"STUDY OF RESULTS FOLLOWING ISOLATED LOOP PANCREATICO JEJUNOSTOMY AFTER CLASSICAL WHIPPLES PROCEDURE: RESULTS OF 38 CASES"

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CERTIFICATE

This is to certify that the dissertation titled **"Study of results following isolated loop pancreaticojejunostomy after classical whipples procedure: Results of 38 cases"** submitted by **Dr.T.S.Chandrasekar** appearing for **M.Ch. (Surgical Gastroenterology and Proctology)** degree examination in August 2014, is a bonafide record, of work done by him under my guidance and supervision in partial fulfilment of requirement of the Tamil Nadu Dr.M.G.R.Medical University, Chennai. I forward this to the Tamil Nadu Dr.M.G.R.Medical University, Chennai.

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DECLARATION

I solemnly declare that this dissertation titled **"Study of results following isolated loop pancreatico jejunostomy after classical whipples procedure: Results of 38 cases"** was prepared by me in the Department of Surgical Gastroenterology and Proctology, Centre of Excellence for Upper Gastrointestinal Surgery, Madras Medical College &Rajiv Gandhi Government General Hospital, Chennai under the guidance and supervision of P**rof.S.M.Chandramohan,** M.Ch, FACS, Professor &Head of the Department of Surgical Gastroenterology and Proctology,Centre of Excellence for Upper Gastrointestinal Surgery, Madras Medical College & Rajiv Gandhi Government General Hospital, Chennai. This dissertation is submitted to The Tamil Nadu Dr. MGR Medical University, Chennai in partial fulfilment of the university requirements for the award of the degree of M.Ch Surgical Gastroenterology and Proctology.

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ABSTRACT:

Title : Study of results following isolated loop pancreatico jejunostomy after classical whipples procedure: Results of 38 cases

AIM: To analyse the results in terms of morbidity and mortality following isolated loop pancreaticojejunal anastomosis and to look for difference if any between duct to mucosa versus dunking type of anastomosis.

To evaluate results in terms of morbidity and mortality from isolated loop pancreaticojejunal anastomosis and compare with results from anastomosis using single jejunal loop and pancreaticogastrostomy.

MATERIALS AND METHODS:

All patients attending the outpatient department of Surgical Gastroenterology with operable growth in the periampullary region or head of pancreas were included in the study group. The data of one hundred and thirty eight patients were collected prospectively. Details tabulated included demographic characters, preoperative variables , performance status , diagnosis ,type of anastomosis , postoperative morbidity and mortality .Postoperative morbity noted included delayed gastric emptying , anastomotic leak , hemorrhagic complications ,wound infection , intraabdominal collection , pneumonitis and urinary tract infection .All patients in the study underwent a standard whipple's pancreaticoduodenectomy.

RESULTS:

Of the male and 38% were female patients. The minimum age was 30 and maximum one hundred and thirty eight patients included in the study 62% were age was 72 with a mean age of 51.7. The distribution of disease were as follows: periampullary 102[79.68%], pancreatic 15[11.7%], distal CBD 6[6%] and duodenal growth 5[4.6%].Among the complications delayed gastric emptying occurred in 57[44.53%], haemorrhage in 7[5.4%], pancreatic leak in 30.46%(grade A-20 [15.6%], grade B-12 [9.3%], and grade C-7[5.4%]), intraabdominal collection in 15%, wound infection in 22%, pneumonitis in 7%, urinary tract infection in 6% of patients. The incidence of delayed gastric emptying in the PG group was 38.46% , the incidence in the PJ group was 40.98% and in the isolated loop pancreaticojejunostomy group was 44.73%.The incidence of haemorrhage was 7.6% in the PG group, 6.5% in the PJ group and nil in the isolated PJ group . The incidence of pancreatic anastomotic leak between the

three groups was 33% in the PG , 29.5% in the PJ group and 15.78% in isolated PJ group. The incidence of intra abdominal collection in the PG group was 7[17.9%], in the PJ group it was 7 [11.4%] and in the isolated PJ group was 5 [13.15%]. The incidence of wound infection was 20.8% in the PG and 26.9% in the PJ group and 22% in isolated PJ group. The incidence of pneumonitis in the PG group was 2 [5.1%] compared to 4[6.5%] in the PJ group and 3[7.8%] in Isolated PJ group. The incidence of urinary tract infection in the PG group was 1[2.5%] and in the PJ group it was 2[3.2%].and 1 [2.6%] in isolated PJ group. The mean duration of nasogastric tube removal was 7.5 days in the PG group and 7.8 days in the PJ group and 7.0 in Isolated PJ group. The mean days of urinary catheter removal was 6.3 days in the PG and 6.7 in the PJ group and 8.0 in isolated PJ group. The mean days of drainage tube removal was 9.3 days in the PG and 9.9 days in the PJ group and 11 in the isolated loop PJ group. The mean postoperative hospital stay was 12.6 days in the PG group and 13.1 days in the PJ group and 11.2 in isolated PJ group.The mortality in the patients who underwent pancreaticogastrostomy was 5.1% ,in the pancreaticojejunostomy group was 4.9 %and 7.8 %in isolated loop PJ .The overall mortality rate was 5.79%.

Discussion : Among the 138 patients 57 patients developed DGE, 21 patients developed DGE and pancreatic leak and 15 patients developed other complications along with DGE and pancreatic leak accounting for a morbidity of 39.28%. 38 % of patients in the PG group and 40.98 % in the PJ and 44.73% group developed DGE. The increase in DGE with isolated loop was statistically significant (P value=0.052, 0.045).Pancreatic leak occurred in 39 patients with grade A leak in 20(14%), grade B leak in 12(8.6%) and grade C leak in 7(5%) patients. All patients with pancreatic leak were managed by non-operative means. There was no statistically significant difference in the incidence of anastomotic leaks among three types of anastomosis , though isolated loop pancreaticojejunostomy tended to have more type A leaks .No hemorrhagic complications were seen with isolated loop pancreaticojejunostomy. There was no significant difference in incidence of other major morbidities.The mortality rate in our study was5.7 % (5.1% in PG group and 4.9% in PJ grou,7.8% in isolated loop PJ group) which was not statistically not significant (P value=1.07,1.12) between the three groups.

Conclusion: In comparison to pancreatico gastrostomy or single loop pancreatico jejunostomy, Isolated loop pancreatico jejunal anastomoses might lead to lower incidence of higher grade of pancreatic leak .Both dunking and duct to mucosa type anastomoses seem to have similar incidence of leaks , in all three type of anastomosis .There is no significant difference in mortality rate between the three types of pancreaticoenteric anastomosis

.However , incidence of higher grade leak and anastomotic leak related mortality is lower with isolated loop anastomosis .Incidence of delayed gastric emptying seems to be higher and hemorrhagic complications rarer with isolated loop pancreaticojejunal anastomosis compared to other types of pancreaticoenteric anastomosis.

INTRODUCTION

Pancreaticoduodenectomy (PD) is the procedure of choice for treatment of peri-ampullary and pancreatic head malignancies and was first described by Allen Whipple *et al* [1] in the 1930s. Early enthusiasm concerning the procedure was followed by scepticism because of the associated high morbidity and mortality rates[2]. However advances in operative techniques and perioperative patient care have resulted in lower hospital mortality and longer Survival, making the procedure relatively safe in expert hands. [3, 4].

Despite recent favorable outcomes, leakage from the pancreatic stump anastomosis is still considered a significant source of morbidity and associated mortality. Various methods of surgical management of the pancreatic remnant have been proposed to address this serious problem. The rationale of creating an isolated Roux loop for the drainage of the pancreatic stump was first introduced by Machado *et al* [5] in 1976. They proposed that this isolated Roux loop can prevent the activation of pancreatic fluid by the intestinal contents and bile, and therefore protect the pancreaticojejunal anastomosis from erosion.

The aim of this study was to assess the results of the pancreaticojejunal anastomosis formed with an isolated Roux loop compared to the standard single loop technique pancreaticojejunostomy and pancreaticogastrostomy.

AIM

To analyse the results in terms of morbidity and mortality following isolated loop pancreaticojejunal anastomosis and to look for difference if any between duct to mucosa versus dunking type of anastomosis.

To evaluate results in terms of morbidity and mortality from isolated loop pancreaticojejunal anastomosis and compare with results from anastomosis using single jejunal loop and pancreaticogastrostomy.

REVIEW OF LITERATURE

Periampullary cancer includes adenocarcinoma of the head, neck, and uncinate process of the pancreas, ampulla, distal common bile duct and ampullary duodenum. Often, the precise site of origin cannot be determined until the tumour has been resected[1]. Pathologic examination of resected pancreaticoduodenectomy specimens reveal that 40–60% are adenocarcinomas of the head of the pancreas, 10–20% are adenocarcinomas of the ampulla of Vater, 10% are distal bile duct adenocarcinomas, and 5–10% are duodenal adenocarcinomas. Since these data represent resected specimens, and since the resectability rate of the nonpancreatic periampullary cancers is much higher, it is likely that pancreas is the site of origin in up to 90% of cases[2].

HISTORY

Of the many indications for pancreatic resection, cancer has been the most intensely researched and the most meticulously documented. Ductal adenocarcinoma is the most common tumor of the pancreas,with a predominant site of origin being the pancreatic head (78%) [3]. Pancreatic resection is deemed to be one of the most complicated and technically challenging surgical procedures[5].The study of the history of pancreatic surgery also offers insight into the evolution of the surgical techniques.

Pancreaticoduodenectomy probably had its origins in papillectomy, with Halsted (1899) being the first to report a successful resection of the ampulla in 1898. This accomplishment emboldened other investigators to experiment with more extensive excisions of the ampulla, duodenum and pancreas. Also in 1898, Codivilla (1898) reported the first pancreaticoduodenectomy, which he had performed in one stage. His patient died on the 21st postoperative day, however, from complications arising from what seemed like a pancreatic leak [4]. The first successful pancreaticoduodenectomy was performed by a German surgeon, Kausch, 11 years after Codivilla's landmark effort [5]. Kausch, a student of Von Mickulicz-Radecki, performed the operation in two stages. In the first, he decompressed the biliary tree, and 6 weeks later, he completed the extirpation and the reconstruction, including a pancreaticoduodenal anastomosis to the third part of the duodenum. In their 1935 landmark publication, Whipple and co-workers reviewed their series of 80 patients who had surgical treatment for ampullary carcinoma, among which were 2 cases of pancreaticoduodenectomy. Whipple's maiden attempt was a two-stage procedure, with biliary and gastric decompression in the first stage and tumor extirpation in the second stage. With increasing experience. Whipple's technique eventually evolved into a one-stage procedure complete with a pancreaticojejunostomy[6]. This metamorphosis was

bolstered by the discovery of Vitamin K in 1929 and the “fat metabolizing hormone” in 1936. His one-stage innovation ensured a clean surgical field devoid of scars and adhesions that were the trademarks of a preliminary operation. In tribute to his efforts in this seminal work, Hunt (1941) labelled this method Whipple’s procedure[7].Even with improvements in multimodality treatment, surgery remains a crucial centrepiece of the treatment algorithm for pancreatic cancer as there is no truly effective chemotherapeutic agents for treating nonresectable disease developed yet. The American Gastroenterological Association (1999) endorsed pancreaticoduodenectomy as the recommended operation for patients with resectable tumours. Technical improvements have led to the advent of a number of different types of surgical techniques that allowed a more individualized, disease-directed approach. These modifications were responsible in part for the decrease in surgical morbidity.

EPIDEMIOLOGY AND RISK FACTORS

In 2004, an estimated 31,270 deaths were attributed to pancreatic cancer, making it the fourth leading cause of cancer mortality in the Unites States[10] .There is a slightly higher incidence in men than in women (relative risk 1.35) and in African American men (30-40% higher). Advancing age is perhaps the stronger risk factor. The peak incidence of

pancreatic cancer is in the 60s and 70s, and mean age at diagnosis is 60 to 65 years [11]. Other risk factors include Ashkenazi Jewish heritage, cigarette smoking, diabetes mellitus, chronic pancreatitis, obesity, low level of physical activity, and occupational exposure to carcinogens. Six genetic syndromes have been linked to pancreatic adenocarcinoma: hereditary pancreatitis, hereditary nonpolyposis colorectal cancer, hereditary breast and ovarian cancer, familial atypical multiple mole melanoma syndrome, Peutz-Jeghers syndrome, and ataxia telangectasia. The relationship between diabetes, pancreatitis, and pancreatic cancer is complex and controversial because pancreatic cancer itself can cause pancreatitis and Hyperglycemia, through destruction of the pancreatic parenchyma and other poorly understood mechanisms [12].

CLINCIAL PRESENTATION

Because most pancreatic cancers arise in the right side of the gland, the hallmark of clinical presentation for periampullary and pancreatic cancer is jaundice, resulting from obstruction of the intrapancreatic portion of the common bile duct. The jaundice is often progressive and associated with dark urine, light stool, and pruritus. Although some patients exhibit vague, intermittent epigastric pain, locally advanced pancreatic cancer with

tumour invasion of the celiac plexus typically causes a constant dull epigastric pain, often accompanied by back pain.

In 15% to 20% patients with pancreatic cancer, new-onset diabetes mellitus is observed. The suspicion of pancreatic carcinoma should be raised in patients older than 60 years who develop mild diabetes. Similarly, the possibility of a pancreatic neoplasm causing partial pancreatic duct obstruction should be considered in elderly patients with newly diagnosed pancreatitis, particularly in the absence of cholelithiasis and ethanol abuse. Obstruction of the pancreatic duct also may cause pancreatic exocrine insufficiency, manifested by malabsorption and steatorrhea. Nonspecific symptoms, such as nausea, anorexia, weight loss, and fatigue, are common in many patients with periampullary cancer. Obstruction of the C loop of the duodenum and at the ligament of Treitz can develop as a result of local tumour involvement from the periampullary region and midbody of the pancreas. At initial presentation, the most common physical finding is jaundice. Evidence of cutaneous scratching is commonly present, secondary to the pruritus [9].

Patients with metastatic pancreatic cancer may exhibit left supraclavicular adenopathy (Virchow's node), ascites, palpable hepatic metastases, periumbilical lymphadenopathy (Sister Mary Joseph's

nodules), or drop metastases surrounding the perirectal region (Blumer's shelf).

Laboratory analysis often reveals elevated liver function studies, reflecting the degree of biliary obstruction. Hyperglycemia is commonly seen, but the mechanism for this is unclear. In deeply jaundiced patients with malabsorption of fat-soluble vitamins, prolongation of the prothrombin time may be seen.

Serum carbohydrate antigen 19-9 (CA 19-9) may be elevated; however, this tumour marker is neither sensitive nor specific for pancreatic cancer because 15% of patients do not secrete CA 19-9 owing to their Lewis antigen status. CA 19-9 levels may not be elevated early in the disease. Using a cut-off of 37 U/ml, the sensitivity and specificity for pancreatic ductal adenocarcinoma have been reported to be 81% to 85% and 85% to 90% (Tamm et al, 2003). Levels greater than 120U/ml have been predictive of metastatic disease (Cooperman, 2001). The main value of CA 19-9 is in follow up of patients after curative resection and in monitoring their response to chemotherapy. [10]

DIAGNOSIS AND ASSESSMENT OF RESECTABILITY

The aim of clinical staging is to define disease extent reliably, so as to avoid unnecessary intervention and the accompanying morbidity, mortality and diminished quality of life in patients with advanced disease[[13]]. Although clinical trials use TNM staging system most often, in practice physicians conventionally the disease as resectable, locally unresectable and metastatic disease [[14]]. Resectable pancreatic cancer is universally defined, based on preoperative workup, as a pancreatic tumour without involvement of the superior mesenteric artery or the celiac axis, a patent superior mesenteric-portal venous confluence, and no evidence of distant metastasis [[15]]. Portal vein involvement is controversial, and resectability often depends on the operating centre. Imaging is the mainstay for diagnosis and staging of pancreatic tumours, as against the traditional approach of surgical exploration and intraoperative evaluation to determine resectability.

COMPUTED TOMOGRAPHY

Helical computed tomography (CT) has been established as the most efficacious initial staging study [[16]] and often is used as the entry point to a management algorithm. The experience, cost, popularity, and ease of interpretation favour helical CT as the most sensitive initial test to

diagnose and stage pancreatic cancer [17].Multiplanar three-dimensional reconstructions can provide involvement of vascular structures and the degree and level of dilation of the pancreatic and biliary ducts [18]. Although the superior mesenteric vein is best seen with axial cuts, sagital reformatting is best for showing superior mesenteric artery involvement [19]. Coronal reformatting can show possible tumour extension into the adjacent duodenum or stomach. Duodenal assessment is enhanced further with the use of a negative oral contrast agent such as water.

Regarding resectability, spiral CT scan has been reported to have a positive predictive value of 100%, negative predictive value of 56%,and overall accuracy of 70% for unresectable pancreactic carcinoma [19].This ability to predict unresectability preoperatively is superior to the ability to predict resectability, particularly because the detection of small (<5mm) liver and peritoneal metastases is limited even with today's CT technology. Vascular involvement is the next most common reason for unresectability. Tumour encasement is inferred from narrowing or obliteration of vascular lumen, and radiologic grading criteria have been developed for circumferential vessel involvement [20, 21]. Generally if the tumour surrounds more than half the circumference of a named vessel, it is deemed unresectable. Additional radiologic features that suggest vascular invasion include perivascular cuffling, described as increased attenuation

of the normal perivascular fat, and the presence of dilated collateral veins. The “teardrop” sign, which describes the deformity of the otherwise round shape of the superior mesenteric vein, suggests venous invasion[22]. An added bonus afforded by the excellent overview of pertinent anatomy and structures is the se of the multidetector CT as a valuable preoperative planning tool [23].

MAGNETIC RESONANCE IMAGING & MRCP

Magnetic resonance imaging (MRI) has been compared extensively with CT for the detection of vascular invasion and distant metastases, and most studies have shown equivalent accuracy between the two modalities[24]. MRCP is non-invasive and delineates the pancreatic and biliary ducts. It detects pancreatic or ampullary carcinoma by showing the effect of a space occupying lesion on the ducts – obstruction or displacement. The classic feature is the “double duct” sign. A strictly defined double-duct sign is only 80% to 85% specific for malignancy, however (Menges et al, 2000).Other recent advances include secretin-enhanced MRCP, which can improve pancreatic duct and side branch delineation. Such pharmacologic stimulation of pancreatic juice secretion allows the evaluation of pancreatic flow dynamics and assessment of pancreatic exocrine function [19].

ENDOSCOPIC ULTRASOUND

In detecting small lesion (<20 mm), EUS is more sensitive with a sensitivity of 93% to 100%. A meta-analysis of studies comparing staging by EUS with other modalities reported that EUS (without fine-needle aspiration) more accurately predicted T stage, N stage, and portal vein involvement than CT. One of the greatest attributes of EUS is the ability to perform EUS-guided fine-needle aspiration of the primary tumour and the regional lymph nodes without the risk of tumour seeding along the needle tract, as opposed to the percutaneous technique [[26]]. EUS guided fine needle aspiration is only of diagnostic value, however, if histology confirms a pancreatic tumour. The major limitations of this technology are that results are operator dependant and a limited visualization afforded for the detection of distant metastasis.

ERCP

The emergence of MRCP, EUS, and multidetector CT with multiplanar three-dimensional reconstruction has reduced the role of endoscopic retrograde cholangiopancreatography (ERCP) as a diagnostic tool. Besides the ever present risk of pancreatitis, the use of ERCP in an obstructed system might induce cholangitis. A normal pancreatogram does not equate absence of malignancy, and this can occur in approximately

20% of patients with pancreatic cancer. Potential “blind spots’ on ERCP include the uncinate process, the accessory duct, and the tail. In a study comparing ERCP with MRCP in evaluating patients with suspected malignant bile duct obstruction, it was found that the presence and site of the biliary stenosis were assessed correctly in 100% of cases using MRCP, as opposed to 95% with ERCP[27]. MRI has an additional advantage given its ability to provide cross-sectional anatomic evaluation of the upper abdomen.

POSITION EMISSION TOMOGRAPHY

Position Emission Tomography (PET) is being used to detect the primary malignant tumour, to detect regional and distant metastases, to differentiate benign disease from malignant disease or recurrent cancer from treatment-related scarring, and to document response to therapy [28].

An extensive review of the FDG PET literature in the year 1993-2000 stated, the overall sensitivity and specificity of FDG PET as an oncologic imaging tool at 84% and 86%, respectively.FDG PET has been found to be more accurate than other imaging methods in detecting pancreatic cancer. It is especially useful in localizing the disease when CT is equivocal owing to treatment-related anatomic alteration [29]. PET provides an alternative in tumours less than 2 cm in diameter. By changing

the radiotracer to carbon 11-labeled 5-hydroxyl L tryptophan, PET imaging also has found a niche in the detection of neuroendocrine tumours. 5-Hydroxyl-L-tryptophan PET has been reported to be better than CT and somatostatin receptor scintigraphy for tumour visualization and has allowed the detection of many small, previously overlooked lesions. PET is not without pitfalls. False negative results are reported in patients with hyperglycemia, patients with very early stage cancer and in well-differentiated tumors.Limited spatial resolution and the absence of anatomic landmarks make PET inferior to CT in assessing surgical resectability, in particular, vascular encasement. It is believed that PET performed in isolation has only a limited role in the workup of pancreatic cancer. The findings should be correlated with CT scans to obtain complementary information. This need has led to the development of hybrid PET-CT scanners, a combined physiologic and anatomic diagnostic modality.

DIAGNOSTIC LAPAROSCOPY

Diagnostic laparoscopy was introduced as a minimally invasive strategy for the detection of peritoneal carcinomatosis and liver metastases to avoid unnecessary laparotomies in patients with advanced disease. Used in conjunction with helical CT, laparoscopic assessment can have a

positive predictive value of 100%, a negative predictive value of 91% and an overall accuracy of 94% [30]. Laparoscopic ultrasound was added as an adjunct to laparoscopy to allow the detection of intraparenchymal lesions and vascular invasion or encasement. With ultrasound, the accuracy of determining resectability is improved to 98%. Advocates have reported that laparoscopy can identify occult metastases, which were not detected by a preceding CT scan, in 30% of patients. Consequently the resection rates after laparoscopy have been reported to be 75% to 95%. Because of these results, some centres strongly recommend the use of diagnose laparoscopy as a routine procedure. But the same is not justified [31] and laparoscopy is performed for patients at high risk of occult metastatic disease and in whom a palliative procedure is not required. In addition, laparoscopy can be performed for patients with ascites, larger primary tumours, and who's clinical or laboratory findings suggest an already advanced disease [31].

STAGING

Currently, only a few patients with pancreatic cancer are candidates for surgical resection, the only potentially curative therapy. In most patients, accurate preoperative staging of periampullary and pancreatic cancer is achieved by multidetector CT with three dimensional

reconstruction. A resectable tumour is characterized by lack of evidence of metastatic disease, a clear tissue (fat) plane between the tumour and visceral arteries (celiac axis and superior mesenteric artery), and less than or equal to 180-degree-circumferential involvement of the superior mesenteric vein-portal vein confluence. In contrast, in unresectable disease ,there is distant metastases, ascites, involvement of the superior mesenteric artery or celiac axis, or total occlusion of the superior mesenteric vein-portal vein confluence. Using three-dimensional CT to stage patients who subsequently underwent laparotomy for periampullary cancer, 98% of patients with three-dimensional CT scans interpreted unequivocally as resectable underwent resection. For patients with nondefinitive three-dimensional CT criteria of unresectability (e.g., questionable superior mesenteric artery involvement or near-complete superior mesenteric vein-portal vein encasement with preserved patency), only 22% underwent resection. Patients with no definitive radiographic criteria for unresectability should not be committed to nonoperative therapy.

TREATMENT

Surgical resection remains the only potentially curative therapy for periampullary and pancreatic cancer. Only a few patients currently diagnosed with pancreatic cancer are candidates for curative resection. It is

hoped that as programmes for early detection improve and gain widespread use, the percentage of patients who are candidates for resection will Increase. Approaches for resection are based on tumour location and extent. Resection of right-sided tumours typically requires pancreaticoduodenectomy. In many instances, preoperative biliary decompression is unnecessary and may result in increased postoperative complications [32].

Selected patients with biliary sepsis, advanced malnutrition, or significant time delay before surgery may benefit from preoperative biliary decompression, which can be accomplished endoscopically with a plastic endoprosthesis in most instances. If endoscopic decompression cannot be accomplished, placement of a percutaneous transhepatic biliary drainage catheter can be pursued.

PREOPERATIVE MANAGEMENT

Preoperative Workup and Preparation

General

Pancreatic resection surgery imposes a significant physiologic stress on patients. Most patients are elderly (the peak incidence of pancreatic cancer falls in the 65-75 year age group) [33]. In such patients, there also is a higher incidence of comorbidities.

Cardiopulmonary exercise testing and lung function testing can evaluate examine accurately the capability of the cardiorespiratory system for oxygen delivery under stress and the need for postoperative ventilator support. Weight loss and dehydration are frequent features of patients with pancreatic disease, and in such patients, the initial effort is to maximize preload. Optimization of after load and myocardial contractility is equally important, and occasionally, may need insertion of pulmonary artery catheters.

Before any major procedure involving resection, the patient's blood is matched for 2 units. Routine blood investigations and serum tumour marker assay, specifically CA 19-9 are done.

A prophylactic dose of low molecular weight heparin to patients, begun the evening before the day of surgery and continued till the patients are ambulant post operatively is advised. In addition, patients wear compression stockings, intraoperatively and for their entire inpatient stay. Stockings act by reducing pooling of blood in deep veins by mechanically preventing venous distension and are a simple, inexpensive method of deep vein thrombosis prophylaxis. Antibacterial prophylaxis has been instrumental in the reducing infection-related morbidity in clean contaminated procedures. It is recommended for all patients undergoing

hepatobiliary or pancreatic surgery. Drugs with anti anaerobic activity are added if there is an anticipated encounter with anaerobes during the procedure, in particular, with procedures involving the gastrointestinal tract. Guidelines recommend the highest licensed dosage of the chosen antimicrobial agent. This agent should be given intravenously at induction of anesthesia to achieve high peak tissue concentration at the site of the wound before the first incision and should be maintained until the time of closure. Re-dosing should be done when the procedure lasts more than 2 antibiotic half-lives. In all procedures in which the biliary tract is entered, the bile is sent for antimicrobial culture and sensitivity to guide postoperative antimicrobial treatment should this need arise.

Pancreatic cancer is notorious in its association with significant metabolic and nutritional disturbances. Weight loss of 10% or more is well known to affect outcome adversely with an overall increased susceptibility to postoperative complications. Clinical trials addressing the role of preoperative nutritional therapy have found no reduction in morbidity or mortality using either total parenteral nutrition (TPN) or enteral nutrition. The controversy is fuelled further by the observation that the surgical mortality or morbidity has decreased significantly without emphasis on prior perioperative nutrition. Perhaps only patients with severe malnutrition, in particular patients with physiologic impairment, would

have a tangible benefit from perioperative and postoperative nutritional support [35].

Patients in whom, for some reason, surgical extirpation has to be delayed and have a demonstrable loss of weight, or patients with severe malnutrition with physiologic dysfunction are candidates for nutritional support. The latter group can be identified using physiologic function tests, such as hand grip strength. Even lung function testing can serve as a simple assessment for voluntary muscle function. Serum markers, such as transferrin, prealbumin and retinol binding protein, also are invaluable in confirming significant malnutrition. These are more accurate than albumin as a marker of nutritional well-being. If perioperative nutritional support is required, the enteral route is preferred.

ROLE OF SOMATOSTATIN

The pancreaticoenteric anastomosis has been deemed the “Achilles heel” of pancreaticoduodenectomy because of the potential for disastrous consequences of life-threatening intra-abdominal sepsis and haemorrhage that may follow a pancreatic leak. Based on the findings of the trials conducted by Buchler et al, 1992 & Friess et al, 1995 all patients scheduled for pancreatic resections, were given a prophylactic subcutaneous octreotide (Sandostatin), beginning with the first dose of 200

μg given at induction. If the pancreas is thought to be high risk by the surgeon, because of a soft consistency or a pancreatic duct size of less than 3 mm in diameter, the post surgical regimen would be three daily doses of 200 μg of octreotide for the next 5 days. Conversely, if the gland is firm with a relatively wide duct, each individual dosage would be 100 μg.

ROLE OF PREOPERATIVE BILIARY DRAINAGE

Patients with pancreatic or periampullary cancer who have jaundice are at risk of developing coagulopathy, malabsorption, malnutrition, and immune dysfunction. There have been at least two meta-analyses published on this subject. Sewnath and colleagues (2002) found that there was no significant difference in the overall death rate between patients who had preoperative biliary drainage and patients who had surgery without preoperative biliary drainage [38]. Instead, the overall complication rate was significantly adversely affected by preoperative biliary drainage. The length of in hospital stay also was increased. The investigators concluded that preoperative biliary drainage has no benefit. In a more recent review, Saleh and associates (2002) found no evidence of either a beneficial or an adverse effect of preoperative biliary stent placement on the outcome of surgery in patients with pancreatic cancer [[39]]. The role of preoperative biliary drainage in patients with biliary

obstruction undergoing pancreatic resection is controversial at best. What is clear is that endoscopic drainage is better than percutaneous methods. So preoperative biliary drainage, as a routine practice, is not warranted .Rather, it can be done for patients with cholangitis or other severe complications of jaundice that would preclude a safe resection. Another indication would be jaundiced patients requiring neoadjuvant chemotherapy before surgical extirpation.

EPIDURAL ANALGESIA:

Studies on “fast track” gastrointestinal surgery have demonstrated that epidural analgesia, given along with an intensive, standardized regimen of early feeding and mobilization reduces hospital stay [40]. Epidural analgesia has many benefits, including a shorter duration of postoperative ileus, decrease in magnitude of the stress response, lesser pulmonary complications, better postoperative pain control and improved mobility. Thoracic epidural analgesia is of particular benefit in patients with a high risk of cardiac or pulmonary morbidity and reduces the duration of hospital stay and hospital costs in this subgroup of patients.

OPERATIVE MANAGEMENT

Panceraticoduodenectomy

Technique

The patient's abdomen is cleansed from the nipple level down to the level of the symphysis pubis, and the operative field is squared off with sterile drapes. By either a midline or roof-top incision peritoneal cavity is entered. The ligamentum teres and the adjoining falciform ligament are routinely divided to facilitate a thorough examination of the liver. The peritoneal surfaces including pelvis and root of mesentery are inspected carefully for metastatic deposits. Resection is preceded only if there is no evidence that would preclude an R0 resection.The lesser sac is entered by dividing the gastrocolic ligament. On the left side, the gastrocolic ligament is divided up to the most medial branch of the short gastric vessels. This ensures an alternative venous egress for the splenic blood flow in case of requirement of venous resection of the superior mesenteric vein-portal vein trunk. Moving toward the right, caudal mobilisation of the hepatic flexure is done .Meticulous and safe dissection in the avascular plane in-between the hepatic flexure and the duodenum and an extensive Kocher manoeuvre is done .This allows freeing of the the third part of the duodenum from the colonic mesentery. The gastrocolic trunk of Henle is encountered here, and

tracing it down leads to the superior mesenteric vein. Alternatively, the superior mesenteric vein can be identified through a Cattell Braasch maneuver. The gastroepiploic vein is divided at the point where it empties into the gastro colic trunk. The superior mesenteric vein is followed upwards to the inferior margin of the pancreas. The peritoneum overlying the lower border of the pancreas is divided to allow better definition of the pancreatic margins. Two stay sutures are taken at the inferior border of the pancreas to facilitate the formation of the tunnel in between the pancreatic neck and the superior mesenteric vein-portal vein trunk. Moving now to the supraduodenal compartment, Cholecystectomy is done in a fundus-first approach. Cystic duct is traced to its origin from the common bile duct, and the common bile duct is transected just cephalad to this point. Due care is taken at this point to avoid any iatrogenic injury to the right hepatic artery, which usually runs behind the hepatic duct[41]. The distal end of the common bile duct and its surrounding fibro fatty tissues are dissected free off the rest of the hepatoduodenal ligament and retracted caudally. A small noncrushing clamp is applied to the proximal stump of bile duct preventing any further bile spillage for the rest of the operation. The proper hepatic artery is identified and looped and is traced proximally to its origin from the common hepatic artery. The gastroduodenal artery is delineated during this dissection. Nodal bearing tissues around the proper

hepatic artery and the common hepatic artery are excised. The gastroduodenal artery is divided near its origin. A potential danger here is the misidentification of a replaced common hepatic artery or even a replaced right hepatic artery as the gastroduodenal artery. One method to avoid this mistake is to place a vascular clamp across the presumed gastroduodenal artery and checking for pulsations at the porta hepatis prior to dividing this vessel. The stomach is then divided and retracted towards the left upper quadrant of the abdomen. The supra-pancreatic portion of the portal vein is now widely exposed. Two stay sutures are now placed on the superior border of the pancreas. These sutures at the superior and inferior pancreatic borders also serve to ligate the superior and inferior pancreatic vessels running longitudinally in the parenchyma and reduce bleeding from the cut edges after transaction. Using peanut swabs and blunt forceps, a tunnel is created cautiously between the superior mesenteric vein-portal vein trunks posteriorly and the pancreatic neck anteriorly. A silicon drain is introduced into this tunnel to loop up the neck. The venous trunk is examined for any tumour involvement on its posterolateral aspect. If venous resection is required, this is kept as the last step in the resectional phase. The portal vein is gently retracted medially exposeing the underlying tissues, and dividing any venous branches.Simultaneously,the specimen is retracted to the right. The tissue and branch arteries arising

from the superior mesenteric artery are serially clamped, divided, and stitch ligated. During this step, the specimen is cupped within the left hand of the surgeon, and the fingers continuously keep track of the position of superior mesenteric artery to avoid any injuries to it. The anterolateral side of the superior mesenteric artery is completely skeletonised of its investing tissues. The third part of the duodenum is transected using a linear stapler, freeing the entire specimen. Margins are taken from the proximal pancreatic stump and the bile duct for frozen section analysis. The ligament of Treitz is mobilized. Mesenteric branches to the fourth part of the duodenum are divided allowing it to be delivered into the inframesocolic compartment under the superior mesenteric artery. The pancreatic stump is rotated to the left, and a collar of investing tissue cleared for about 2 cm from the divided end to provide a clear all-round visualization of the pancreatic capsule; this facilitates subsequent comfortable construction of the pancreaticoenteric anastomosis. Hemostasis is achieved and the operative field is irrigated with warm saline before proceeding to the reconstructive part of the operation.

VASCULAR RESECTION

Fuhrman and co-workers (1996) found that tumours adherent to the superior mesenteric vein – portal vein trunk did not exhibit more

aggressive biology, suggesting that venous adherence was a function of tumour location rather than an indicator of aggressiveness. Subsequent studies have reported that the need for portal vein resection does not affect overall patient survival. In 2004, new evidence emerged to suggest that portal vein resection might confer some survival benefits. In a prospective randomized study, Lygidakis and associates (2004) 29 showed that patients with portal-mesenteric venous invasion who were randomized to venous resection had far better 2-year and 5-year survivals compared with patients who were randomized to only palliative bypass. Venous involvement can be described as short segment or long segment. As with all vascular surgery, proximal and distal control must be secured first. For short segment involvement, a cuff resection is done. The strategy would be to dissect circumferentially around the point of involvement to allow side clamping of the vein. The involved area is excised with a longitudinal bielliptical incision with clear margins, and the venotomy subsequently is closed in a transverse fashion using nonabsorbable monofilament sutures in a continuous fashion (Prolene 5-0). If a segmental resection is necessary to ensure clear margins, reconstruction of the portal vein and superior mesenteric vein can be accomplished in most instances by an end-to-end anastomosis. Otherwise, a generous Cattell-Brascsh maneuver with or

without a caudal mobilization of the liver, usually allows a tension-free anastomosis.If still not possible , a vein graft can be used.

LYMPHADENECTOMY:

Several studies exist about extended lymph node dissection and its possible benefits. Three level I studies were reported from centers from three different continents – Europe [42,] North America (United States) [43,44,] [30] and Asia (Japan)[45.] They unanimously said that the increased radicality of lymphadenectomy did not prolong survival rates. Ishikawa and colleagues (1997) provided a possible explanation for these disappointing results. They found that patients with lymph node metastases confined to the anterior and posterior panceraticoduodenal groups fared as well as patients without any lymph node involvement. In contrast, patients with involvement of other, more distant lymph node groups did not benefit from an extended lymphadenectomy (Ishikawa et al, 1997). A standard lymphadenectomy, which would include the removal of the anterior and posterior pancreaticoduodenal groups, would be adequate .

MANAGEMENT OF PANCREATIC REMNANT:

The aftermath of a pancreatic leak can be devastating, particularly when it results in retroperitoneal sepsis. This is found to be a major cause of mortality in whipples procedure [[46]]. Mere occlusion of the duct has

been shown to result in higher fistula rates, along with increasing the risk of pancreatic exocrine and endocrine insufficiency. Drainage of the pancreatic remnant to the gastrointestinal tract is an important step, but it runs the risk of anastomotic breakdown. The pancreaticoenteric anastomosis has grabbed the attention of surgeons, causing a search for a more reliable technique to avoid this dreaded complication of anastomotic leak . Several techniques have been described, and the literature will continue to report novel techniques promising to be even safer. Rather than the choice of anastomotic technique, however, the successful management of the pancreatic anastomosis depends more on the surgeon's meticulous execution of the technique with which he or she is familiar [47].

As long as the basic rules of a safe anastomosis are followed, including careful handling of the pancreatic tissues, a tension-free approximation, ensuring good blood supply, and no distal obstruction, any pancreaticoenteric anastomotic technique can have a good outcome. One of the most commonly employed technique is a pancreaticojejunal anastomosis. This anastomosis is done by invaginating the transected pancreas into the end of the jejunum, also known as dunking method ; another variation is to anastomose the pancreatic duct directly to an opening in the jejunum, called the duct-to-mucosa technique. The technique of pancreaticojejunal anastomosis, whether end-to-side or end-

to-end, and whether duct-to -mucosa or dunking, does not appear to influence the anastomotic leak rate significantly. Another technique is to anastomose the pancreatic stump to the stomach. Proponents of the pancreaticogastrostomy cite various reasons [48]. First, it is easier to perform, because of the close proximity of the stomach to the pancreas. Second, rich gastric blood supply makes this anastomosis less prone to ischemia. Third, because the exocrine enzymes encounter an acidic environment, the leak rate is theoretically lower as the enzymes do not get activated. The last statement has been disproved, however. In a prospective randomized trial comparing pancreaticojejunostomy with pancreaticogastrostomy, the leak rates were not significantly different [pancreaticojejunostomy 11%; pancreaticogastrostomy 12%)[49].In a prospective randomized trial [50] of pancreaticogastrostomy versus pancreaticojejunostomy after pancreaticoduodenectomy .Yeo et al has concluded that pancreatic fistula is a common complication after pancreaticoduodenectomy, with an incidence most strongly associated with surgical volume and underlying disease and the data do not support the hypothesis that pancreaticogastrostomy is safer than pancreaticojejunuostomy or is associated with a lower incidence of pancreatic fistula. In a meta analysis by Wente MN and Shrikande SV et al ,they concluded that all non randomized observational clinical studies have reported superiority of

pancreaticogastrostomy over pancreaticojejunostomy but all randomized controlled studies has shown equally good results. In a study by H Ramesh et al results suggested that pancreaticogastrostomy deserves wider application [52]. In another prospective randomized trial Bassi et al has showed that both type of anastamosis does not influence significantly the risk of overall complications or the incidence of pancreatic fistula. However, significant decreases in the risk of associated complications, biliary fistulas, postoperative collections and DGE were observed using pancreaticogastrostomy. A Chinese meta analysis of all four randomized controlled trials has evidence suggesting that pancreaticogastrostomy is better than pancreaticojejunostomy after pancreaticoduodenectomy.

Isolated loop Pancreaticojejunostomy:

An ideal reconstructive technique should not only minimize the risk of Pancreatic fistula formation, but should also ensure that, should a pancreatic fistula form, its complications are prevented or minimized. An isolated jejunal loop for Pancreaticoenteric anastomosis is theoretically expected to achieve these desired endpoints. Previous studies, using an isolated jejunal loop for pancreatoenteric anastomosis can minimize the risk of Pancreatic Fistula, although its effect in terms of reducing pancreatic fistula related morbidity is not clear.[53–59]

Advocates of this technique believe that diverting bile away from the pancreaticojejunostomy site minimizes the pancreatic enzyme activation and hence reduces the risk of pancreato enteric anastomotic fistula [60] .Another argument cited in favour of using a Roux loop in Pancreaticojejunostomy relies on the belief that, if a pancreato enteric anastomotic fistula forms, it will be a 'pure' pancreatic fistula and these fistulae cause lesser complications compared with complex PF, in which the bile activates the pancreatic juice, with further repercussions.

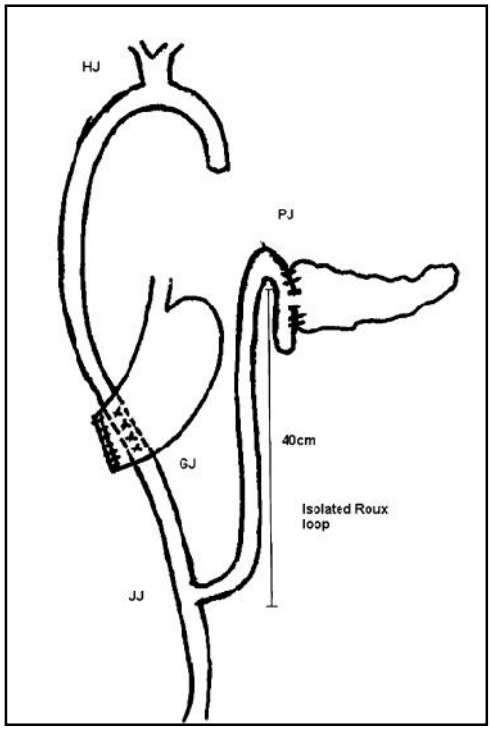
The isolated Roux loop pancreaticojejunal end-to-side anastomosis was initially described by Funovics et al. [61] who described 48 patients with double Roux loops to separate the pancreatic and hepatic anastomoses, which resulted in a pancreatic fistula rate of 18.6% but a mortality of only 2%. Sutton CD et al in 2004 reported a series of 61 patients with zero postoperative pancreaticoenteric leaks and mortality rate of 5%. [62/17].However, recent studies have not borne out this promise of better results .In a recent randomised controlled trial, El Nakeeb et al analysed 90 patients randomly assigned to isolated Roux loop pancreaticojejunostomy with those of pancreaticogastrostomy after pancreaticoduodonectomy.They concluded that Isolated loop Pancreaticojejunal anastomosis was not associated with a lower rate of post operative pancreatic fistula , but was associated with a decrease in the incidence of postoperative steatorrhea and

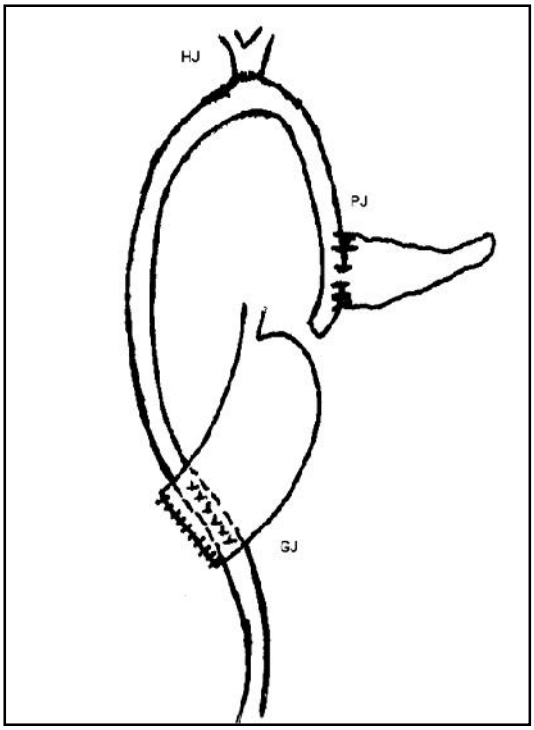
the technique allowed for early oral feeding and the maintenance of oral feeding even if post operative pancreatic fistula developed.[63]

Operative details of isolated Roux loop pancreaticojejunal anastomosis:

A 40-cm long isolated loop of jejunum is fashioned and passed in the retrocolic plane through the mesocolon for pancreaticojejunal anastomosis .

Isolated Loop PJ **Single loop PJ**





The anastomosis is done by a duct to mucosa technique or a dunking technique using 3.0/4.0 prolene interrupted sutures for the anastomosis.

BILIARY-ENTERIC ANASTOMOSIS:

In contrast to the pnacreaticoenteric anastomosis, there are fewer variations to the technique employed for the biliary-enteric anastomosis. This anastomosis usually is constructed in an end-to-side manner with a single interrupted layer of monofilament absorbable sutures (PDS 5-0) with C1 needle.

The anastomosis is positioned at about 20 to 30 cm downstream from the pancreaticojejunostomy in case of a pancreaticogastrostomy or a single loop PJ.

RECONSTITUTION OF GI CONTINUITY:

Based on whether a distal gastrectomy or a PPPD was performed, the reconstruction is done by a gastrojejunostomy (distal gastrectomy) or a duodenojejunostomy (PPPD).

Abdominal Drains and Nasogastric Tube.

Intraperitoneal drains have been placed near the biliary and pancreatic anastomosis intending to control leakage of blood or biliary, lymphatic, or pancreatic secretions. This practice has been prophylactic in nature, and it is based more on habit rather than evidence. This practice has been challenged more recently. A randomized trial addressing the value of

drains after pancreatic resection found that placement of drains did not translate into a reduction in surgical morbidity [64]. Rather, a significantly higher proportion of patients randomized to the drain group development intraperitoneal sepsis, fluid collection, or fistula.

RESULTS

After resection of periampullary and pancreatic cancer, longterm survival is determined largely by the site of origin of tumour. In an evaluation 242 patients with resected periampullary adenocarcinoma at the Johns Hopkins Hospital, the 5-year actual survival rate for the entire cohort was 20%[55]. Actual 5-year survival rates were the best for duodenal adenocarcinoma (59%) compared with the rest: ampullary (39%), distal bile duct (27%) and pancreas (15%). For the entire group of patients surviving 5 or more years, there were statistically more duodenal and ampullary primaries, fewer node-positive resections, [35] fewer margin-positive resections, and more well differentiated tumours compared with patients who failed to survive 5 years.

In an analysis of 616 patients with resected adenocarcinoma of the pancreas at the Johns Hopkins Hospital, several factors were found to influence long-term survival shows that lymph node involvement, margin positivity; tumour size greater than or equal to 3 cm, and poor tumour

differentiation all resulted in worse survival. Although there is some controversy over whether patients do worse with pancreatic adenocarcinoma arising from the left side versus the right side of the gland, for patients who undergo resection, there seems to be no statistical difference in survival. By multivariate analyses, pathologic factors identified as prognostically favorably affecting outcome were, negative resection margin, tumour diameter less than 3 cm, and good to moderate tumour differentiation. Particularly for pancreatic primaries, an important observation is that the survival rate continues to decline after 5 years, mostly owing to recurrent disease; 5-year survival does not indicate a cure of pancreatic cancer, although the decrement in survival beyond 5 years is less steep than the decrement in survival from the time of surgery to 5 years postoperatively.

ADJUVANT THERAPY : POSTOPERATIVE

CHEMORADIATION AND CHEMOTHERAPY

Overall, the 5-year survival for all patients diagnosed with pancreatic cancer is only 3%. After resection, approximately15% to 20% of patients can be expected to survive 5 years, with most dying as a result of recurrent disease, manifesting locoregionally and distantly.These patterns of disease recurrence and general poor outcome support the

rationale for adjuvant chemoradiation. The first randomized controlled trial evaluating adjuvant therapy for pancreatic cancer was reported by the Gastrointestinal Tumour Study Group (GITSG). A survival benefit was seen in patients randomly assigned to radiation therapy combined with 5-fluorouracil (5-FU) compared with surgery alone (median survival 20 months versus 11 months). Despite limited accrual, the GITSG trial was the first to show a potential benefit for adjuvant therapy after the first to show a potential benefit for adjuvant therapy after resection of pancreatic cancer. Subsequent reports from the GITSG and single institutions supported the use of adjuvant chemoradiation. A randomized controlled trial done by the European Organization for Research and Treatment of Cancer showed a trend toward improved survival with adjuvant 5-FU-based chemo radiation compared with surgery alone in patients with periampullary and pancreatic cancer (Klinkenbijl et al, 1999); however, this study was statistically underpowered and reported as a negative trial.The results from the European Study Group for Pancreatic Cancer (ESPAC-1) trial were reported by Neoptolemos and colleagues (2004). Compared with the observation group, however, patients who received chemoradiation alone seemed to have a worse median survival, suggesting a possible role for treatment-related toxic radiation effects. Although

controversy surrounds the use of adjuvant chemoradiation, several on-going clinical trials are exploring various regimens.

NEOADJUVANT THERAPY

In theory, there are several potential advantages of therapy administered in the neoadjuvant (preoperative) versus the post operative adjuvant setting. In a series of 132 patients with resectable pancreatic cancer at the M.D. Anderson Cancer Center, the investigators reported that various neoadjuvant chemoradiation regimens followed by pancreaticoduo- denectomy can be completed successfully with a median survival of 21 months. Currently, there is no proven survival benefit of neoadjuvant chemoradiation compared with postoperative therapy; however, numerous trials are ongoing.

MATERIALS AND METHODS

All patients admitted with a diagnosis of periampullary carcinoma or carcinoma head of pancreas, between August 2011 to February 2014 were evaluated by imaging studies and those patients found to have resectable disease were selected for study.

All data were collected prospectively and the clinical parameters were noted in a proforma. Details noted included age, gender, chief complaints, co-morbid illness, nature of diet, habit of smoking and alcohol consumption were also noted. Findings on physical examination such as jaundice, pallor, pedal edema and other signs of liver failure if present were noted. Clinical examination of the abdomen was done to look for a palpable gallbladder, hepatomegaly and free fluid. A per rectal examination to rule out any possibility of rectal deposits. Basic biochemical and hematologic investigations including a complete blood count, Renal function tests and Liver function tests were noted. Coagulation profile and serum tumour marker study was done for all patients. After an initial ultrasonogram of abdomen, an upper GI endoscopy and contrast enhanced computerised tomography was done for all patients.

A total of 128 patients with operable growth in the pancreatic head, ampullary, distal bileduct and duodenum in the periampullary region were included in the study group. Informed consent was obtained from all the patients explaining the nature of illness and the magnitude of morbidity and mortality. Whenever possible if a growth is seen at endoscopy or side viewing endoscopy, a biopsy was attempted. MRI was not done routinely, but if already available at admission and the information needed to assess the resectability is sufficient, a CECT abdomen was not requested .The performance status of the patient is assessed and the cardiorespiratory status evaluated. Hydration status, nutritional status and coagulation profile are noted and corrected if necessary with injection vitamin K and fresh frozen plasma. All patients were encouraged to have incentive spirometry for 2 weeks before surgery. For patients with bilirubin more than 15 mg% , poor performance status, and poor nutritional status and for those presenting with cholangitis a preoperative endoscopic biliary drainage was performed except for one patient for whom we have performed an operative biliodigestive bypass before pancreaticoduodenectomy. All patients in the study were subjected for a standard whipple's pancreaticoduodenectomy. With the patient in supine position abdomen is opened by a rooftop incision and thorough laparotomy done. After ascertaining the operability once more resection is proceeded.

Reconstruction pancreaticoenteric anastamosis was done either in the form of a pancreaticogastrostomy , pancreaticojejunostomy or isolated loop pancreaticojejunostomy as per the choice of operating surgeon.

Pancreaticogastrostomy is done usually by the invaginating(dunking) technique in two layers. Pancreaticojejunostomy is done as an end to side anastomosis by Buchler's technique. Isolated loop pancreaticojejunostomy is done by fashioning an isolated jejuna loop, 40 cm long ,taken in a retrocolic plane. Anastomosis was end to side either duct to mucosa or dunking method . .Hepaticojejunostomy was done using 3-0 vicryl interrupted sutures by parachute technique. An antecolic gastrojejunostomy is done in either of the three. The duration of surgery, blood loss, number of transfusions, the technique of pancreaticoenteric, bilioenteric and gastrojejunal anastomosis were noted.

The day of removal of nasogastric tube, drainage tube and urinary catheter in the post-operative period were noted. The values of serum amylase and drainage tube amylase were noted on the 3rd and if necessary on the 5th postoperative day. A complete blood count and Liver function tests were obtained at the time of discharge. The length of postoperative stay was noted along with major complications like delayed gastric emptying, early and late haemorrhage, pancreatic leak, intra-abdominal

collection and other minor complications like wound infection, pneumonitis and urinary tract infection. The complications after whipple's operation as noted in the proforma were defined as follows:

Delayed Gastric Emptying

All patients who were unable to start oral fluids by 7th day and those who required ryles tube for more than 10 days or who required reinsertion after 10 days were considered to have delayed gastric emptying.

Haemorrhage

Bleeding complication following pancreaticoduodenectomy requiring monitoring, transfusion, radiological and surgical intervention were noted. Early haemorrhage occur within 24 hrs and late haemorrhage occurred after 24 hrs.

Pancreatic leak

Any measurable amount of fluid after day 3 in the drainage tube with amylase level more than 3 times that of serum values is suggestive of pancreatic leak and has been graded A,B & C according to the severity and plan of management.

Intra-abdominal collection

Any collection detected by ultrasonogram or CECT of more than 5 cm is noted as intra abdominal collection and planned for percutaneous drainage.

Wound infection

Any collection of pus or fluid at the operated site with mild fever, leucocytosis and local inflammatory signs in the absence of any major complications is defined as wound infection. It was managed by letting out the pus or fluid, sending it for culture and sensitivity treating with appropriate antibiotics.

Pneumonitis

Any post-operative lung signs with fever and diminished air entry is defined as basal pneumonitis and aggressively treated by ambulation,chest physiotherapy, antibiotics and nasal oxygen.

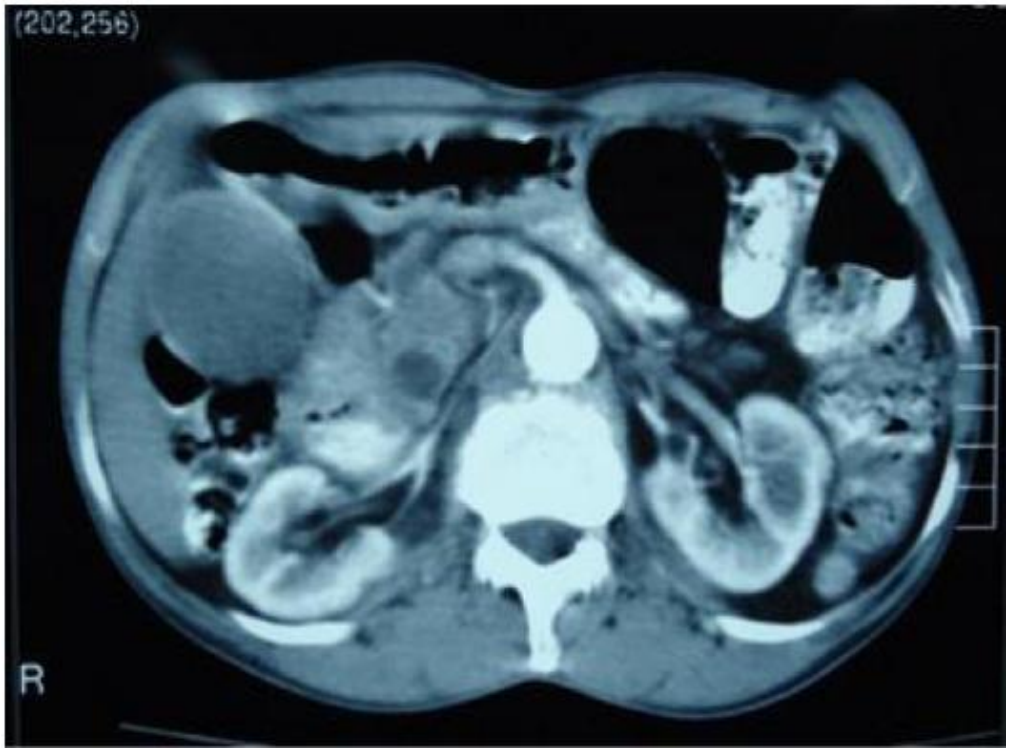
Urinary Tract Infection

Patients presented with fever with no other sources and positive urinary culture. Treated by hydration, antibiotics and adequate glycemic control.

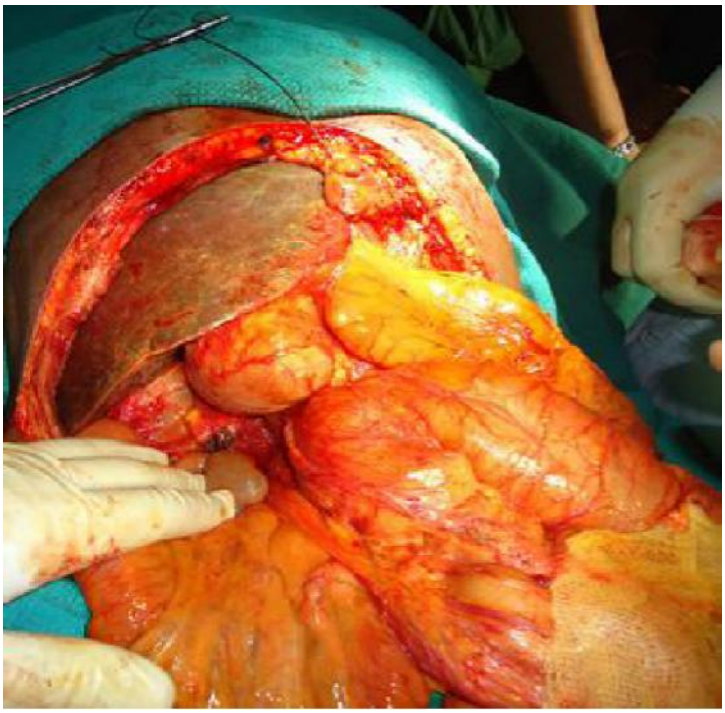
STATISTICAL ANALYSIS

The data collected in the proforma were entered in an excel sheet of Microsoft Office software and inference obtained after statistical analysis. The mean and standard deviation were reported for continuous variables and for categorical variables proportions were computed. To compare and find the statistical significance between the two group proportions chi-square test was used and to compare between the two group means independent t-test was used. The P-values <0.05 were considered to indicate statistical significance.

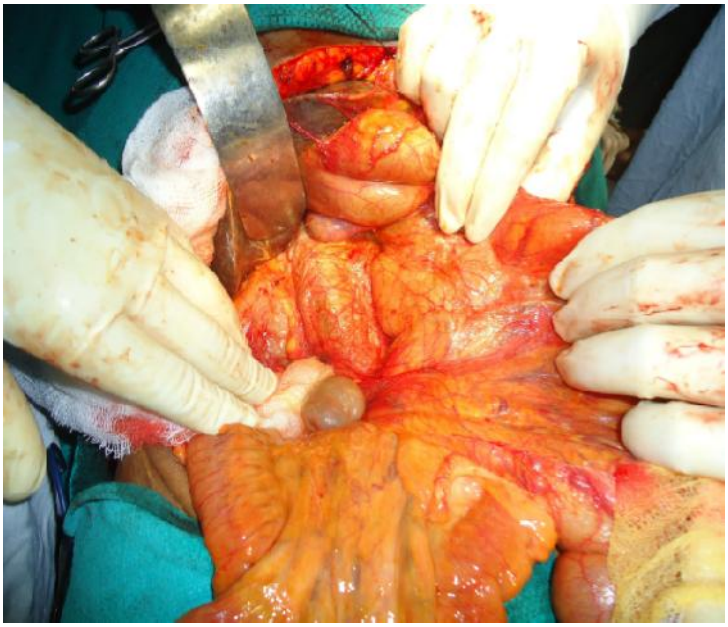
CECT ABDOMEN SHOWING PERIAMPULLARY LESION



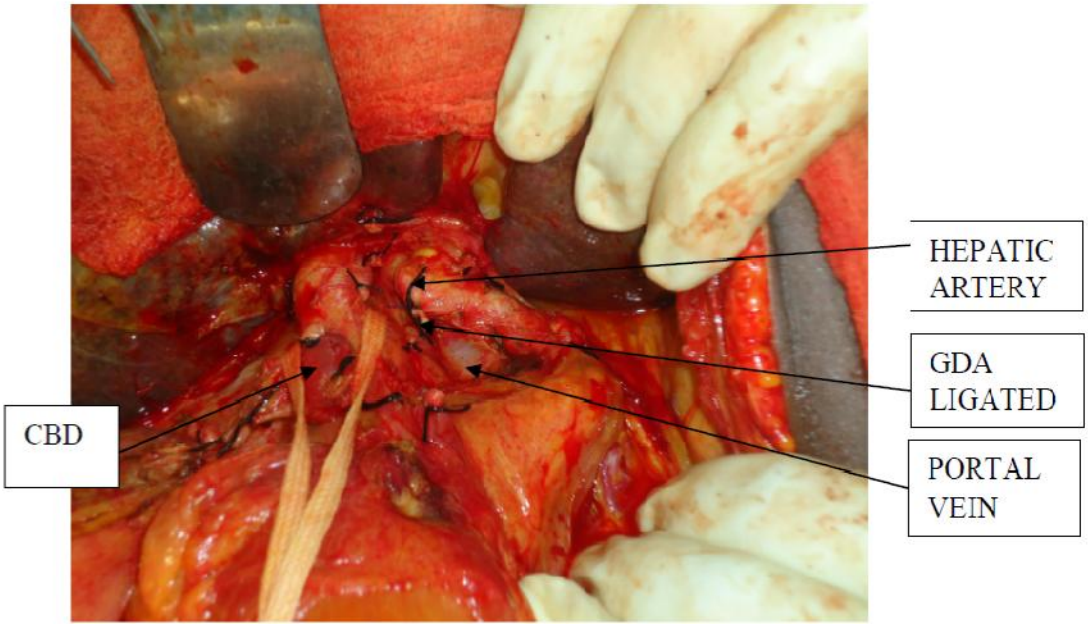
CHOLESTATIC LIVER WITH DISTENDED GALLBLADDER



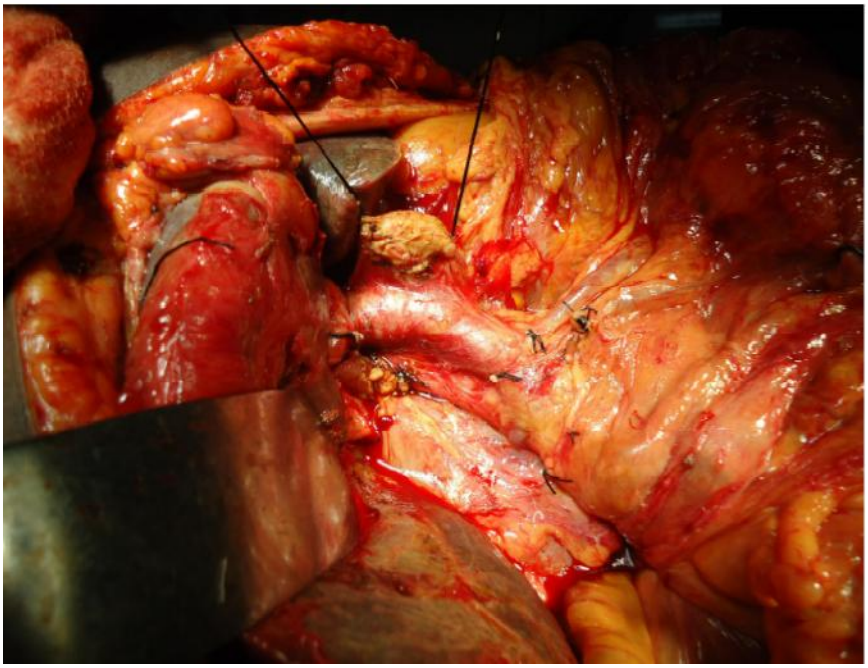
KOCHERISATION



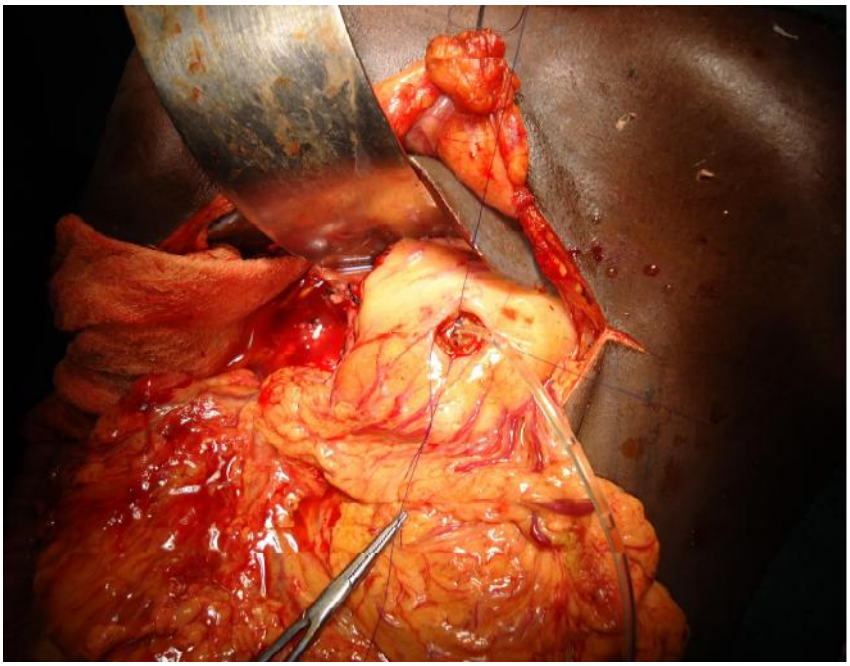
GASTRODUODENAL ARTERY LIGATION



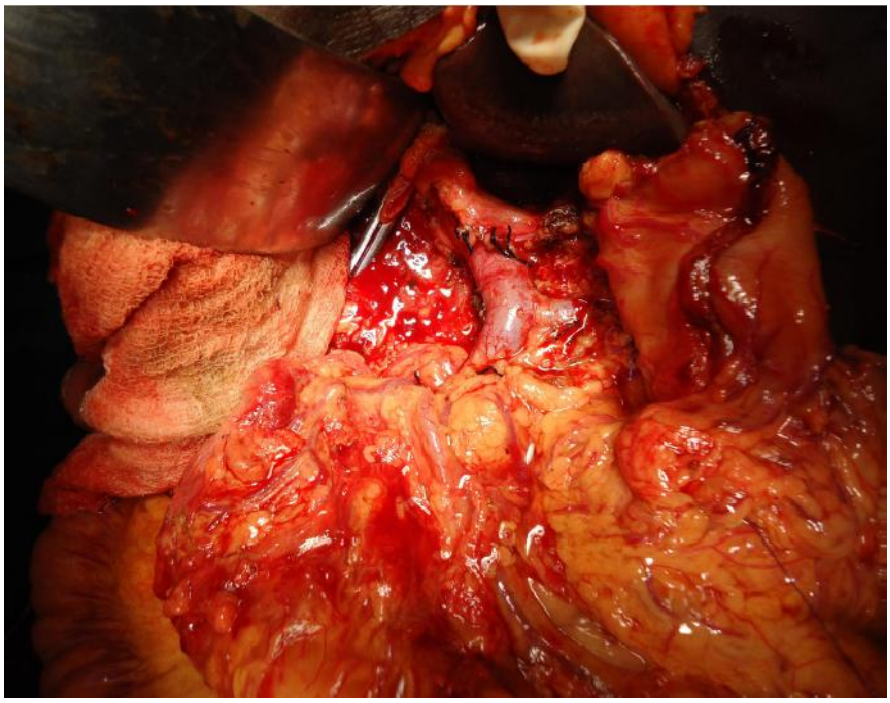
PANCREATIC REMNANT



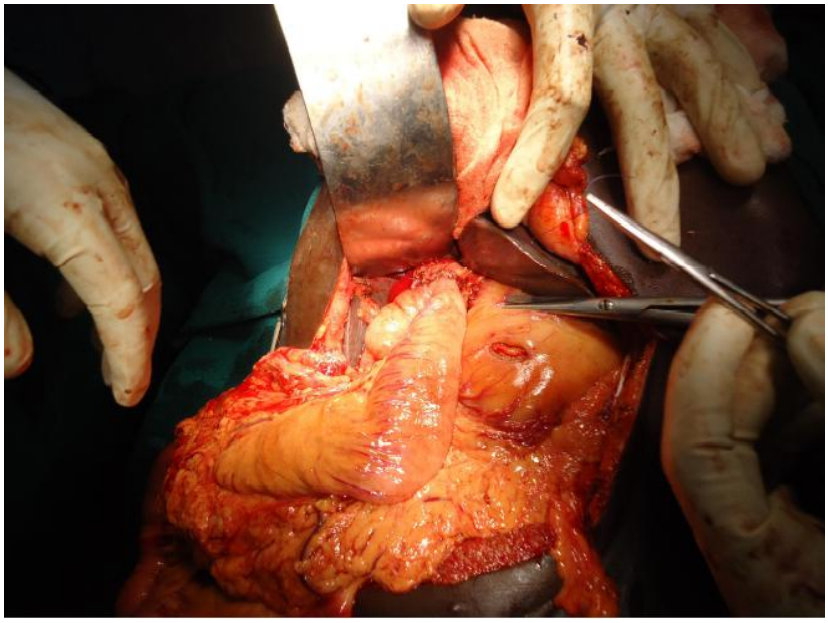
PANCREATICOGASTROSTOMY SEEN THROUGH ANTERIOR GASTROTOMY



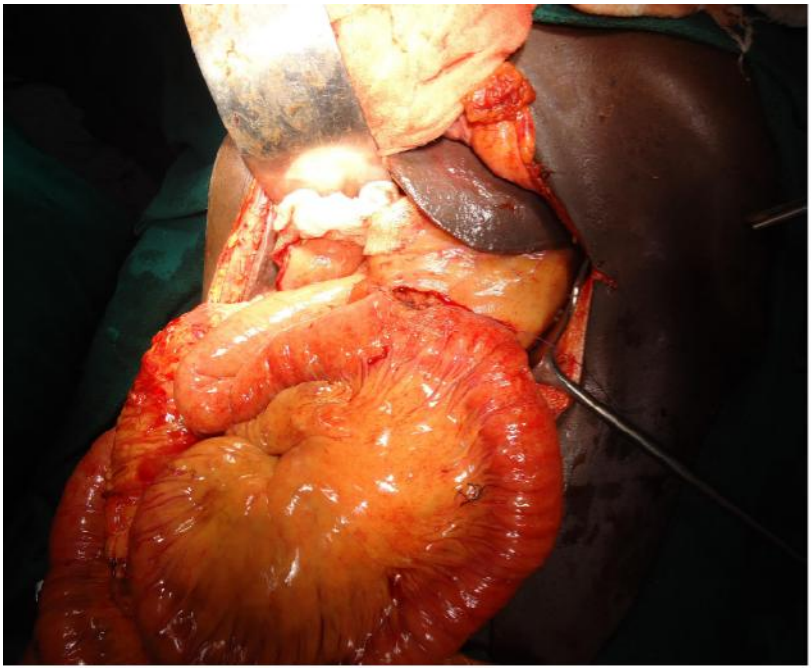
AFTER COMPLETION OF PANCREATICOGASTROSTOMY



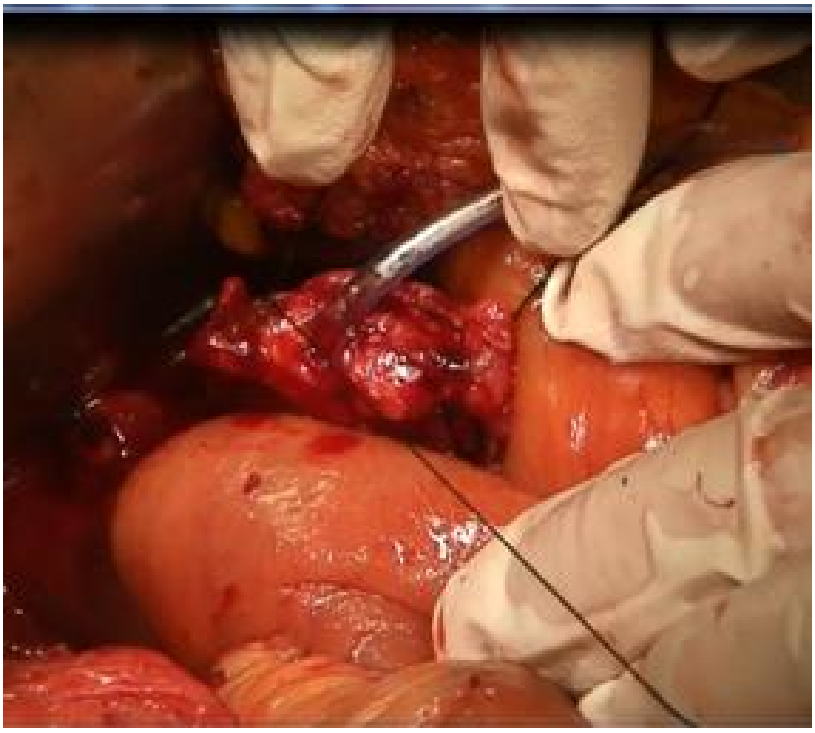
HEPATICOJEJUNOSTOMY



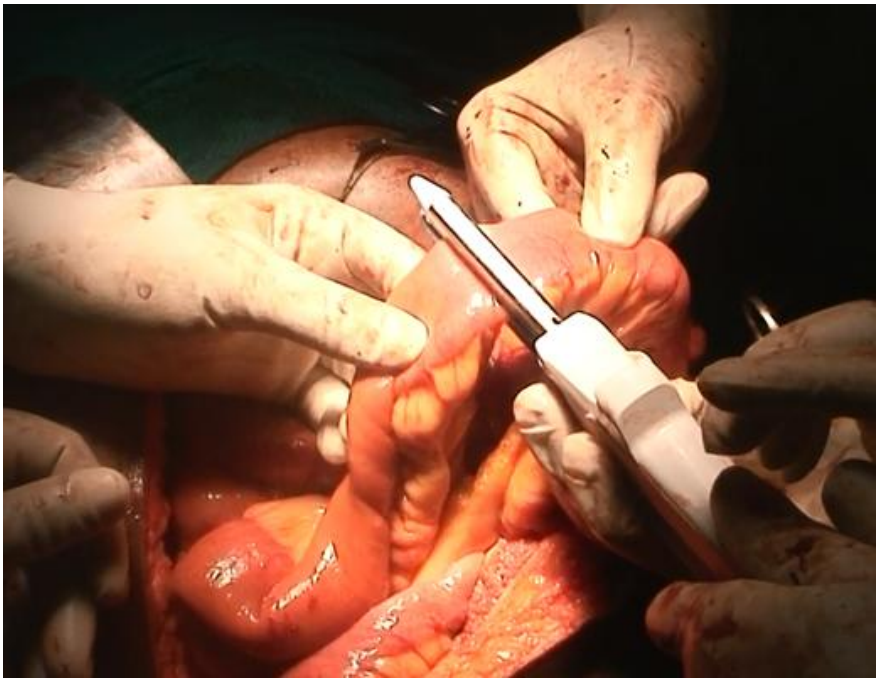
GASTROJEJUNOSTOMY



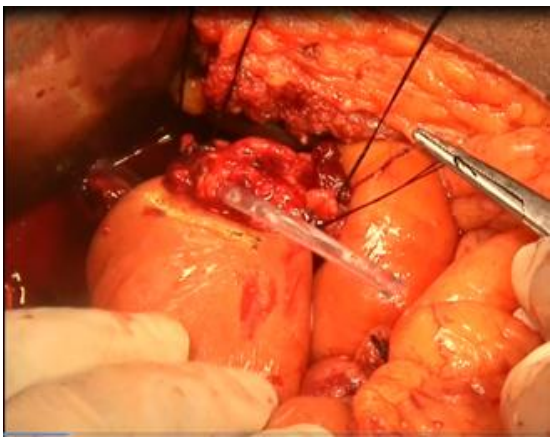
PANCREATIC STUMP MOBILISED

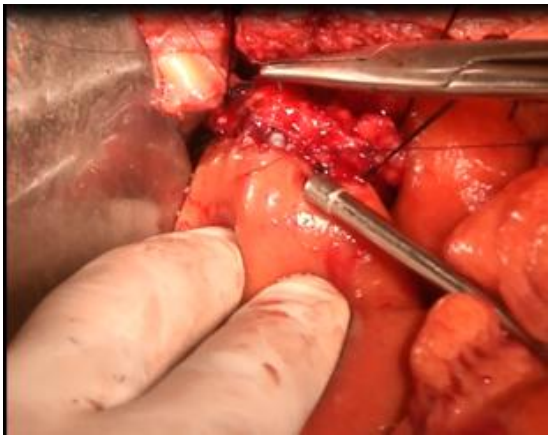


ROUX LOOP FASHIONED

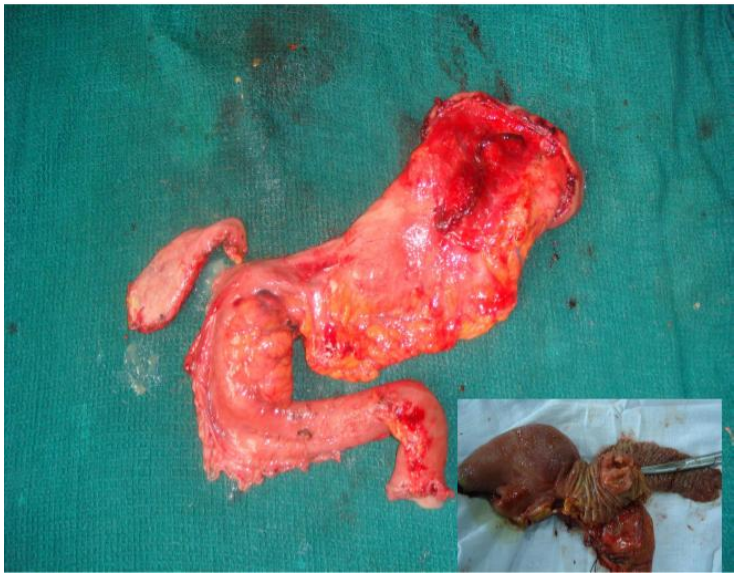


DUCT TO MUCOSA PJ ISOLATED LOOP





RESECTED SPECIMEN



RESULTS

Among the one hundred and thirty eight patients included in the study 62% were male and 38% were female patients. The minimum age was 30 and maximum age was 72 with a mean age of 51.7 .On clinical presentation 90% had jaundice, 86% had abdominal pain, 84% had weight loss, 56% had pruritus, 11% had fever, 12% had cholangitis and 28% had other symptoms such as nausea, vomiting, loss of appetite and constipation.

SYMPTOMATOLOGY

Symptoms	Frequency	Percentage
Jaundice	124	90
Abdominal pain	118	86
Weight loss	115	84
Pruritus	77	56
Cholangitis	15	11
Fever	16	12
Others	38	28

On evaluating the patients for co-morbid illness 24% had Diabetes Mellitus, 10% had hypertension 2% had bronchial asthma and 22% had previous surgery.

CO-MORBID ILLNESS & PREVIOUS SURGERY

Co-morbidity	Frequency	Percentage
Diabetes mellitus	28	20.2
Hypertension	26	18.8
COPD	15	10.86
Previous surgery	28	20.28

CLINICAL EXAMINATION

Findings	Frequency	Percentage
Icterus	112	81.15
Pallor	38	27.53
Palpable gallbladder	98	71.01
Hepatomegally	56	40.57

On examination, 81.15% were icteric and 27.53% had pallor. Gallbladder was palpable in 71.01% of patients and liver was palpable in 40.57% of patients. Liver echoes were found to be normal in 92% of

patients. Intrahepatic biliary radical dilatation was found in 96% and Common bileduct was dilated in 92% of the patients.

ULTRASONOGRAM FINDINGS

Parameters	Frequency	Percent
Liver echoes	127	92.02
IHBR Dilatation	136	96.37
CBD dilatation	128	92.75
Mass visualised	56	40.57

Ultrasonogram was able to diagnose the mass only in 40.57% of the patients. Vascular involvement of the portal vein alone was pre-operatively diagnosed in one patients who underwent resection. MRI scan was done in 32 % of patients. Biopsy was available in 65% of patients and pre-operative biliary drainage was done in 19.56% of patients.

PREOPERATIVE BIOPSY AND BILIARY DRAINAGE

Procedure	Frequency	Percent
BIOPSY DONE	91	65.94
PREOP BILIARY DRAINAGE	27	19.56

Among the study population the distribution of disease were as follows: periampullary 102[79.68%], pancreatic 15[11.7%], distal CBD 6[6%] and duodenal growth 5[4.6%].

Among the one hundred and thirty eight patients, patients with one morbidity condition were 14%, with two conditions were 12%, with three conditions were 14% and 60% had no morbidity. Among the complications delayed gastric emptying occurred in 57[44.53%], haemorrhage in 7[5.4%], pancreatic leak in 30.46%(grade A-20 [15.6%], grade B-12 [9.3%], and grade C-7[5.4%]), intraabdominal collection in 15%, wound infection in 22%, pneumonitis in 7%, urinary tract infection in 6% of patients. At the time of discharge about 84% had a normal blood count and 78 % had a normal liver function tests.

N=138	**Minimum**	**Maximum**	**Mean**	**Standard deviation**
Age	27	72	50.74	11.242
Hb	8.5	14.8	9.6	2.162
TC	4200	18000	8721.40	3362.493
P	42	92	71.62	9.710
L	10	43	26.92	8.342
E	0	11	4.84	2.339

ESR	11	165	64.20	31.768
TB	0	39	17.73	8.321
DB	0	22	12.34	5.832
SAP	75	770	310.72	181.230
Albumin	2.3	5.0	2.253	.4976
PT	11	22	12.46	2.132
INR	0.9	1.74	1.1322	0.1772
CA.19-9	8	244.9	51.314	41.712
DURN_SURG	180	660	310	111.56
BLOOD LOSS	80	4500	400	634.91
TRANSFUSION	2	8	2.90	1.465
RT_REMOVAL	2	45	5.63	2.328
URINARY	2	12	5.47	2.774
DT REMOVAL	2	20	8.63	5.016
SERUM AMYLASE	0	790	89.90	87.813
DT AMYLASE	0	7239	265.5	1281.30

INTRAOPERATIVE VARIABLES (PG Vs PJ Vs ISOL PJ)

	Technique	N	Mean	Standard deviation	P value
Duration of surgery	PG	39	240 minutes	35	0.562
	PJ	61	270 minutes	25	
	ISOL PJ	38	320 minutes	45	
Blood loss	PG	39	550 ml	125	0.562
	PJ	61	625ml	75	
	ISOL PJ	38	610ml	100	
Transfusion	PG	39	2.14 units	0.56	0.056
	PJ	61	2.35 units	0.75	
	ISOL PJ	38	3.45 units	1.09	

POSTOPERATIVE EVENTS (PG Vs PJ Vs Isol PJ)

	Technique	N	Mean	Standard deviation	P value
RT_Removal	PG	39	7.5	2.1	0.45
	PJ	61	7.77	7.2	
	PJ ISOL	38	8.2	8.5	
Urinary	PG	39	6.25	0.5	0.75
	PJ	61	6.73	1.03	
	PJ ISOL	28	6.66	1.5	
DT_removal	PG	39	9.33	2.2	0.052
	PJ	61	9.92	3.0	
	PJ ISOL	38	11.52	2.5	

Serum amylase	PG	39	68.58	22.4	0.65
	PJ	61	50.50	12.2	
	PJ ISOL	28	76.23	34.8	
DT amylase	PG	39	418.54	34.34	0.78
	PJ	61	151.69	22.9	
	PJ ISOL	38	224.35	45.2	
Post_stay	PG	39	12.58	2.3	0.81
	PJ	61	13.08	3.5	
	PJ ISOL	38	15.34	4.5	

When comparing between the three groups undergoing pancreaticogastrostomy , pancreaticojejunostomy and isolated loop pancreaticojejunostomy ,the incidence of delayed gastric emptying in the PG group was 38.46% , the incidence in the PJ group was 40.98% and in the isolated loop pancreaticojejunostomy group was 44.73%.The incidence of haemorrhage was 7.6% in the PG group, 6.5% in the PJ group and nil in the isolated PJ group . When comparing the incidence of leak between the three groups it was about 33% in the PG and 29.5% in the PJ group and 15.78% in isolated PJ group. The incidence of intra abdominal collection in the PG group was 7[17.9%], in the PJ group it was7[11.4%] and in the isolated PJ group was 5 [13.15%]. Regarding the incidence of minor

morbidities, the incidence of wound infection was 20.8% in the PG and 26.9% in the PJ group and 22% in isolated PJ group. The incidence of pneumonitis in the PG group was 2 [5.1%] compared to 4[6.5%] in the PJ group and 3[7.8%] in Isolated PJ group. The incidence of urinary tract infection in the PG group was 1[2.5%] and in the PJ group it was 2[3.2%].and 1 [2.6%] in isolated PJ group. The mean duration of nasogastric tube removal was 7.5 days in the PG group and 7.8 days in the PJ group and 7.0 in Isolated PJ group. The mean days of urinary catheter removal was 6.3 days in the PG and 6.7 in the PJ group and 8.0 in isolated PJ group. The mean days of drainage tube removal was 9.3 days in the PG and 9.9 days in the PJ group and 11 in the isolated loop PJ group. The mean postoperative hospital stay was 12.6 days in the PG group and 13.1 days in the PJ group and 11.2 in isolated PJ group

The mortality in the patients who underwent pancreaticogastrostomy was 5.1% ,in the pancreaticojejunostomy group was 4.9 %and 7.8 %in isolated loop PJ .The overall mortality rate was 5.79%.

MORTALITY (PG Vs PJ Vs Isolated Loop PJ]

Technique	Total No	Mortality	Percentage Mortality
PG	39	2	5.1
PJ	61	3	4.9
ISOL LOOP	38	3	7.8
Overall Mortality			5.79
P value 1.04			

DISCUSSION

Though the concept of cure after pancreaticoduodenectomy has been challenged, surgical resection is the only therapy for malignancies of the head of pancreas and periampullary region, which gives the patient a significantly increased survival. The mortality ranges between 3-5% and the morbidity following pancreaticoduodenectomy is still in the range of 40-60%. Morbidity and mortality arising out of such a major surgical intervention requires special attention for those with limited survival (10-30% are true 5 year survivors). Hence analyzing the peri-operative factors influencing the morbidity and mortality is important for improving outcome following this demanding surgical procedure. In our study we have evaluated the perioperative variables which influence the outcome between isolated loop pancreaticojejunostomy, single loop pancreaticojejunostomy and pancreaticogastrostomy . We have also tried to analyse whether isolated loop pancreaticojejunostomy gives better results compared to the other two anastomosis .We also tried to find out if there was any difference in outcome between duct to mucosa and dunking type anastomosis in each of the three types of anastomosis .

Age & sex

As per various studies the peak incidence of pancreatic cancer is in the 60's and 70's and the mean age at diagnosis is 60-65 years[11]. There is a slightly higher incidence in men than in women (relative risk 1.35) and advancing age is perhaps the stronger risk factor. In our study the minimum age at diagnosis was 30 and the maximum age was at 72. The mean age of presentation was 51.74 with a standard deviation of 10.9.

Out of the 128 patients (61.71%) were male and 19(38.29%) were female patients.

Clinical presentation

The hallmark of presentation for periampullary and pancreatic cancer is jaundice, resulting from obstruction of the intrapancreatic portion of the common bile duct[1] . Although some patients exhibit a vague abdominal pain, locally advanced pancreatic cancer with tumour invasion of celiac plexus typically causes a constant dull pain accompanied by back pain. on-specific symptoms such as nausea, anorexia, weight loss and fatigue are common in many patients. Weight loss of 10% or more is well known to affect outcome adversely with an overall increased susceptibility to postoperative complications. In our study 90% of patients presented with jaundice and 86% presented with abdominal pain. 84% presented

with weight loss, 56% presented with pruritus, 12% with fever and 14% with cholangitis. Other symptoms like nausea, vomiting, loss of appetite and fatigue were present in 28% of patients. Patients with cholangitis and poor performance status were subjected to endoscopic biliary drainage. All the 15 patients with cholangitis were managed initially by endoscopic biliary drainage. One of the patient who presented with cholangitis with performance status ECOG 3 as we were are not possible to drain either endoscopically or percutaneously we offered an operative biliodigestive bypass and resected subsequently. A total of 27 patients had preoperative biliary drainage .

Nutritional status and co-morbid illness

Lillemoe et al observed that 15-20% patients with pancreatic cancer had new-onset diabetes mellitus[11] . As many patients are elderly[33] there is also a higher incidence of co-morbid illness. Cardio-pulmonary testing assess the ability to deliver oxygen during stress and the need for postoperative ventilator support. Weight loss and dehydration are frequent features in such patients and hence need to be aggressively addressed. In our study diabetes mellitus was the major co-morbid illness with an incidence of 24%, hypertension 10%, bronchial asthma 2% and 21.8% had previous surgery particularly in the female population.

Out of the 8 patients with mortality 6 of the patients had hypertension and 6 patients had diabetes mellitus.. All patients with previous surgery were females and 15 out of the 28 patients had undergone puerperal sterilisation. Previous surgery did not have any impact in the duration of surgery when compared with patients who had no previous operation.

Personal habits

Though dietary habits have no direct influence, they have indirect influence in the form of nutritional status and hence the performance status. 60% of patients were non-vegetarians and 40% were vegetarians.

This dietary habit had no influence on the outcome. The study had 32% smokers and 48% with history of alcohol intake . Patients who were found to be nutritionally depleted were encouraged to take adequate enteral nutrition and albumin infusion was administered preoperatively. Patients with significant pulmonary co morbidity were all smokers. A period of abstinence from smoking for at least 2 weeks before surgery, incentive spirometry, lung function tests, nebulisation with bronchodilators and mucolytics, aggressive postoperative chest physiotherapy and ventilator support formed part of the management protocol for these patients . Among the patients with mortality three were smokers.

Physical examination

Jaundice was the most common clinical presentation with 82% and 20% were anaemic. Gall bladder was palpable in 78% of the patients and liver was palpable in 40%.

Imaging, endoscopy and biopsy

All patients underwent initial ultrasonogram of the abdomen and pelvis.

Liver was found to have normal echoes in 91.4% of patients with intrahepatic biliary radical dilatation in 97.6% of study group. Common bile duct dilatation was diagnosed in 96.8% of patients, whereas mass in the head of pancreas or periampullary region was diagnosed only in 34.37% of patients. Therefore the accuracy of ultrasonogram in detecting IHBR dilatation is more than that of CBD dilatation which in turn is more than the presence of mass. Hence ultrasonogram is an easily available, cost effective, less time consuming and adequate initial imaging study to differentiate between proximal and distal biliary obstruction but the disadvantage is the observer variation which is operator dependent. There is considerable evidence in literature that helical CT is the most efficacious initial imaging study[16] and is the most sensitive initial tool to diagnose and stage pancreatic cancer[17].Our practice is to do a 64 slice MDCT with

pancreatic protocol with vascular reconstruction for all patients to assess the resectablity with accuracy[18]. Those patients deemed to be unresectable by distant metastasis, peritoneal metastasis and vascular invasion were not included in the study except for one patient with solid and cystic components of head of pancreas with portal vein involvement for which we have done a pancreaticoduodenectomy and vascular resection with grafting.Upper GI endoscopy for all patients and attempted for a biopsy if feasible with a side viewing scopy. If clinical, biochemical and imaging modalities suggest distal obstruction and operable growth we proceed with surgery even if the biopsy turns out to be negative or inconclusive after explaining to the patient and the relatives of the possibility of a benign postoperative biopsy report. Out of the 138 patients 91patients were biopsied preoperatively and all the preoperative biopsies correlated with postoperative biopsy reports. Among these , 89 were periampullary carcinomas where biopsy was done by side viewing endoscopy and 2 were carcinoma head of pancreas , where CT guided FNAC was done .

Preoperative biliary drainage

There are 6 prospective randomized studies(Hattfield et al 1982,Mc person et al 1984, Smith et al 1985, Smith et al, Lai et al, Wig et al) which analysed the outcome after a preoperative biliary drainage.

Only 2 studies suggested that preoperative biliary drainage is beneficial (Smith et al & Wig et al). A meta-analysis by Sewnath has showed that routine preoperative biliary drainage carries no benefit[38]. Instead there is a high complication rate with prolonged hospital stay. Saleh and his associates have showed that there is no evidence of either a beneficial or an adverse effect of preoperative biliary stenting. We have done preoperative biliary drainage for 27 patients(19.56%). Majority of the indications were for cholangitis and the rest for poor performance status or with biliribin more than 15. Our current protocol is to opt for preoperative biliary drainage in patients with bilirubin more than 15 mg %.One patient underwent open surgical biliodigestive bypass for poor nutritional status with vomiting with ECOG3 and later proceeded with resection.

Provisional diagnosis

The distribution of diseases in our study as follows:

Periampullary102 (79.68%), head of pancreas 15(11.7%), duodenal 5 (4.6%) and distal bileduct 6(6%).

Biochemical parameters

The mean haemoglobin concentration was 9.8 with lowest at 8.7 and highest at 14.2 and the need for preoperative transfusion is decided when haemoglobin is less than 8g%.The mean total count was 6361.4 and the

highest was 18000 which is a clue to diagnose cholangitis earlier and hence decide upon urgent endoscopic biliary decompression. The mean bilirubin value is 15.8mg% as literature evidence suggests malignancy with a level above 10mg%. The mean serum alkaline phosphatase value was 304.8. Serum albumin was from 2.2 – 5.4 and the average value is 3.25g%.

Intraoperative factors

The mean duration of surgery was 296.79 minutes [4.94hours]with shortest duration of 4 hours and longest duration of 11 hours. This patient had a portal vein resection with venous graft. The mean blood loss was 646.52 ml and on an average blood requirement was 2.79 units per patient.

Type of anastomosis

Among the 138 patients 39 underwent pancreaticogastrostomy, 61 underwent pancreaticojejunostomy single loop and 38 underwent isolated loop pancreaticojejunostomy . On analyzing the preoperative variables among both the sub-groups they were almost comparable, with minor difference they were not statistically significant. There are 4 randomized controlled trials, [1]favouring pancreaticogastrotomy in terms of lesser leak rate (Fernandezcruz L et al,2008). 3 RCT's (Bassi et al, Yeo et al & Duffas et al) have showed PG and PJ to be similar in terms of leak rate. [1] A meta-analysis by Mc Kay et al has favoured PG and another meta-analysis by

Wente et al has shown no difference between both subgroups in terms of leak as well as major morbidity.

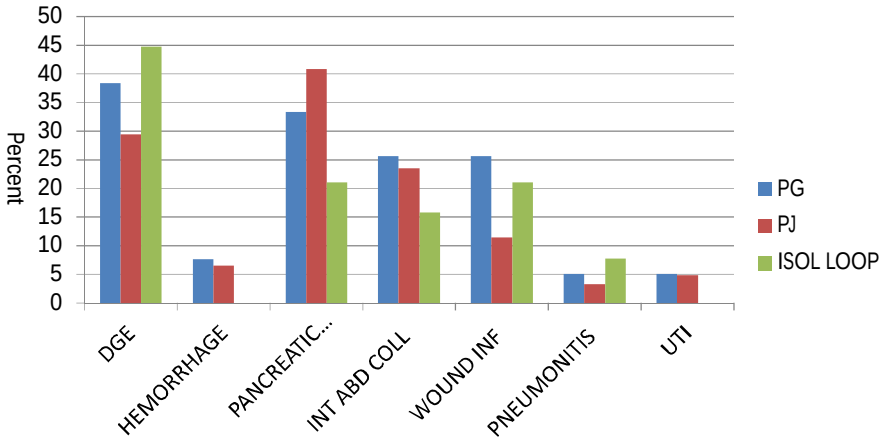
Operative time

Anastomosis	**No**	**Time**	**P value**	
			PJ Isol Vs PG	Pj Isol Vs PJ
PG	39	240 minutes		
PJ	61	270 minutes	0.045	0.052
ISOL PJ	38	320 minutes		

Mean operative time was 4hours in the PG group,4.5 hours in PJ group and 5.3 hours in isolated loop PJ group. On average , isolated loop anastomosis took 50 minutes longer than a single loop PJ and 80 minutes longer than a PG anastomosis .

The amount of estimated blood loss in PG group was 550 ml ,in the PJ group was 625 ml and 610 ml in isolate loop PJ group. Comparing between the three subgroups there was no significant difference in terms of removal of nasogastric tube, drainage tube and postoperative stay. Biochemical investigation reports at the time of discharge showed no significant difference between the three subgroups.

MORBIDITY



The incidence of haemorrhage was 7.6% (3) in the PG and 6.5% [4] in the PJ group .There were no hemorrhagic complications in the isolated PJ group. Four patients were managed by endoscopically and two patients were managed conservatively. One patient died following profuse bleeding from PG site despite endoscopic therapy .

The incidence of pancreatic leak was 33 % in the PG group compared to 29.5% the PJ group and 15.78 %.This shows a significant decrease with isolated loop anastomosis . There is also an improving trend as initially , we preferred PG anastomosis followed by PJ and then a move to Isolated loop PJ and raises the possibility of a learning curve effect .

The incidence of intra-abdominal collection was 25.64% in the PG group compared to 23.52 % in the PJ group and 21.05 % in the isolated PJ group.

The incidence of wound infection in the PG group was 25.64% and in the PJ group it was 26.4% and 21.05% in the Isolated loop PJ group . 5.8% patient developed pneumonitis in the isolated PJ group , but PG group had 5.1% and the PJ group had 4.7%.Urinary tract infection was seen in 5.1% in the PG group, 4.9 % in PJ group and none in the isolated loop PJ group.

DELAYED GASTRIC EMPTYING (PG Vs PJ Vs ISOL LOOP)

Delayed gastric emptying

	A	**B**	**C**	**Total [%]**	**P value**	
					ISOL PJ VS PG	**ISOL PJ VS PG**
PG	7	3	5	15[38.46]	0.052	0.045
PJ	15	6	4	25[40.98]		
Isolated loop	10	4	3	17[44.73]		
All[%]	32[25]	13[10.15]	12[9.3]	57[44.53]		

DGE Isolated loop

Anastomosis	Total number	A	B	C	Total%
Duct to mucosa	22	5	3	2	10[45.45]
Dunking	16	5	1	1	7[43.75]
Total	38	10[26.31]	4[10.52]	3[7.8]	17[44.73]
P value	0.75				

Haemorrhage

	Total	Early	Late	Luminal	Extra luminal	False extra luminal	Sentinel bleed	Mild	Severe
PG	3	2	1	1	2	0	1	2	1
PJ	4	2	2		4	0	0	4	
Isolated loop	0	0	0	0	0	0	0	0	
All	7[5.4%]	6[4.6%]	1[0.7%]	1[0.7%]	4[3.1%]	1[0.7%]	1[0.7%]	6[85.71%]	1[14.28%]

Anastomotic leak

	A	B	C	No leak	Total Leak %	Total	P Value	
							PG Vs ISOL	PJ Vs ISOL
PG	6	5	2	26	33	39	0.67	0.75
PJ	10	5	3	43	29.5	61		
Isolated loop	4	2	2	32	15.78	38		
Total	20	12	7		30.46			

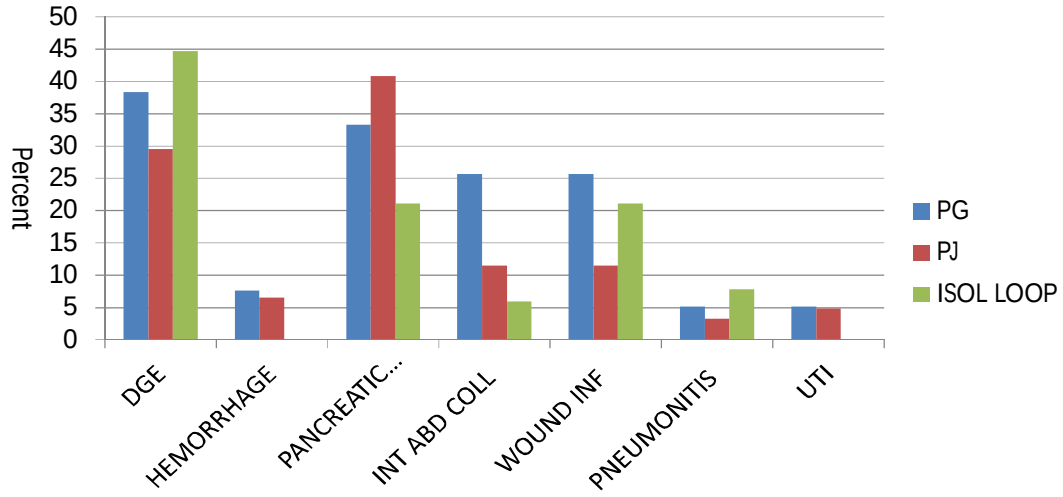
Isolated loop

Total No 38		A	B	C	No leak	Total leak %	P value	
							PG Vs ISOL	PJ VS ISOL
Duct to mucosa	22	2	0	0	20	9.09	1.02	1.24
Dunking	16	2	2	2	10	37.5		

Morbidity 49[39.28%]

	Leak	DGE	Haemorrhage	Wound infection	Intra abdominal collection	UTI	Pneumonitis
PG	13[33.33%]	15[38.4%]	3[7.6%]	10[25.64%]	10[25.64%]	2[5.1%]	2[5.1%]
PJ	18[29.5%]	25[40.9%]	4[6.5]	16[26.4%]	14[23.52%]	3[4.91%]	2[3.27%]
ISOL	8[21.05%]	17[44.7%	0	8[21.05%]	6[15.78%]	0	3[7.8%]
Total	39[30.46%]	57[44.53]	7[5.4%]	19[14.84%]	18[14.06%]	5[3.9%]	7[5.4%]
					Total		**159**

MORBIDITY



Among the 138 patients 57 patients developed delayed gastric emptying, 36 patients developed DGE and pancreatic leak and 17 patients developed other complications along with DGE and pancreatic leak accounting for a morbidity of 39.28%. The incidence of delayed gastric emptying in the PG group was38.46[15],in the PJ group which was 40.98%[25] and in the isolated limb PJ group was 44.73%[17]. The maximum days we have retained the nasogastric tube was for 26 days. We have managed the patients with prokinetics and maintaining them on enteral feeding through feeding jejunostomy. Pancreatic leak occurred in 39 patients with grade A leak in 20(15.62%), grade B leak in 12(9.37%) and grade C leak in 7(5.46%) patients. All patients with pancreatic leak were managed by non-operative means. Grade A leaks were managed

conservatively and grade B leaks required supportive care in the postoperative ward with drainage tube retained for a prolonged period and grade C leaks were managed aggressively in the ICU with one or more image guided percutaneous drainage tubes and nutritional support. We have not reoperated for a suspected leak.

Intra abdominal collection

Anastomosis	**Total number**	**Intra abdominal collection**
PG	39	10[25.64%]
PJ	61	7[11.47%]
Isol Loop PJ	38	6[15.78%]
Total		23[16.6%]

P =0.67 not significant

Pneumonitis

Anastomosis	Total number	Pneumonitis
PG	39	2[5.1%]
PJ	61	2[3.27%]
Isol Loop PJ	38	3[7.8%]
Total		7[5.4%]

P= 0.564

Wound Infection

Anastomosis	Total number	Wound infection
PG	39	10[25.64%]
PJ	61	7[11.47%]
Isol Loop PJ	38	8[21.05%]
Total		19[14.84%]

UTI

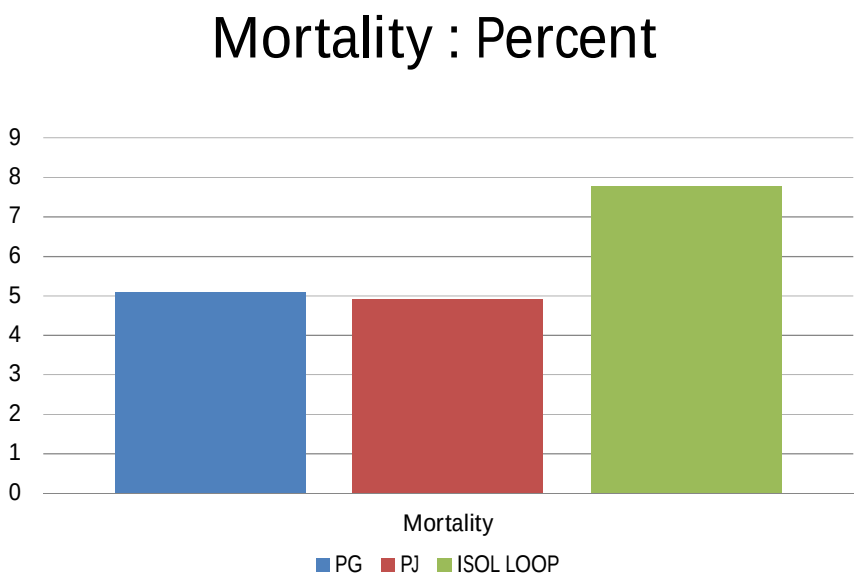
Anastomosis	Total number	UTI
PG	39	2[5.1%]
PJ	61	3[4.91%]
Isol Loop PJ	38	0
Total		5[3.9%]

P=0.768

Mortality

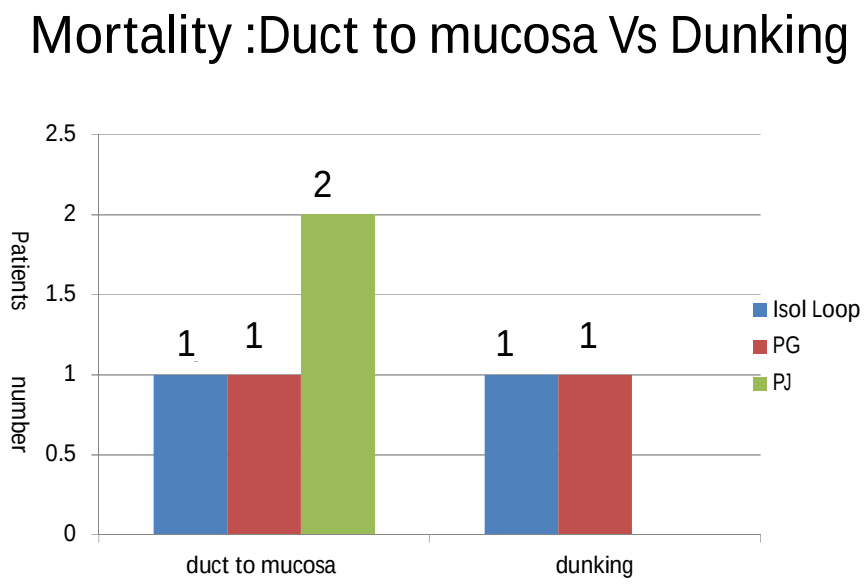
	Mortality [%]	Duct to mucosa	Dunking
PG	2[5.1]	1	1
PJ	3[4.9]	2	0
Isolated loop	3[7.8]	1	1
Total			8[5.7]

P=1.078



The mortality rate in our study was 5.7% (5.1% in PG group and 4.9% in PJ group, 7.8% in isolated loop PJ group). The mortality rate in the literature is in the range of 3-5%. In our study the reason for mortality were due to cardirespiratory impairment due to myocardial infarction and other two cases were due to haemorrhage and metabolic encephalopathy. One of the patient had an urgent endoscopy and we could not find any bleeding points except for clots. Patient was on ventilator with haemodynamic support and could not be shifted for angioembolisation. We reopened and explored but could not find the source and patient succumbed with multiorgan failure. The other patient was haemodynamically unstable on day 4 and before we could intervene patient succumbed due to metabolic encephalopathy. Both the patients had adequately controllable co-morbid illnesses. Though our study showed a

33.3% leak in the PG group and 29.5% in the PJ and 21.05%leak rate in the isolated loop PJ group, the incidence of type C leak was 6.4% in th PG group , 4.91% in PJ group and 5.1 % in the isolated loop PJ group .Two of these in the isolated limb PJ group died of multiorgan failure and sepsis .Both of these did not have pancreatic anastomotic leak .One in the PG group succumbed to hemorrhagic complications .



In summary, there is no significant difference in mortality rate between the three types of anastomosis, though the incidence of higher grade fistulae and fistula related mortality was lower with isolated loop .Incidence of delayed gastric emptying is higher and hospital stay longer with isolated loop anastomosis.

CONCLUSION

In comparison to pancreatico gastrostomy or single loop pancreatico jejunostomy, Isolated loop pancreatico jejunal anastomoses might lead to lower incidence of higher grade of pancreatic leak in both soft and in normal pancreas.

Both dunking and duct to mucosa type anastomoses seem to have similar incidence of leaks , in all three type of anastomosis .

There is no significant difference in mortality rate between the three types of pancreaticoenteric anastomosis .However , incidence of higher grade leak and anastomotic leak related mortality is lower with isolated loop anastomosis

Incidence of delayed gastric emptying seems to be higher and hemorrhagic complications rarer with isolated loop pancreaticojejunal anastomosis compared to other types of pancreaticoenteric anastomosis.

So , isolated loop pancreatic stump anastomosis seems to be less prone to anastomotic leak though there is higher incidence of delayed gastric emptying and prolonged hospital stay.

BIBLIOGRAPHY

1. Blumgart LH, Surgery of the liver biliary tract and pancreas, Fourth edition,867-903.

2. Maingot's Abdominal operations,11th edition:1031-1050.

3. Schafer et al,2002 Evidence based pancreatic head resections for pancreatic cancer and chronic pancreatitis. Ann Surg 236;137-148

4. Child CG III,1985 History of pancreatic surgery.In Toledo-Pereya LH, The pancreas- Principles of medical and surgical practice. New York john wiley & sons.

5. Kausch W 1912, Das Karzinoma der papilla duodeni and seine radikale entfernung, Betir Klin Chir 78:439-486

6. Whipple AO,1941:The rational of radical surgery for cancer of the pancreas and ampullary region.Ann Surg 114:612

7. Hunt VC,1941 :Surgical management of carcinoma of the ampulla of vater and the periampullary portion of the duodenum.Ann Surg 114:570

8. Imamura M et al 2004,A randomized multicenter trial comparing resection and radiochemotherapy for resectable locally invasive pancreatic cancer surgery 136:1003-1011

9. Conlon KC et al 1996, Long term survival after curative resection for pancreatic ductal adenocarcinoma : clinicopathological analysis of 5 year survivors.Ann Surg 223:273-279

10. Jemal A, et al, 2004: Cancer statistics, 2004. CA Cancer J Clin 54:8-29

11. Lillemoe KD, et al, 2000: Pancreatic cancer: state of the art care CA Cancer j Clin 50:241-268

12. Yeo, 2002a. Yeo TP, et al: Pancreatic cancer. Curr Probl Cancer 2002; 26:176-275.

13. Spanknebel and Conlon, 2001. Spanknebel K, Conlon KC: Advances in the surgical management of pancreatic cancer. Cancer J 2001; 7:312-323.

14. Haller, 2002. Haller DG: Future directions in the treatment of pancreatic cancer. Semin Oncol 2002; 29(suppl 20):31-39.

15. Li, 2004. Li DH, et al: Pancreatic cancer. Lancet 2004; 363:1049-1057.

16. Freeny, 2001. Freeny PC: Pancreatic carcinoma: what is the best imaging test?. Pancreatology 2001; 1:604-609.

17. Cooperman, 2001. Cooperman AM: Pancreatic cancer: the bigger picture. Surg Clin North Am 2001; 81:557-574.

18. Murcia, 2001. Murcia NM, et al: Multidetector CT of the pancreas and bile duct system: value of curved planar reformations. AJR Am J Roentgenol 2001; 173:689-693.

19. Kalra, 2003a. Kalra MK, et al: State-of-the-art imaging of pancreatic neoplasms. Br J Radiol 2003; 76:857-865.

20. Lu, 1997. Lu DS, et al: Local staging of pancreatic cancer: criteria for unresectability of major vessels as revealed by pancreaticphase, thin-section helical CT. AJR Am J Roentgenol 1997; 168:1439-1443.

21. O'Malley, 1999. O'Malley ME, et al: Adenocarcinoma of the head of the pancreas: determination of surgical unresectability with thin-section pancreatic-phase helical CT. AJR Am J Roentgenol 1999; 173:1513-1518.

22. Hough, 1999. Hough TJ, et al: Teardrop superior mesenteric vein: CT sign for unresectable carcinoma of the pancreas. AJR Am J Roentgenol 1999; 173:1509-1512.

23. Copel, 2003. Copel L, et al: Use of three-dimensional CT in the abdomen: a useful preoperative planning tool. Surg Technol Int 2003; 11:71-78

24. Clarke, 2003. Clarke DL, et al: Preoperative imaging of pancreatic cancer: a management-orientated approach. J Am Coll Surg 2003; 196:119-129.

25. Romijn, 2000. Romijn MG, et al: MRI with mangafodipir trisodium in the detection and staging of pancreatic cancer. J Magn Reson Imaging 2000; 12:261-268.

26. Gress, 2001. Gress F, et al: Endoscopic ultrasonography-guided fine-needle aspiration biopsy of suspected pancreatic cancer. Ann Intern Med 2001; 134:459-464.

27. Di Cesare, 2003. Di Cesare E, et al: Malignant obstructive jaundice: comparison of ERCP and MRCP in the evaluation of distal lesions. Radio Med (Torino) 2003; 105:445-453.

28. Annovazzi, 2003. Annovazzi A, et al: 18-Fluorodeoxyglucose positron emission tomography in nonendocrine neoplastic disorders of the gastrointestinal tract. Gastroenterology 2003; 125:1235-1245.

29. Berberat, 1999a. Berberat PO, et al: Diagnosis and staging of pancreatic cancer by positron emission tomography. World J Surg 1999; 23:882-887.

30. Conlon and Minnard, 1997. Conlon KC, Minnard EA: The value of laparoscopic staging in upper gastrointestinal malignancy. Oncologist 1997; 2:10-17.

31. Hennig, 2002. Hennig R, et al: Staging laparoscopy and its indications in pancreatic cancer patients. Dig Surg 2002; 19: 484-488.

32. Lillemoe, 2000. Lillemoe KD, et al: Pancreatic cancer: state-ofthe-art care. CA Cancer J Clin 2000; 50:241-268.

33. Lankisch, 2002. Lankisch PG, et al: Epidemiology of pancreatic diseases in Luneburg County: a study in a defined German population. Pancreatology 2002; 2:469-477.

34. de Lalla, 2002. de Lalla F: Surgical prophylaxis in practice. J Hosp Infect 2002; 50(suppl A):S9-S12.

35. Gupta and Ihmaidat, 2003. Gupta R, Ihmaidat H: Nutritional effects of oesophageal, gastric and pancreatic carcinoma. Eur J Surg Oncol 2003; 29:634-643.

36. Li-Ling and Irving, 2001. Li-Ling J, Irving M: Somatostain and octreotide in the prevention of postoperative pancreatic complications and the treatment of enterocutaneous pancreatic fistulas: a systematic review of randomized controlled trials. Br J Surg 2001; 88:190-199.

37. Stojadinovic, 2003. Stojadinovic A, et al: An evidence-based approach to the surgical management of resectable pancreatic adenocarcinoma. J Am Coll Surg 2003; 196:954-964.

38. Sewnath, 2002. Sewnath ME, et al: A meta-analysis on the efficacy of preoperative biliary drainage for tumours causing obstructive jaundice. Ann Surg 2002; 236:17-27.

39. Saleh, 2002. Saleh MMA, et al: Preoperative endoscopic stent placement before pancreaticoduodenectomy: a meta-analysis of the effect on morbidity and mortality. Gastrointest Endosc 2002; 56:529-534.

40. Basse, 2002. Basse L, et al: Accelerated postoperative recovery programme after colonic resection improves physical performance, pulmonary function and body composition. Br J Surg 2002; 89: 446-453.

41. Skandalakis, 2004. Skandalakis JE, et al: Hepatic surgical anatomy. Surg Clin N Am 2004; 84:413-435.

42. Pedrazzoli, 1998. Pedrazzoli S, et al: Standard versus extended lymphadenectomy associated with pancreatoduodenectomy in the surgical treatment of adenocarcinoma of the head of the pancreas: a multi-centre prospective randomized study. Lymphadenectomy Study Group. Ann Surg 1998; 228:508-517.

43. Yeo, 1999. Yeo CJ, et al: Pancreatoduodenectomy with or without extended retroperitoneal lymphadenectomy for periampullary adenocarcinoma: comparison of morbidity and mortality and short term exposure. Ann Surg 1999; 229:613-622.

44. Yeo, 2002. Yeo CJ, et al: Pancreaticoduodenectomy with or without extended distal gastrectomy and extended retroperitoneal lymphadenectomy for periampullary adenocarcinoma, part 2. Ann Surg 2002; 236:355-368.

45. Nimura, 2004. Nimura Y, et al: Standard versus extended lymphadenectomy in pancreatoduodenectomy for pancreatic cancer: a multicenter randomized controlled trial. Pancreatology 2004; 4:274.(abstract).

46. Berberat, 1999b. Berberat PO, et al: Prevention and treatment of complications in pancreatic cancer surgery. Dig Surg 1999; 16: 327-336.

47. Trede, 2001. Trede M, et al: Personal observations, opinions, and approaches to cancer of the pancreas and periampullary area. Surg Clin North Am 2001; 81:595-610.

48. Zenilman, 2000. Zenilman ME: Use of pancreaticogastrostomy for pancreatic reconstruction after pancreaticoduodenectomy. J Clin Gastroenterol 2000; 31:11-18.

49. Yeo, 1995a. Yeo CJ, et al: Pancreaticoduodenectomy for cancer of the head of the pancreas: 201 patients. Ann Surg 1995; 221:721-731.

50. Yeo, 1995b. Yeo CJ, et al: A prospective randomized trial of pancreaticogastrostomy and pancreaticojejunostomy after pancreaticoduodenectomy. Ann Surg 1995; 222:580-588.

51. Wente MN,Shrikande et al ,Pancreaticojejunostomy versus pancreaticogastrostomy:systematic review and meta-analysis

52. Ramesh H, Pancreaticojejunostomy versus pancreaticogastrostomy in reconstruction following pancreaticoduodenectomy,

53. Khan AW, Aggarwal AK, Davidson BR. (2002) Isolated Roux loop duct to mucosa pancreaticojejunostomy avoids pancreatic leaks in pancreaticoduodenectomy. *Dig Surg* 19:199–204.

54 . Sutton CD, Garcea G, White SA, O'Leary E, Marshall LJ, Berry DP *et al*. (2004) Isolated Roux loop pancreaticojejunostomy: a series of 61 patients with zero postoperative pancreaticoenteric leaks. *J Gastrointest Surg* 8: 701–705.

55. Funovics JM, Zöch G, Wenzl E, Schulz F. (1987) Progress in reconstruction after resection of the head of the pancreas. *Surg Gynecol Obstet* 164:545–548.

56. Kingsnorth AN. (1994) Safety and function of isolated Roux loop pancreaticojejunostomy after Whipple's pancreaticoduodenectomy. *Ann R Coll Surg Engl* 76:175–179.

57. Albertson DA. (1994) Pancreaticoduodenectomy with reconstruction by Roux en Y pancreaticojejunostomy: no operative mortality in a series of 25 cases. *South Med J* 87:197–201.

58. Papadimitriou JD, Fotopoulos CA, Smyrniotis B, Prahalias AA, Kostopanagiotou G, Papadimitriou LJ. (1999) Subtotal

pancreatoduodenectomy. Use of a defunctionalized loop for pancreatic stump drainage. *Arch Surg* 134:135–139.

59. Jover JM, Carabias A, Feurte S, Ríos R, Ortega I, Limones M. (2006) Results of defuntionalized jejunal loop after pancreaticoduodenectomy. *Cir Esp* 80:373–377.

60. Machado MC, Monterio da Cunha JE, Bachella T, Bove P. (1976) A modified technique for the reconstruction of the alimentary tract after pancreatoduodenectomy. *Surg Gynecol Obstet* 143:271–273.

61. Funovics JF, Zoch G, Wenzel G, Schulz M. Progress in reconstruction after resection of the head of the pancreas. Surg Gynecol Obstet 1987; 164: 545-8.

62. Isolated Roux loop pancreaticojejunostomy versus pancreatico gastrostomy after pancreaticoduodenectomy: a prospective randomized study. El Nakeeb A, Hamdy E, Sultan AM, Salah T, Askr W, Ezzat H, Said M, Zeied MA, Abdallah T. HPB (Oxford). 2014 Jan 28

63. Yin Feng Shen et al,Reconstruction by pancreaticogastrostomy versus pancreaticojejunostomy following pancreaticoduodenectomy: A metanalysis of RCT's.

64. Conlon, 2001. Conlon KC, et al: Prospective randomized clinical trial of the value of intraperitoneal drainage after pancreatic resection. Ann Surg 2001; 234:487-494.

65. Büchler, 1992. Büchler MW, et al: Role of octreotide in the prevention of postoperative complications following pancreatic resection. Am J Surg 1992; 163:125-130.

DATA SHEET

Analysis of results of Isolated loop pancreatic stump anastomosis following Whipples procedure

Name : Age /Sex: Ip.No :

DOA: DOS: DOD:

Diagnosis:

Complaints : Abdominal pain :

Jaundice :

Fever :

Pruritus:

Weight loss:

Cholangitis :Y/N

Others :

H/O past illness: DM/HT/CHD/BR.Asth /TB/

Previous Surgery

Personal history : Smoker /Alchohol /Veg /Nonveg

Physical examination: Icterus /pallor

P/A Palpable gallbladder /liver /free fluid

P/R exam

Preoperative investigations :

CBC	Hb	TC	DC	ESR
LFT	TB	DB	SAP	Albumin
	PT	INR		

Ca 19.9

USG liver texture

IHBR

CBD

Mass head of pancreas /periampullary

OGD:

SVS:

CECT abdomen

MRI:

Preoperative biliary drainage : Yes /No

Biosy ;Yes /No

Provisional diagnosis : Ampullary

Duodenal

Distal CBD

Head of pancreas

Duration

Blood loss

Technique D2M Dunking

PJ

ISOL PJ

PG

Bile duct :

GJ tupe : Antecolic /retrocolic

Blood transfusion

Post op course :

RT removed on

Urinary cath removed on

DT removed on

Post op Biochem investigations

DT amylase

Serum amylase

CBC

LFT

Post operative stay ____days

Morbidity :

Major : DGE

Anastomotic leak

Hemorrhage

Intra abdominal collection

Minor: wound infection

Pneumonitis

UTI

Mortality :

INFORMATION TO PARTICIPANTS

Title: - **"Study of results of isolated loop pancreaticojejunal anastomosis following whipples procedure"**

Principal Investigator: Dr.T.S.Chandrasekar

Co-Investigator(if any):

Name of Participant:

Site :

You are invited to take part in this research/ study/procedures/tests. The information in this document is meant to help you decide whether or not to take part. Please feel free to ask if you have any queries or concerns.

What is the purpose of research?

We have obtained permission from the Institutional Ethics Committee.

The study design

Prospective and Retrospective study

Study Procedures

The study involves evaluation of results following isolated loop pancreaticojejunal anastomosis following whipples procedure . The planned scheduled involve visits at _____,_____,____, and_____(days/ weeks) after your initial visit. You will be required to visit the hospital _____ number of times during the study.

At each visit, the study physician will examine you. Some [blood / urine /imaging/clinical examination other] tests will be carried out at each visit. [… … ml of blood will be collected at each visit. Blood collection involves prick with a needle and syringe.] These tests are essential to monitor your condition, and to assess the safety and efficacy of the treatment given to you.

In addition, if you notice any physical or mental change(s), you must contact the persons listed at the end of the document.

You may have to come to the hospital (study site) for examination and investigations apart from your scheduled visits, if required.

Possible risks to you – If any, Briefly mention

Possible benefits to you - If any, Briefly mention

Possible benefits to other people

The results of the research may provide benefits to the society in terms of advancement of medical knowledge and/or therapeutic benefit to future patients.

Confidentiality of the information obtained from you

You have the right to confidentiality regarding the privacy of your medical information (personal details, results of physical examinations, investigations, and your medical history). By signing this document, you will be allowing the research team investigators, other study personnel, sponsors, Institutional Ethics Committee and any person or agency required by law like the Drug Controller General of India to view your data, if required.

The information from this study, if published in scientific journals or presented at scientific meetings, will not reveal your identity.

How will your decision to not participate in the study affect you?

Your decision not to participate in this research study will not affect your medical care or your relationship with the investigator or the institution. You will be taken care of and you will not loose any benefits to which you are entitled.

Can you decide to stop participating in the study once you start?

The participation in this research is purely voluntary and you have the right to withdraw from this study at any time during the course of the study without giving any reasons. However, it is advisable that you talk to the research team prior to stopping the treatment/discontinuing of procedures etc.

Signature of Investigator Signature of Participant

Date Date

MASTER CHART

Name	Age	sex	DIAGNOSIS	Anast	DTM/Dunking	Abd_pain	Jaundice	Fever	Pruritus	Wt_loss	Cholangitis	Others	DM	HT	BA	Pre_surgery	N.V	Veg	Smoker	Alc	Icterus	Pallor	GB	Liver	Hb	TC	P	L	E	ESR	TB	DB	SAP	Alb	PT	INR	CA19-9	Liver_Echo	IHBR	CBD	Mass
Rajakannu	45	M	PERIAMPULLARY CA	PG	1	1	1	2	1	1	2	1	2	2	2	2	1	2	2	1	1	2	1	2	7.5	4600	70	15	5	68	3	2	243	2.9	11	0.91	13.8	1	1	1	2
rajendran	42	M	PERIAMPULLARY CA	PJ	1	1	1	2	1	1	2	1	2	2	2	2	1	2	1	1	1	2	1	2	9	4800	80	12	6	26	16	8	436	3.6	14	1.16	120	1	1	1	1
singaram	62	M	PERIAMPULLARY CA	PJ	1	1	1	2	2	2	2	2	1	2	2	2	1	2	1	1	1	2	1	2	10	5600	63	20	4	45	12	10	384	3.6	12	1	58	1	1	1	2
Subramani	58	M	PERIAMPULLARY CA	PJ	2	1	1	1	1	1	1	2	2	2	2	2	1	2	2	1	1	2	1	1	8.6	14000	60	38	2	126	20.6	12.8	684	2.9	18	1.5	104	2	1	1	2
Deivasigamani	68	M	PERIAMPULLARY CA	PJ	2	1	2	2	2	1	2	2	1	1	2	2	1	2	1	1	2	2	2	2	10.2	6800	67	28	4	29	1.8	0.9	112	3.9	12	1	26	1	2	2	2
Vijaya	45	F	PERIAMPULLARY CA	PJ	2	1	1	2	2	1	2	2	2	2	2	1	1	2	2	2	1	1	1	1	8.8	7600	64	30	6	54	14.6	7.4	256	3.6	13	1.08	82	1	1	1	2
Salomi	35	F	PERIAMPULLARY CA	PJ	1	1	1	2	2	1	2	2	2	2	2	1	1	2	2	2	1	2	1	2	7.9	4300	73	24	3	77	16.2	6.9	186	3	12	1	18	1	1	1	2
Malar	30	F	CA HOP	PJ	1	1	1	1	1	1	1	2	2	2	2	1	2	2	2	1	2	1	1	8	18000	64	23	9	120	24.9	20.8	540	2.2	18	1.5	112	1	1	1	2
Parvathi	72	F	PERIAMPULLARY CA	PJ	1	1	1	2	1	1	2	2	1	2	2	1	2	1	2	2	1	2	2	2	7	3400	70	28	2	33	12	8	120	3	12	1	20	1	1	2	2
Kaleshasherif	47	M	PERIAMPULLARY CA	PJ	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	12	4500	58	36	5	40	3	1.2	80	3.2	14	1.16	26	1	1	2	2
Yanathi	60	M	PERIAMPULLARY CA	PJ	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	1	1	9.4	5400	60	34	6	46	16	12	420	3.8	12	1	21	1	1	1	2
Renganayaki	50	F	PERIAMPULLARY CA	PJ	2	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	2	2	13.8	3600	64	30	1	50	18	14	680	3.6	13	1.08	38	2	1	1	1
Kumar	66	M	PERIAMPULLARY CA	PJ	2	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	10.2	4800	66	34	4	80	14	12	720	2.8	14	1.16	22	1	1	1	2
Karunanidhi	54	M	PERIAMPULLARY CA	PJ	2	1	1	2	2	1	2	2	2	2	2	2	1	2	2	2	1	2	1	1	13.2	6700	78	22	1	76	16	12	204	3.5	15	1.3	12	1	1	1	1
Chokkalingam	72	M	PERIAMPULLARY CA	PJ	2	1	1	1	1	1	1	2	1	1	2	2	1	2	1	1	1	2	1	1	12	12200	86	12	2	146	21	14.6	490	3	16	1.33	94	1	1	1	2
Chinnapillai	60	M	PERIAMPULLARY CA	PJ	2	2	1	2	1	1	2	1	1	1	2	2	1	2	1	2	1	2	1	2	11	8700	67	31	4	56	16	12	324	3	14	1.16	22	1	1	1	2
Kesavan	40	M	PERIAMPULLARY CA	PJ	1	1	1	2	2	1	2	2	2	2	2	2	2	1	2	1	1	2	1	2	9	880	58	32	8	50	19	16	200	3	12	1	30	1	1	1	2
Maragatham	60	F	PERIAMPULLARY CA	PJ	1	1	1	2	1	1	2	2	2	2	2	1	2	1	2	2	1	1	1	2	7	4400	86	16	2	80	19	14	120	3.4	13	1.08	32	1	1	1	2
Krishnan	40	M	PERIAMPULLARY CA	PJ	1	2	1	2	1	1	2	2	2	2	2	2	1	2	1	1	1	2	1	2	9	4300	76	22	4	45	19	14	256	2.8	14.6	1.2	33	1	1	1	2
Elumalai	69	M	PERIAMPULLARY CA	PJ	1	1	1	1	1	1	1	2	1	2	2	2	1	2	1	1	1	1	1	1	7	3450	62	24	8	125	23.5	19	446	2.9	16	1.33	32	1	1	1	2
Maragatham	51	F	CA HOP	PG	2	1	2	2	2	1	2	1	2	2	2	1	1	2	2	2	2	2	2	2	9.6	5800	72	22	4	45	0.33	0.11	452	4.1	10.09	0.8	32	1	1	1	1
Sathyanarayana	57	M	PERIAMPULLARY CA	PJ	2	1	2	2	1	2	2	2	2	2	2	2	1	2	1	1	2	1	2	9	880	58	32	8	50	19	16	200	3	12	1	30	1	1	1		2
Babu	67	M	PERIAMPULLARY CA	PG	2	2	1	2	1	2	2	2	1	2	2	2	2	1	1	1	2	1	1	1	9.2	9400	82	12	3	45	20.6	17.2	316	3.6	15.7	1.3	62	1	1	1	2
Narasimman	60	M	PERIAMPULLARY CA	PG	1	2	1	2	1	1	2	2	2	2	2	2	2	1	1	1	1	2	1	1	9.8	3900	45	33	2	40	7.5	4.5	458	2.7	14.1	1.16	235.9	1	1	1	1
Rajammal	70	F	PERIAMPULLARY CA	PG	2	1	2	2	2	1	2	1	2	2	2	2	2	1	2	2	2	1	2	2	9.2	4800	48	42	6	72	0.7	0.3	72	3.2	13.1	1.11	20	1	1	1	1
Dhanabackiam	45	F	PERIAMPULLARY CA	PG	1	1	2	1	1	2	2	2	2	2	1	1	2	2	2	1	2	1	2	12	9.7	78	21	2	66	17	13	196	3.4	12	1	22	1	1	1		2
Samikannu	55	M	PERIAMPULLARY CA	PG	1	1	1	2	2	2	2	1	2	2	2	2	1	2	2	2	1	2	1	2	8.6	9200	76	21	3	60	2.9	1.7	256	2.8	14.6	1.2	30	1	1	1	1
Gunalan	65	M	PERIAMPULLARY CA	PG	1	2	1	2	1	1	2	2	1	2	2	2	1	2	2	2	1	2	1	2	9.6	5600	80	18	2	98	18	12	322	3	12	1	80	1	1	1	1
Premkumari	50	M	CA HOP	PG	2	1	1	2	1	1	2	1	2	2	2	2	1	2	2	2	1	2	1	2	10.5	6500	73	23	9	67	15.5	11.8	105	3.6	15	1.25	67.74	1	1	1	2
Nawab jan	68	M	PERIAMPULLARY CA	PG	2	1	2	1	2	1	1	2	2	1	1	2	2	1	2	1	1	2	1	1	2	10.2	7600	67	32	5	20	22	16.4	670	3	18	1.5	98	1	1	2
Ravi	48	M	PERIAMPULLARY CA	PG	2	1	1	2	1	1	2	2	2	2	2	2	1	2	1	1	1	2	1	2	13	4600	76	30	4	60	16	14.4	340	3.4	12	1	32	1	1	1	2
Thilagam	40	F	PERIAMPULLARY CA	PG	2	1	2	2	2	1	2	1	2	2	2	1	1	2	2	2	2	2	2	2	9.6	5800	72	22	4	45	0.33	0.11	452	4.1	10.09	0.8	32	1	1	1	1
Shankaran	40	M	PERIAMPULLARY CA	PJ	1	1	1	2	2	1	2	2	2	2	2	2	2	1	2	1	1	2	1	2	9	880	58	32	8	50	19	16	200	3	12	1	30	1	1	1	2
Pujiammal	40	F	PERIAMPULLARY CA	PG	1	1	1	2	1	2	1	2	2	2	2	1	2	1	2	2	1	2	2	1	4.7	8300	75	19	3	24	21.9	13.8	293	3.2	11	1.02	26	2	1	1	1
Aravalli	40	F	PERIAMPULLARY CA	PG	1	1	1	2	1	1	2	1	2	2	2	2	1	2	2	2	1	2	1	2	10.5	6500	73	23	9	67	15.5	11.8	105	3.6	15	1.25	67.74	1	1	1	2
Vasantha	47	F	PERIAMPULLARY CA	PG	1	1	1	2	2	1	2	2	2	2	2	2	2	1	2	2	1	2	1	2	12	4500	76	22	4	34	17.8	12.4	120	3.2	12	1	20	1	1	1	2
sulochana	60	F	PERIAMPULLARY CA	PJ	2	1	1	2	1	1	2	2	1	1	2	1	2	1	2	2	1	1	1	1	6.6	5600	70	22	8	55	19.8	11	420	2.9	15	1.25	26	1	1	1	2
Fathima beevi	46	F	PERIAMPULLARY CA	PG	2	1	1	2	1	1	2	2	1	2	2	1	2	1	2	2	1	1	1	1	8	2300	68	33	6	102	18	10	336	2.6	19.6	1.64	112	1	1	1	2
Dhanabackiam	56	F	PERIAMPULLARY CA	PG	2	1	1	2	1	1	2	2	1	2	2	2	1	2	2	2	1	2	1	2	11	6800	72	23	7	23	22	11	234	3	15	1.25	34	1	1	1	1
Sekar	47	M	PERIAMPULLARY CA	PJ	2	1	1	2	2	1	2	2	2	2	2	2	2	1	2	1	1	2	1	1	12.8	7300	68	21	7	106	18	16	212	3	12	1	20	1	1	1	2
Viswanathan	45	M	PERIAMPULLARY CA	PJ	1	1	1	2	2	1	2	2	2	2	2	2	2	1	2	1	1	2	1	2	9	880	58	32	8	50	19	16	200	3	12	1	30	1	1	1	2
Natarajan	40	M	PERIAMPULLARY CA	PJ	1	1	1	2	1	1	2	2	2	2	2	2	1	2	2	1	2	1	2	1	10.2	4500	66	24	6	12	20	17.9	302	3.4	12	1	100.4	1	1	1	2
Gopal	58	M	PERIAMPULLARY CA	PG	1	1	1	2	1	1	2	2	2	2	2	2	1	2	1	1	1	2	1	2	13	4600	76	30	4	60	16	14.4	340	3.4	12	1	32	1	1	1	2

Subramani	58	M	PERIAMPULLARY CA	PG	2	1	1	2	2	1	2	2	2	2	2	2	2	1	1	1	1	2	1	1	12	4500	80	17	3	50	15.6	11.5	102	3	15	1.25	24	1	1	1	2
Sagadevan	45	M	PERIAMPULLARY CA	PG	2	2	1	2	1	1	2	1	2	2	2	2	1	2	2	2	1	2	1	1	9.4	10600	76	34	7	156	26.8	20.9	159	5.4	13	0.9	90	1	1	1	1
Krishnan	40	M	PERIAMPULLARY CA	PG	2	1	2	2	2	1	2	2	2	2	2	2	2	1	1	1	2	2	2	1	9.9	11600	73	17	10	40	1.2	0.6	96	3.3	15.9	1.22	50.4	2	1	1	1
Balasubramanian	57	M	PERIAMPULLARY CA	PG	1	1	1	1	1	1	1	1	2	2	1	2	1	2	2	2	1	2	1	2	12	10200	62	38	4	112	29	18	441	3.9	11.2	0.89	30.2	1	1	1	1
selvam	46	M	PERIAMPULLARY CA	PJ	1	1	1	2	1	1	2	2	2	2	2	2	1	2	2	1	1	2	1	1	8.3	12200	90	7	3	10	23	16	122	3.3	12	1	64	1	1	2	1
Saradha	50	F	PERIAMPULLARY CA	PG	2	1	1	1	1	1	1	1	2	2	2	2	1	2	2	2	1	2	1	1	14.2	10600	78	18	4	15	22	18	680	3.1	11.6	0.92	20	1	1	1	1
suseela	47	F	carcinoma head of pan	PG	1	1	1	2	2	1	2	1	2	2	2	1	1	2	1	1	1	2	1	1	6.5	7400	81	8	1	64	18.5	11	139	2.9	17.4	1.45	32	1	1	1	1
AARAVALLI	40	F	PERIAMPULLARY CA	PG	2	2	1	2	1	2	2	2	2	2	2	2	1	2	2	2	1	1	1	2	10.5	6500	75	33	4	14	15.5	11.8	105	3.6	17	1.2	67.74	1	1	1	1
RANIAMMAL	65	F	PERIAMPULLARY CA	PG	2	1	1	2	1	1	2	2	2	2	2	2	1	2	1	1	1	2	1	2	13	4600	76	30	4	60	16	14.4	340	3.4	12	1	32	1	1	1	2
DHANABAKIAM	50	F	PERIAMPULLARY CA	PG	1	1	1	2	2	1	2	2	2	2	2	2	2	1	1	1	1	2	1	1	12	4500	80	17	3	50	15.6	11.5	102	3	15	1.25	24	1	1	1	2
BALASUBRAMANIAM	57	M	CA HOP	PG	2	1	1	2	1	1	2	1	2	2	2	2	1	2	2	2	1	2	1	1	9.4	10600	76	34	7	156	26.8	20.9	159	5.4	13	0.9	90	1	1	1	1
Subramani	67	M	PERIAMPULLARY CA	PG	2	1	1	2	2	1	2	2	2	2	2	2	2	1	1	1	1	2	1	1	12	4500	80	17	3	50	15.6	11.5	102	3	15	1.25	24	1	1	1	2
Sagadevan	45	M	PERIAMPULLARY CA	PG	2	2	1	2	1	1	2	1	2	2	2	2	1	2	2	2	1	2	1	1	9.4	10600	76	34	7	156	26.8	20.9	159	5.4	13	0.9	90	1	1	1	1
Krishnan	44	M	PERIAMPULLARY CA	PG	2	1	2	2	2	1	2	2	2	2	2	2	2	1	1	1	2	2	2	1	9.9	11600	73	17	10	40	1.2	0.6	96	3.3	15.9	1.22	50.4	2	1	1	1
Balasubramanian	57	M	PERIAMPULLARY CA	PG	1	1	1	1	1	1	1	1	2	2	1	2	1	2	2	2	1	2	1	2	12	10200	62	38	4	112	29	18	441	3.9	11.2	0.89	30.2	1	1	1	1
selvam	46	M	PERIAMPULLARY CA	PJ	1	1	1	2	1	1	2	2	2	2	2	2	1	2	2	1	1	2	1	1	8.3	12200	90	7	3	10	23	16	122	3.3	12	1	64	1	1	2	1
Saradha	55	F	PERIAMPULLARY CA	PG	2	1	1	1	1	1	1	1	2	2	2	2	1	2	2	2	1	2	1	1	14.2	10600	78	18	4	15	22	18	680	3.1	11.6	0.92	20	1	1	1	1
suseela	47	F	CA HOP	PG	1	1	1	2	2	1	2	1	2	2	2	1	1	2	1	1	1	2	1	1	6.5	7400	81	8	1	64	18.5	11	139	2.9	17.4	1.45	32	1	1	1	1
AARAVALLI	44	F	PERIAMPULLARY CA	PG	2	2	1	2	1	2	2	2	2	2	2	2	1	2	2	2	1	1	1	2	10.5	6500	75	33	4	14	15.5	11.8	105	3.6	17	1.2	67.74	1	1	1	1
RANIAMMAL	65	F	PERIAMPULLARY CA	PG	2	1	1	2	1	1	2	2	2	2	2	2	1	2	1	1	1	2	1	2	13	4600	76	30	4	60	16	14.4	340	3.4	12	1	32	1	1	1	2
DHANABAKIAM	50	F	PERIAMPULLARY CA	PG	1	1	1	2	2	1	2	2	2	2	2	2	2	1	1	1	1	2	1	1	12	4500	80	17	3	50	15.6	11.5	102	3	15	1.25	24	1	1	1	2
BALASUBRAMANIAM	57	M	PERIAMPULLARY CA	PG	2	1	1	2	1	1	2	1	2	2	2	2	1	2	2	2	1	2	1	1	9.4	10600	76	34	7	156	26.8	20.9	159	5.4	13	0.9	90	1	1	1	1
SELVAM	60	M	PERIAMPULLARY CA	PG	2	1	2	2	2	1	2	2	2	2	2	2	2	1	1	1	2	2	2	1	9.9	11600	73	17	10	40	1.2	0.6	96	3.3	15.9	1.22	50.4	2	1	1	1
SARADHA	50	F	PERIAMPULLARY CA	PG	1	1	1	1	1	1	1	1	2	2	1	2	1	2	2	2	1	2	1	2	12	10200	62	38	4	112	29	18	441	3.9	11.2	0.89	30.2	1	1	1	1
SELVAM	46	M	PERIAMPULLARY CA	PG	1	2	1	2	1	1	2	2	2	2	2	2	1	2	2	1	1	2	1	1	8.3	12200	90	7	3	10	23	16	122	3.3	12	1	64	1	1	2	1
SUSEELA	47	F	CA HOP	PG	1	2	1	1	1	1	1	1	2	2	2	2	1	2	2	2	1	2	1	1	14.2	10600	78	18	4	15	22	18	680	3.1	11.6	0.92	20	1	1	1	1
PANDURANGAN	60	M	PERIAMPULLARY CA	PG	1	2	1	2	2	1	2	1	2	2	2	1	1	2	1	1	1	2	1	1	6.5	7400	81	8	1	64	18.5	11	139	2.9	17.4	1.45	32	1	1	1	2
THANGAMARI	47	F	PERIAMPULLARY CA	PG	2	1	1	2	1	2	2	2	2	2	2	2	1	2	2	2	1	1	1	2	10.5	6500	74	10	5	33	15.5	11.8	105	3.6	11	0.9	67.74	1	1	1	1
SAMUTHIRAM	52	M	PERIAMPULLARY CA	PG	2	2	1	2	1	2	2	1	1	2	2	2	1	2	1	1	1	1	2	2	10.8	8000	82	18	5	34	0.8	0.2	227	3.4	10.4	0.85	55	1	1	1	2
RAJARAM	65	M	PERIAMPULLARY CA	PG	2	1	1	2	1	1	2	1	2	2	2	2	1	2	2	1	1	2	1	2	7.5	4600	70	15	5	68	3	2	243	2.9	11	0.91	13.8	1	1	1	2
GANAPATHI	60	M	CAHOP	PG	2	1	1	2	1	1	2	1	2	2	2	2	1	2	1	1	1	2	1	2	9	4800	80	12	6	26	16	8	436	3.6	14	1.16	120	1	1	1	1
NAGALAKSHMI	45	F	PERIAMPULLARY CA	PG	2	1	1	2	2	2	2	2	1	2	2	2	1	2	1	1	1	2	1	2	10	5600	63	20	4	45	12	10	384	3.6	12	1	58	1	1	1	2
AARAVALLI	40	F	PERIAMPULLARY CA	PG	2	1	1	1	1	1	1	2	2	2	2	2	1	2	2	1	1	2	1	1	8.6	14000	60	38	2	126	20.6	12.8	684	2.9	18	1.5	104	2	1	1	2
RANIAMMAL	65	F	PERIAMPULLARY CA	pj	2	2	2	2	2	1	2	2	1	1	2	2	1	2	1	1	2	2	2	2	10.2	6800	67	28	4	29	1.8	0.9	112	3.9	12	1	26	1	2	2	2
DHANABAKIAM	50	F	CA HOP	pj	1	2	1	2	2	1	2	2	2	2	2	1	1	2	2	2	1	1	1	1	8.8	7600	64	30	6	54	14.6	7.4	256	3.6	13	1.08	82	1	1	1	2
BALASUBRAMANIAM	57	M	PERIAMPULLARY CA	pj	1	2	1	2	2	1	2	2	2	2	2	1	1	2	2	2	1	2	1	2	7.9	4300	73	24	3	77	16.2	6.9	186	3	12	1	18	1	1	1	2
SELVAM	60	M	PERIAMPULLARY CA	pj	1	1	1	1	1	1	1	1	2	2	2	2	1	2	2	2	1	2	1	1	8	18000	64	23	9	120	24.9	20.8	540	2.2	18	1.5	112	1	1	1	2
SARADHA	50	F	PERIAMPULLARY CA	pj	1	1	1	2	1	1	2	2	1	2	2	1	2	1	2	2	1	2	2	2	7	3400	70	28	2	33	12	8	120	3	12	1	20	1	1	2	2

SELVAM	46	M	PERIAMPULLARY CA	pj	2	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	12	4500	58	36	5	40	3	1.2	80	3.2	14	1.16	26	1	1	2	2
SUSEELA	47	F	CA HOP	pj	2	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	1	1	9.4	5400	60	34	6	46	16	12	420	3.8	12	1	21	1	1	1	2
PANDURANGAN	60	M	PERIAMPULLARY CA	pj	1	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	2	2	13.8	3600	64	30	1	50	18	14	680	3.6	13	1.08	38	2	1	1	1
THANGAMARI	47	F	PERIAMPULLARY CA	pj	1	2	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	10.2	4800	66	34	4	80	14	12	720	2.8	14	1.16	22	1	1	1	2
SAMUTHIRAM	52	M	PERIAMPULLARY CA	PG	2	2	1	2	2	1	2	2	2	2	2	2	1	2	2	2	1	2	1	1	13.2	6700	78	22	1	76	16	12	204	3.5	15	1.3	12	1	1	1	1
RAJARAM	65	M	PERIAMPULLARY CA	PG	2	2	1	2	1	1	2	1	2	2	2	2	1	2	2	1	1	2	1	2	7.5	4600	70	15	5	68	3	2	243	2.9	11	0.91	13.8	1	1	1	2
GANAPATHI	60	M	CAHOP	PG	2	2	1	2	1	1	2	1	2	2	2	2	1	2	1	1	1	2	1	2	9	4800	80	12	6	26	16	8	436	3.6	14	1.16	120	1	1	1	1
NAGALAKSHMI	45	F	PERIAMPULLARY CA	PG	2	1	1	2	2	2	2	2	1	2	2	2	1	2	1	1	1	2	1	2	10	5600	63	20	4	45	12	10	384	3.6	12	1	58	1	1	1	2
AZAGU	60	M	CA HOP	PG	2	1	1	1	1	1	1	2	2	2	2	2	1	2	2	1	1	2	1	1	8.6	14000	60	38	2	126	20.6	12.8	684	2.9	18	1.5	104	2	1	1	2
JAGADEESH	32	M	CA HEAD/UNCI	PG	2	1	2	2	2	1	2	2	1	1	2	2	1	2	1	1	2	2	2	2	10.2	6800	67	28	4	29	1.8	0.9	112	3.9	12	1	26	1	2	2	2
ALAGAMMAL	50	F	PERIAMPULLARY CA	PG	2	1	1	2	2	1	2	2	2	2	2	1	1	2	2	2	1	1	1	1	8.8	7600	64	30	6	54	14.6	7.4	256	3.6	13	1.08	82	1	1	1	2
RAJENDRAN	50	F	CA HOP	PJ[IS	1	1	1	2	2	1	2	2	2	2	2	1	1	2	2	2	1	2	1	2	7.9	4300	73	24	3	77	16.2	6.9	186	3	12	1	18	1	1	1	2
RANGAPPAN	65	M	CA HOP	PJ[IS	1	2	1	1	1	1	1	1	2	2	2	2	1	2	2	2	1	2	1	1	8	18000	64	23	9	120	24.9	20.8	540	2.2	18	1.5	112	1	1	1	2
MEENATCHI	60	F	PERIAMPULLARY CA	PJ[IS	1	2	1	2	1	1	2	2	1	2	2	1	2	1	2	2	1	2	2	2	7	3400	70	28	2	33	12	8	120	3	12	1	20	1	1	2	2
KULANTHAISAMY	55	M	PERIAMPULLARY CA	PJ[IS	1	2	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	12	4500	58	36	5	40	3	1.2	80	3.2	14	1.16	26	1	1	2	2
AANDI	60	M	PERIAMPULLARY CA	PJ[IS	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	1	1	9.4	5400	60	34	6	46	16	12	420	3.8	12	1	21	1	1	1	2
RAJAN	37	M	PERIAMPULLARY CA	PG[D	2	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	2	2	13.8	3600	64	30	1	50	18	14	680	3.6	13	1.08	38	2	1	1	1
CHOKKAMMAL	54	F	PERIAMPULLARY CA	PJ[IS	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	10.2	4800	66	34	4	80	14	12	720	2.8	14	1.16	22	1	1	1	2
REHMATHUNNISA	37	F	CA HOP	PJ[IS	1	1	1	2	2	1	2	2	2	2	2	2	1	2	2	2	1	2	1	1	13.2	6700	78	22	1	76	16	12	204	3.5	15	1.3	12	1	1	1	1
JEYARAJ	47	M	PERIAMPULLARY CA	PJ[IS	1	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	2	2	13.8	3600	64	30	1	50	18	14	680	3.6	13	1.08	38	2	1	1	1
BHASKAR	54	M	PERIAMPULLARY CA	PJ[IS	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	10.2	4800	66	34	4	80	14	12	720	2.8	14	1.16	22	1	1	1	2
PARAMASIVAM	40	M	CA D2-3	PJ[IS	1	2	1	2	2	1	2	2	2	2	2	2	1	2	2	2	1	2	1	1	13.2	6700	78	22	1	76	16	12	204	3.5	15	1.3	12	1	1	1	1
RAMANI	42	M	PERIAMPULLARY CA	PG[D	2	2	1	2	1	1	2	2	2	2	2	2	1	2	2	2	1	1	2	2	10	7700	75	23	4	45	19.1	12	246	3	20	1.95	63.2	1	1	1	2
SELVI	60	F	PERIAMPULLARY CA	PJ[IS	1	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	2	2	13.8	3600	64	30	1	50	18	14	680	3.6	13	1.08	38	2	1	1	1
RANJINI	27	F	PERIAMPULLARY CA	PJ[IS	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	10.2	4800	66	34	4	80	14	12	720	2.8	14	1.16	22	1	1	1	2
hariraman	45	m	PERIAMPULLARY CA	PG[D	2	1	1	2	2	1	2	2	2	2	2	2	1	2	2	2	1	2	1	1	13.2	6700	78	22	1	76	16	12	204	3.5	15	1.3	12	1	1	1	1
VEERAPPAN	60	M	CA HOP	PJ[IS	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	2	2	13.8	3600	64	30	1	50	18	14	680	3.6	13	1.08	38	2	1	1	1
DILLI	60	M	PerIAMPULLARY CA	PJ[IS	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	10.2	4800	66	34	4	80	14	12	720	2.8	14	1.16	22	1	1	1	2
srinivasan	52	m	PERIAMPULLARY CA	PJ[IS	1	1	1	2	2	1	2	2	2	2	2	2	1	2	2	2	1	2	1	1	13.2	6700	78	22	1	76	16	12	204	3.5	15	1.3	12	1	1	1	1
Angu	56	M	DUODENAL CA	PJ[IS	1	1	1	2	2	1	2	2	2	2	2	2	1	2	2	2	1	2	1	1	13.2	6700	78	22	1	76	16	12	204	3.5	15	1.3	12	1	1	1	1
Vittabai	67	F	PERIAMPULLARY CA	PG[D	2	2	1	2	2	1	2	1	2	2	2	2	1	2	2	2	1	1	2	2	10.5	9500	77	24	4	45	0.7	13	205	3.5	11.3	0.8	0.6	1	1	1	2
Paulraj	55	M	CA HOP	PJ[IS	1	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	2	2	13.8	3600	64	30	1	50	18	14	680	3.6	13	1.08	38	2	1	1	1
Ramalingam	56	M	CA HOP	PJ[IS	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	10.2	4800	66	34	4	80	14	12	720	2.8	14	1.16	22	1	1	1	2
Anandaraj	44	M	PERIAMPULLARY CA	PJ[IS	1	1	1	2	2	1	2	2	2	2	2	2	1	2	2	2	1	2	1	1	13.2	6700	78	22	1	76	16	12	204	3.5	15	1.3	12	1	1	1	1
Omana	56	F	PERIAMPULLARY CA	PJ[IS	2	2	2	1	2	2	2	1	1	1	2	2	1	2	2	1	2	2	no	2	9.8	6800	76	26	4	34	4.9	2	128	2.9	17.4	1.26	12	1	1	1	2
Rajeswari	45	F	CA HOP	PJ[IS	1	2	1	2	2	2	2	2	1	2	2	2	1	2	2	2	2	1	1	2	12	6500	78	25	5	44	11	6	243	4	17	1.2	24	1	1	1	1
Feroz khan	40	M	PERIAMPULLARY CA	PJ[isc	1	2	1	2	1	1	2	2	2	2	2	2	1	2	2	1	1	1	2	2	14.8	7300	67	17	4	45	19.8		268	4.2	13	0.9	11.2	1	1	1	1
Datchinaamoorthi	56	M	PERIAMPULLARY CA	PJ[IS	1	2	1	2	2	2	2	2	1	2	2	2	1	2	1	2	1	1	2	2	11	4300	75	37	5	43	22	11	223	3.3	14	0.8	45	1	1	1	1
Balu	42	M	PERIAMPULLARY CA	PJ[IS	1	1	2	2	2	1	2	1	1	2	2	2	1	2	1	1	2	1	2	2	9.6	7600	77	33	4	43	0.9	0.2	82	3.5	14	1.3	35.1	1	1	1	1
Savaraiyah	60	M	PERIAMPULLARY CA	PJ[isc	1	1	1	2	1	2	2	2	1	2	2	2	1	2	2	1	1	2	1	1	10.3	10000	80	37	5	45	8.8	4	76	3.5	14.7	1.04	290.7	1	1	1	2
Shanmugam	70	M	PERIAMPULLARY CA	PJ[isc	1	1	2	2	2	2	2	2	1	1	1	2	2	1	1	1	1	1	2	1	11	11000	75	47	5	42	0.9	0.2	34	2.9	14	1	224	1	2	1	1
Duraisamy	65	M	DUODENAL CA	PJ[IS	1	1	1	2	2	2	2	2	1	1	1	2	2	1	1	1	1	1	1	1	12	5000	77	34	6	47	2.3	1	45	3.2	13	1.2	34	1	2	1	1
Thenmozhi	55	F	PERIAMPULLARY CA	PG[D	1	1	1	1	1	1	1	1	2	1	2	1	1	2	2	2	1	1	2	2	10.2	7700	67	34	5	55	7.1	3	146	2.9	12.8	0.9	4.7	1	1	1	2
Sudhakar	30	M	CA HOP	PJ[isc	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	13.2	6500	67	33	4	24	0.5	0.3	500	4.3	15.8	1.17	11.5	1	1	1	2
sowriammal	70	F	PERIAMPULLARY CA	PJ[IS	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	2	11.7	6700	60	37	3	24	1	0.2	267	3.2	12	0.7	47.9	1	1	1	1
chakkubai	55	F	duodenal ca	PJ[IS	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	10	7700	60	37	3	24	0.8	0.1	73	4.1	12	0.9	19.3	1	1	1	1
HALEEMA	45	F	DISTAL CBD	PJ[IS	2	2	1	1	1	1	1	2	2	2	2	1	1	2	2	2	1	1	2	2	11.5	6500	68	34	4	45	3.4	2	230	3.6			611.6	1	2	1	1
KUPPAN	60	M	DISTAL CBD	PJ[isc	1	2	1	2	1	1	2	2	2	1	2	2	1	2	2	2	1	1	2	2	10.2	7700	70	26	4	24	1.4	0.8	93	3.3	12.8	0.96	53.1	2	1	1	2
Kalimuthu	65	M	DISTAL CBD	PJ[IS	2	2	1	2	1	1	2	1	1	1	2	2	1	2	2	1	1	1	2	1	10	12800	69	25	6	33	4.4	1.2	454	2.8	15.6	1.03	173.3	2	1	1	2
Rakkammal	55	F	PERIAMPULLARY CA	PJ[isc	2	1	1	1	2	1	2	1	2	2	2	2	1	2	2	2	1	1	1	2	7	19400	80	17	13	33	15.5	8.9	606	2.7	15.9	1.15	1.7	2	1	1	1
Balaraman	60	m	PERIAMPULLARY CA	PJ[IS	1	1	2	2	2	2	2	2	2	2	2	2	1	2	1	1	2	1	2	2	10.3	7700	60	37	3	24	8.5	3	73	4.1	12	0.9	1412	1	1	1	1
kalyanasundaram	70	m	PERIAMPULLARY CA	Pj[iso	2	1	1	2	1	1	2	2	2	2	2	2	1	2	2	2	1	1	1	2	11	4500	69	8	5	34	12	8	67	3	11	0.9	145	1	1	1	1
Palani	39	m	PERIAMPULLARY CA	PJ[IS	2	2	1	1	1	2	2	2	2	2	2	2	1	2	1	1	1	1	2	2	10	7700	60	37	3	24	10.4	8.4	345	4.1	12	0.9	39	1	1	1	1
PERIASAMY	68	m	DISTAL CBD	PJ[IS	2	1	1	2	1	1	2	2	2	2	2	1	1	2	1	1	1	1	1	2	8.7	6900	43	47	10	38	23.2	16.4	250	2.5	17	1.4	262	1	1	1	1
parvathiammaal	70	F	DISTAL CBD	PG[D	2	2	1	2	1	1	2	2	2	2	2	2	1	2	2	2	1	1	1	1	11	4200	76	37	4	34	22	16	223	3.5	15.6	1.4	244	1	1	1	2
babu	39	M	PERIAMPULLARY CARC	PG[D	1	2	1	1	1	1	1	2	2	2	2	2	1	2	2	2	1	1	2	2	9.8	3900	73	40	5	45	7.5	4.5	458	2.7	16.4	1.2	19	1	1	1	1
badrunnisa	55	F	PERIAMPULLARY	PJ	1	2	1	1	1	1	1	2	2	2	2	2	1	2	2	2	1	1	2	2	9.8	3900	73	40	5	45	7.5	4.5	458	2.7	16.4	1.2	19	1	1	1	1

OGD	size	VAS	MRI	Pre_Biliary dr	Biopsy	Ampullary	Pancreas	Distal CBD	Duo_carcin	Durn_surger	Blood_loss	Trans	Tech	RT	Urinary	DT	Serum_amylase	DTamylase	CBC	LFT	stay	DGE	Hae	leak	Intra_abd	Wd inf	Pneumonitis	UTI	Mortality
1	3.5	2	2	2	1	2	2	2	2	10	800	2	PG	7	6	8	84	68	1	1	15	2	2	4	2	1	2	2	2
1	2.6	2	2	2	2	2	1	2	2	5	200	0	PJ	8	10	12	96	54	1	1	16	2	2	4	2	2	2	2	2
1	1	2	2	2	1	1	2	2	2	5	250	0	PJ	12	8	14	120	100	1	1	14	1	2	4	1	1	1	2	2
1	1.5	2	1	1	1	1	2	2	2	4.5	100	0	PJ	9	7	10	120	86	1	1	12	2	2	4	2	1	2	2	2
1	2.6	2	2	2	2	2	1	2	2	5	80	0	PJ	11	8	14	102	450	1	1	18	1	2	2	1	1	2	2	2
1	1.1	2	2	2	1	1	2	2	2	5	120	0	PJ	7	5	10	102	50	1	1	12	2	2	4	2	2	2	2	2
1	1.5	2	1	2	1	1	2	2	2	4	80	0	PJ	7	4	9	86	42	1	1	11	2	2	4	2	2	2	2	2
1	1	2	1	1	1	2	2	2	1	6	200	0	PJ	9	4	8	24	36	1	1	14	2	2	4	2	2	2	2	2
1	3	2	2	2	1	1	2	2	2	6	100	0	PJ	8	7	9	40	80	1	1	10	2	2	4	2	2	2	2	2
1	1	2	2	2	1	2	1	2	2	4	100	0	PJ	8	4	9	30	66	1	1	12	2	2	4	2	2	2	2	2
1	2	2	2	2	1	1	2	2	2	6	120	0	PJ	6	8	9	40	36	1	1	12	2	2	4	2	2	2	2	2
1	3	2	2	2	1	2	2	1	2	6	100	0	PJ	7	6	8	32	74	1	1	14	2	2	4	2	2	2	2	2
1	2.2	2	2	2	2	2	2	2	1	6	200	0	PJ	8	5	9	26	58	1	1	13	2	2	4	2	2	2	2	2
1	3.2	2	2	2	2	1	2	2	2	6	200	0	PJ	9	5	10	20	27	1	1	12	2	2	4	2	2	2	2	2
1	2.2	2	1	2	1	1	2	2	2	8	1050	3	PJ	0	0	0	0	0	0	0	0	2	1	3	1	2	2	2	1
1	2	2	2	2	2	2	1	2	2	7	220	0	PJ	9	12	10	23	46	1	1	18	2	2	4	2	1	1	1	2
1	2	2	2	2	1	1	2	2	2	6	100	0	PJ	6	8	9	34	64	1	1	14	2	2	4	2	2	2	2	2
1	4	2	2	2	2	2	1	2	2	4	100	0	PJ	6	4	9	24	36	1	1	14	2	2	4	2	2	2	2	2
1	1.2	2	2	2	1	1	2	2	2	5	200	0	PJ	8	9	20	45	680	1	1	20	2	2	2	1	1	2	2	2
1	2	2	1	1	1	1	2	2	2	6	560	0	PJ	8	7	10	34	58	1	1	12	2	2	4	2	1	2	2	2
1	2	2	2	2	1	1	2	2	2	4	150	0	PG	11	9	14	45	160	1	1	16	1	2	1	2	2	2	2	2
1	2	2	2	2	1	2	1	2	2	6	100	0	PJ	6	8	9	34	64	1	1	14	2	2	4	2	2	2	2	2
1	2	2	2	2	1	1	2	2	2	4	200	0	PG	10	9	15	86	46	1	1	16	1	2	1	2	2	2	2	2
1	2.6	2	2	2	2	2	1	2	2	6	200	2	PG	8	7	6	6	10	2	1	13	2	2	4	2	1	2	2	2
1	4	2	2	2	1	2	1	2	2	6	100	0	PG	5	4	9	48	24	1	1	11	2	2	4	2	2	2	2	2
1	3	2	2	2	1	2	1	2	2	4	150	0	PG	5	4	8	35	80	1	1	12	2	2	4	2	2	2	2	2
1	3	2	1	1	2	1	2	2	2	3.5	800	1	PG	7	6	8	620	410	2	1	10	2	2	4	2	2	2	2	2
1	2	2	2	2	1	1	2	2	2	6	200	0	PG	6	8	9	45	85	1	1	12	2	2	4	2	1	2	1	2
1	3	2	2	2	1	1	2	2	2	6	200	0	PG	8	7	9	60	45	1	1	10	2	2	4	2	2	2	2	2
1	3	2	1	1	1	2	1	2	2	7	800	2	PG	9	6	11	50	102	1	1	15	2	2	4	2	1	2	1	2
1	4	2	2	2	1	2	2	1	2	6	200	0	PG	7	6	9	42	50	1	1	14	2	2	4	2	2	2	2	2
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1	2	2	2	2	1	2	1	2	2	6	100	0	PJ	6	8	9	34	64	1	1	14	2	2	4	2	2	2	2	2
1	1.3	2	2	2	1	1	2	2	2	4	400	0	PG	6	7	9	123	35	1	1	11	2	2	4	2	2	2	2	2
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1	1	2	2	2	1	1	2	2	2	6	150	0	PG	8	6	9	45	46	1	1	12	2	2	4	2	2	2	2	2
1	1	2	2	2	1	1	2	2	2	7	560	4	PJ	0	0	0	0	0	0	0	0	0	1	3	1	2	1	2	1
1	1.2	2	1	2	1	1	2	2	2	8	450	3	PG	0	0	0	0	0	0	0	0	0	1	3	1	2	2	2	1
1	2.8	2	1	1	1	1	2	2	2	7	550	4	PG	0	0	0	0	0	0	0	0	0	1	3	1	2	2	2	1
1	2.8	2	2	2	1	1	2	2	2	8	900	3	PJ	14	12	16	102	800	2	1	18	1	2	2	2	1	2	2	2
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1	3.4	2	1	2	1	1	2	2	2	8	800	4	PJ	15	12	18	66	560	2	1	20	1	2	2	1	2	2	1	2
1	4	2	2	2	1	1	2	2	2	6	200	0	PG	7	6	9	42	50	1	1	14	2	2	1	2	2	2	2	2

1	1.5	2	2	2	1	1	2	2	2	5	150	0	PG	8	5	10	58	69	1	1	12	2	2	4	2	2	2	2	2
1	2.8	2	1	2	1	1	2	2	2	7	1100	2	PG	16	6	8	55	170	1	1	17	1	2	1	2	2	2	2	2
1	8	1	2	2	1	2	1	2	2	11	4650	7	PG	12	10	16	13	8297	2	2	20	1	2	3	1	2	2	2	2
1	2	2	1	1	1	1	2	2	2	9	300	2	PG	6	10	11	32	24	1	1	15	2	2	2	2	2	2	2	2
1	2	2	2	1	1	1	2	2	2	5	300	0	PJ	9	6	8	45	349	1	1	12	2	2	1	2	2	2	2	2
1	1.3	2	2	1	1	2	2	1	2	5	600	0	PG	6	4	12	28	21	1	1	16	2	2	2	2	1	2	2	2
1	2.5	2	2	1	1	2	2	2	1	4	400	2		7	4	6	56	45	1	1	23	2	2	1	2	1	1	1	2
1	2.5	2	2	2	2	1	2	2	2	6	200	2	PG	8	3	9	23	34	1	1	45	2	2	2	2	2	2	2	2
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1	1.5	2	2	2	1	1	2	2	2	5	150	0	PG	8	5	10	58	69	1	1	12	2	2	4	2	2	2	2	2
1	2.8	2	1	2	1	1	2	2	2	7	1100	2	PG	16	6	8	55	170	1	1	17	1	2	1	2	2	2	2	2
1	1.5	2	2	2	1	1	2	2	2	5	150	0	PG	8	5	10	58	69	1	1	12	2	2	4	2	2	2	2	2
1	2.8	2	1	2	1	1	2	2	2	7	1100	2	PG	16	6	8	55	170	1	1	17	1	2	1	2	2	2	2	2
1	8	1	2	2	1	2	1	2	2	11	4650	7	PG	12	10	16	13	8297	2	2	20	1	2	3	1	2	2	2	2
1	2	2	1	1	1	1	2	2	2	9	300	2	PG	6	10	11	32	24	1	1	15	2	2	2	2	2	2	2	2
1	2	2	2	1	1	1	2	2	2	5	300	0	PJ	9	6	8	45	349	1	1	12	2	2	1	2	2	2	2	2
1	1.3	2	2	1	1	2	2	1	2	5	600	0	PG	6	4	12	28	21	1	1	16	2	2	2	2	1	2	2	2
1	3	2	2	2	1	1	2	2	2	3	450	2	PG	5	4	7	46	56	1	1	13	2	2	2	2	2	2	2	2
1	2.5	2	2	2	2	1	2	2	2	6	200	2	PG	8	3	9	55	34	1	1	45	2	2	2	2	2	2	2	2
1	4	2	2	2	1	1	2	2	2	6	200	0	PG	7	6	9	42	50	1	1	14	2	2	1	2	2	2	2	2
1	1.5	2	2	2	1	1	2	2	2	5	150	0	PG	8	5	10	58	69	1	1	12	2	2	4	2	2	2	2	2
1	2.8	2	1	2	1	1	2	2	2	7	1100	2	PG	16	6	8	55	170	1	1	17	1	2	1	2	2	2	2	2
1	8	1	2	2	1	2	1	2	2	11	4650	7	PG	12	10	16	13	8297	2	2	20	1	2	3	1	2	2	2	2
1	2	2	1	1	1	1	2	2	2	9	300	2	PG	6	10	11	32	24	1	1	15	2	2	2	2	2	2	2	2
1	2	2	2	1	1	1	2	2	2	5	300	0	PJ	9	6	8	45	349	1	1	12	2	2	1	2	2	2	2	2
1	1.3	2	2	1	1	2	2	1	2	5	600	0	PG	6	4	12	28	21	1	1	16	2	2	2	2	1	2	2	2
1	2.6	2	2	2	2	2	1	2	2	5	80	0	PJ	11	8	14	102	450	1	1	18	1	2	2	1	1	2	2	2
1	2.5	2	2	2	2	1	2	2	2	6	200	2	PG	8	3	9	120	86	1	1	45	2	2	2	2	2	2	2	2
1	4	2	2	2	1	1	2	2	2	4	200	2	PG[D	6	3	7	83	65	1	1	16	2	2	2	2	1	2	2	2
1		2	2	2	1	2	2	2	2	10	800	2	PG	7	6	8	84	68	1	1	15	2	2	4	2	1	2	2	2
1	2.6	2	2	2	2	2	1	2	2	5	200	0	PJ	8	10	12	96	54	1	1	16	2	2	4	2	2	2	2	2
1	1	2	2	2	1	1	2	2	2	5	250	0	PJ	12	8	14	120	100	1	1	14	1	2	4	1	1	1	2	2
1	1.5	2	1	1	1	1	2	2	2	4.5	100	0	PJ	9	7	10	120	86	1	1	12	2	2	4	2	1	2	2	2
1	2.6	2	2	2	2	2	1	2	2	5	80	0	PJ	11	8	14	102	450	1	1	18	1	2	2	1	1	2	2	2
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1	1.5	2	1	2	1	1	2	2	2	4	80	0	PJ	7	4	9	86	42	1	1	11	2	2	4	2	2	2	2	2
1	1	2	1	1	1	2	2	2	1	6	200	0	PJ	9	4	8	24	36	1	1	14	2	2	4	2	2	2	2	2
1	3	22	2	2	1	1	2	2	2	6	100	0	PJ	8	7	9	40	80	1	1	10	2	2	4	2	2	2	2	2

1	1	2	2	2	1	2	1	2	2	4	100	0	PJ	8	4	9	30	66	1	1	12	2	2	4	2	2	2	2	2
1	2	2	2	2	1	1	2	2	2	6	120	0	PJ	6	8	9	40	36	1	1	12	2	2	4	2	2	2	2	2
1	3	2	2	2	1	2	2	1	2	6	100	0	PJ	7	6	8	32	74	1	1	14	2	2	4	2	2	2	2	2
1	2.2	2	2	2	2	2	2	1	6	200	0	PJ	8	5	9	26	58	1	1	13	2	2	4	2	2	2	2	2	2
1	3.2	2	2	2	2	1	2	2	2	6	200	0	PJ	9	5	9	26	58	1	1	13	2	2	4	2	2	2	2	2
1		2	2	2	1	2	2	2	2	10	800	2	PG	7	6	8	84	68	1	1	15	2	2	4	2	1	2	2	2
1	2.6	2	2	2	2	2	1	2	2	5	200	0	PJ	8	10	12	96	54	1	1	16	2	2	4	2	2	2	2	2
1	1	2	2	2	1	1	2	2	2	5	250	0	PJ	12	8	14	120	100	1	1	14	1	2	4	1	1	1	2	2
1	1.5	2	1	1	1	1	2	2	2	4.5	100	0	PJ	9	7	10	120	86	1	1	12	2	2	4	2	1	2	2	2
1	2.6	2	2	2	2	2	1	2	2	5	80	0	PJ	11	8	14	102	450	1	1	18	1	2	2	1	1	2	2	2
1	1.1	2	2	2	1	1	2	2	2	5	120	0	PJ	7	5	10	102	50	1	1	12	2	2	4	2	2	2	2	2
1	1.5	2	1	2	1	1	2	2	2	4	80	0	PJ	7	4	9	86	42	1	1	11	2	2	4	2	2	2	2	2
1	1	2	1	1	1	2	2	2	1	6	200	0	PJ	9	4	8	24	36	1	1	14	2	2	4	2	2	2	2	2
1	3	22	2	2	1	1	2	2	2	6	100	0	PJ	8	7	9	40	80	1	1	10	2	2	4	2	2	2	2	2
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1	2.2	2	2	2	2	2	2	2	1	6	200	0	PJ	8	5	9	26	58	1	1	13	2	2	4	2	2	2	2	2
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MADRAS MEDICAL COLLEGE, CHENNAI-3

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CERTIFICATE OF APPROVAL

To
Dr. T.S. Chandrasekar,
PG in Surgical Gastroenterology,
Department of Surgical Gastroenterology,
Madras Medical College, Chennai-3.

Dear Dr. T.S. Chandrasekar,

The Institutional Ethics Committee of Madras Medical College, reviewed and discussed your application for approval of the proposal entitled **"Study of Results of Isolated Loop Pancreaticojejunal Anastomoses following Whipples Procedure"** No.43032014

The following members of Ethics Committee were present in the meeting held on 11.03.2014 conducted at Madras Medical College, Chennai-3.

1.	Dr. C. Rajendran, M.D.	-- Chairperson
2.	Prof. Kalaiselvi, MD Vice-Principal, MMC, Ch-3	-- Member Secretary
3.	Prof. Nandhini, M.D. Inst. of Pharmacology, MMC, Ch-3.	-- Member
4.	Prof. Bhavani Shankar, M.S. Prof & HOD of General Surgery, MMC, Ch-3.	-- Member
5.	Prof. V. Padmavathi, M.D. I/c Directory of Pathology, MMC, Ch-3.	-- Member
6.	Thiru. S. Govindasamy, BABL	-- Lawyer
7.	Tmt. Arnold Saulina, MA MSW	-- Social Scientist

We approve the proposal to be conducted in its presented form.

Sd/Chairman & Other Members

The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information / informed consent and asks to be provided a copy of the final report.

12/3/14

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE
CHENNAI-600 003

Member Secretary, Ethics Committee

7/3/14

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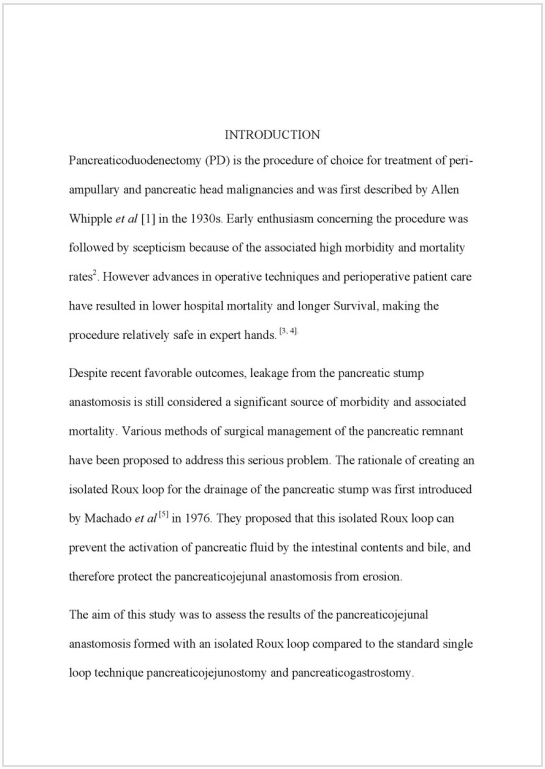

INTRODUCTION

Pancreaticoduodenectomy (PD) is the procedure of choice for treatment of peri-ampullary and pancreatic head malignancies and was first described by Allen Whipple *et al* [1] in the 1930s. Early enthusiasm concerning the procedure was followed by scepticism because of the associated high morbidity and mortality rates[2]. However advances in operative techniques and perioperative patient care have resulted in lower hospital mortality and longer Survival, making the procedure relatively safe in expert hands. [3, 4].

Despite recent favorable outcomes, leakage from the pancreatic stump anastomosis is still considered a significant source of morbidity and associated mortality. Various methods of surgical management of the pancreatic remnant have been proposed to address this serious problem. The rationale of creating an isolated Roux loop for the drainage of the pancreatic stump was first introduced by Machado *et al*[5] in 1976. They proposed that this isolated Roux loop can prevent the activation of pancreatic fluid by the intestinal contents and bile, and therefore protect the pancreaticojejunal anastomosis from erosion.

The aim of this study was to assess the results of the pancreaticojejunal anastomosis formed with an isolated Roux loop compared to the standard single loop technique pancreaticojejunostomy and pancreaticogastrostomy.

Study of results following isolated loop pancreatico jejunostomy after classical whipples procedure: Results of 38 cases

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