ORIGINAL ARTICLE

Pancreatic anastomosis leakage management following pancreaticoduodenectomy how could be manage the anastomosis leakage after pancreaticoduodenectomy?

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Background: Pancreatic anastomosis leakage and fistula formation following pancreaticoduodenectomy (Whipple's procedure) is a common complication. Delay in timely diagnosis and proper management is associated with high morbidity and mortality. To report our experience with management of pancreatic fistula following Whipple's procedure. **Materials and Methods:** In this retrospective study, medical records of 90 patients who underwent Whipple's procedure from 2009 to 2013 at our medical center were reviewed for documents about pancreatic anastomosis leakage and fistula formation. **Results:** There were 15 patients who developed pancreatico-jejunal anastomosis leakage. In 6 patients (3 males and 3 females) the leakage was mild (conservative therapy was administered), but in 9 patients (6 males and 3 females), there was severe leakage. For the latter group, surgical intervention was done (2 cases underwent re-anastomosis and for 7 cases pancreatico-jejunal stump ligation was done along with drainage of the location). **Conclusion:** In severe pancreatic anastomotic leakage, it is better to intervene surgically as soon as possible by debridement of the distal part of the pancreas and ligation of the stump with nonabsorbable suture. Furthermore, debridement of the jejunum should be done, and the stump should be ligated thoroughly along with drainage.

Key words: Anastomostic leakage, debridement, pancreas, pancreaticoduodenectomy, stump ligation

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INTRODUCTION

Obstructive jaundice occurs following cancer of the pancreas, duodenum, and ampulla of Vater. Its treatment is via pancreaticoduodenectomy (Whipple's procedure).[1-5] This procedure is usually done via classic or pyloric preservation that stomach antrum is usually resected.[5-7] Three anastomoses are created including the anastomosis between the pancreas and alimentary tract (pancreatico-jejunalor pancreaticogastrostomy anastomosis), anastomosis between the biliary tract and the intestine, and gastrojejunal or duodenojejunal anastomosis. In the first anastomosis type, it is more likely to observe anastomotic leakage and consequently this condition is associated with high morbidity and mortality.[8]

Anastomosis leakage is reported to occur in 3-26% of patients who are undergoing pancreaticoduodenectomy.[5] The leakage may be mild demonstrated by increased secretions at the site of drainage or may be severe accompanied by systemic manifestations may occur such as tachycardia, illness, fever, and finally peritonitis and septicemia.[6,8,9] Leakage is usually seen on postoperative day 3 and later on.[9] In mild cases, in which just increased secretions at the site of drainage is observed, the general condition of the patient is good and amylase level of the secretions is 3 times of the blood amylase level and no intra-abdominal pus (fluid) collection is detected on ultrasound.[6,8,9] Management of leakage at this stage is mainly conservative and includes initiating total parenteral nutrition (TPN), antibiotic administration, and octreotide.[9,10] However, in severe cases fever, tachycardia, and dehydration develop and on abdominal ultrasonography there is usually intra-abdominal collection of fluid and there may be peritoneal irritation signs.[2,3,8] Most surgeons at this stage recommend repeated laparotomy considering the extent of dehiscence, pancreatic anastomosis, repeated suturing, jejunum to pancreas anastomosis, and even more aggressive therapies such as pancreatectomy and splenectomy.[3,6-8] More extensive surgical interventions are associated with higher morbidity and mortality,

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in particular in the pancreatectomy, where there is a possibility of developing diabetes.[6]

Considering the above mentioned facts and difficulties in management of pancreatic anastomosis leakage after pancreaticoduodenectomy, we decided to report the rate of anastomosis leakage after the surgery and share our experience regarding the management of this complication.

MATERIALS AND METHODS

Between 2009 and 2013, 90 patients underwent pancreaticoduodenectomy at our university hospital. There were 38 women (42.2%) and 52 men (57.8%) with an age range of 45-70 years. The indications for surgery were malignancies of the pancreatic head or duodenum. For 25 patients, the surgery method was of pyloric preservation type and for 59 cases, classic Whipple procedure including was carried out pancreatectoduodenectomymy and enterectomy without vagotomy. Pancreatico-jejonostomy was done in two layer by 3o silk suture by invaginating the pancreatic stump in the jejunum. In 3 cases, after Whipple procedure, end-to-end anastomosis of the distal part was employed applying nonabsorbable suture in two layers in the form of pancreticogastrostomy.

Due to edema at the distal part of the pancreas, anastomosis was not created for 3 patients due to chronic pancreatitis and its firmness. Pancreatic stump was closed by interrupted nonabsorbable suture and end-to-end anastomosis between stomach and jejunum was created and then choleducojejunostomy was done. Jejunostomy was not done in any of the patients.

In all patients, sump drain was placed and was left to drain along the border of the right 12th rib.

After the surgery, all patients were followed for a month.

RESULTS

Fifteen patients (17%) developed pancreatic anastomosis leakage during the postoperative days 3-7, where 6 cases developed mild leakage and in 9 patients severe leakage was demonstrated. In six cases (3 males and 3 females), pancreatic leakage was mild characterized by increased drainage along with high amylase content of the drain (2-3 times of serum amylase level). These patients were feverish, but no abdominal tenderness was noted on physical examination. Abdominal ultrasonography was done which did not reveal intra-abdominal fluid collection. There was only peri-pancreatic edema. Conservative management performed of these cases comprised keeping the patients nil per oral, fluid and electrolyte correction, and starting TPN, and administration of antibiotic (cefazolin and metronidazole), andoctreotide along with placing appropriate drainage. They were discharged with good general condition after 15-30 days following the surgery and no further drainage.

Nine patients (6 males and 3 females) who developed severe leakage faced deterioration of the general condition after pancreaticoduodenectomy characterized by dehydration, tachycardia, and severe peritoneal irritation signs. On both abdominal ultrasonography and computed tomography scan performed, free intra-abdominal fluid, as well as pleural effusion, was diagnosed. After establishing initial resuscitative measures, the patients underwent the second laparotomy. During the operation, all of them had some degrees of dehiscence of the pancreatico-jejunostomy anastomosis with fluid collection formation and severe edema and inflammation of the distal part of the pancreas. After drainage of the secretions and thorough irrigation of the abdominal cavity, anastomosis was separated, and distal part of the pancreas was examined. In 2 patients, the pancreas was freed for 2 cm and debridement was done and then anastomosis between the pancreas and posterior portion of the stomach was performed [Table 1].

In 7 cases, creating an anastomosis seemed to be impossible due to severe inflammation of the pancreas. Therefore, after separating the anastomosis, some parts of the distal part of the pancreas was excised, and pancreas stump was closed by interrupted nonabsorbable suture. Some parts of the jejunum were excised as well and the stump was closed and drain was placed.

Two patients were diabetic, and no deterioration in the general condition was observed after the repeated laparotomy. One patient developed organ failure and died.

For all patients with severe leakage, tube jejunostomy was created after the second laparotomy. After a month follow-up, all 6 patients were discharged after 3-4 weeks with good general condition. None of the patients

Table 1: Characteristics of 9 patients who developed severe anastomosis leakage after pancreaticoduodenectomy

Patient number	Gender	Indication of surgery	Outcome
1	Female	Pancreatic head carcinoma	Alive
2	Female	Pancreatic head carcinoma	Alive
3	Male	Pancreatic head carcinoma	Alive
4	Male	Pancreatic head carcinoma	Alive
5	Male	Pancreatic head carcinoma	Alive
6	Male	Pancreatic head carcinoma	Alive
7	Male	Ampullary cancer	Died
8	Female	Cholangiocarcinoma	Alive
9	Male	Duodenal cancer	Alive

developed clinical pancreatitis. No radiologic follow-up seemed necessary.

DISCUSSION

Despite recent advances in success rate of pancreaticoduodenectomy and a considerable decline of surgical mortality (3-5%), postoperative complications are still concerning, in particular pancreatic leak and fistula.[11-14] In fact, the reports suggest that despite advances made in surgical technique, the rate of pancreatic fistula has not changes.[15]

Pancreatic anastomosis leakage was documented in about 17% of patients studied. This complication rate has been reported to occur in 6-24% of patients following pancreaticoduodenectomy.[8-10] The diagnosis of this condition is based on clinical, radiologic, and laboratory studies. High drainage with 2-3 times increase in amylase content, peritoneal irritation signs, dehydration, fever, tachycardia, and observing free intra-abdominal fluid collection and pleural effusion are used for the diagnosis.[1,2,5,9]

In mild pancreatic leakage, conservative management yields excellent outcome.[7,8,10] But in severe cases, repeated surgeries may be necessary such as total pancreatectomy and splenectomy, pancreaticogastrostomy anastomosis, and repeated pancreatico-jejunal anastomosis.[6,7,10] Due to severe pancreatic inflammation these surgeries may be associated with profound hemorrhage and considering poor general condition of the suffering patients, high morbidity and mortality are usually seen.

Yang *et al*.[16] in their study on 62 patients who underwent pancreaticoduodenectomy in a 4-year period reported that 10 patients (16%) developed pancreatic anastomosis leakage. They noted that pancreatic duct size and texture of the remnant pancreas were associated with the occurrence of this complication. They also proposed that duct-to-mucosa pancreatico-jejunostomy, which was performed for those with a hard pancreas and a dilated pancreatic duct, resulted in better outcome (only 1 patient developed anastomosis leakage, 6.25%) when compared with invagination pancreatico-jejunostomy which was associated with a higher rate of leakage (19.6%) regarding pancreatic anastomosis leakage after pancreaticoduodenectomy.

Paye *et al*.[17] described a pancreas-preserving surgical method which proved to be effective in the management of severe leakage. In their method, while the pancreas was preserved, it was drained by wirsungostomy with exteriorization or closure of the jejunal stump. They reported that in 6 years experience, 12 patients were managed with this method, and only 1 patient died as a result of recurrent hemorrhage on postwirsungostomy day 1. There is still controversy in the literature with respect to the best method of managing pancreatic fistula after pancreaticoduodenectomy owing to the fact that different factors such as patient characteristics, severity of fistula, Surgeon's experience among many others affect the outcome.

According to our experience, recommended approach for this condition includes pancreatic debridement, closing its stump, resection of extra parts of the jejunum, closing the jejunal stump and feeding tube jejunostomy. Complete drainage of the abdomen and nutritional support after the surgical intervention. This approach was done for 7 cases. We observed one patient died in this approach but died which was due to organ failure. Other 6 patients were discharged with good general condition and in the follow-up time of 3 months to 4-year no case of clinical pancreatitis was documented.

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AUTHOR'S CONTRIBUTION

All authors designed the study, analyzed the data and wrote the paper and approved the final manuscript together.

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