradictory with other studies that have found the reverse [35-37]. HXese lower rates of pancreatic anastomosis leaks have also been documented in both series that do and do not use pancreatic stents [3,28,37]. A noteworthy technique that they have deployed that diцers from ours was that they constructed an external layer of the anastomosis with interrupted sutures and did not use pancreatic duct stent for duct to-mucosa anastomosis. Furthermore they also provided a buttress to the pancreatic stump by providing some horizontal mattress U-sutures in cases of soн and intermediate textured pancreas. HXe goal of these procedures was similar to our technique of incorporating the thick bites of thick pancreatic tissue so as to achieve a Ẑrm and tight anastomosis. Similarly the internal layer of duct to mucosa should be perfectly apposed to the wall so as to ensure undisturbed ẑow of pancreatic juice into the jejunum. HXe jejunum too be vigilantly so as to prevent cracks and crevices from where the pancreatic juice can leak out (Figure 2). HXe use of an internal trans-anastomotic stent and loupe ampliẐcation can be particularly important in securing a tight anastomosis too.

Whether to use the pancreatic stent or not has received conẑicting

17. You D, Jung K, Lee H, Heo J, Choi S, et al. (2009) Comparison of diwerent