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Pancreaticoduodenectomy for Pancreatic and Duodenal Malignancy

MAGED S. BARSOUM, M.D. and MOHAMED S. HAFEZ, M.D.

The Department of Surgery, Faculty of Medicine, Cairo University.

Abstract

Radical resection of malignant tumors of the pancreatic head, distal common bile duct, periampullary region and duodenum was performed in eleven patients with a mean age : 51.4 years. More than half the patients had been jaundiced at the time of operation. Preoperative stenting of the C.B.D. helped to improve the jaundice prior to resection. Formal Whipple pancreaticoduodenectomy was the standard procedure in 8 patients and pylorus-preserving pancreaticoduodenectomy was done in 3 patients. Five patients had carcinoma of the pancreatic head proper, three patients had periampullary carcinoma, two patients had carcinoma of the distal C.B.D., and one patient had lymphoblastic lymphoma of the second part of the duodenum. Pancreatic fistula occurred in two patients, one of whom died because of associated uncontrollable infection and nutritional depletion, and the other one closed spontaneously. Minor septic complications developed in two patients. Long-term follow-up shows five patients who are alive and free of recurrence. Certain detailed meticulous steps in the technique of reconstruction and pancreatic-jejunal anastomosis have helped to improve the results. Pancreaticoduodenectomy is considered to have an acceptable morbidity and mortality and the long-term survival is possible even for patients with cancer head proper of pancreas.

Introduction

BASED upon the decline in operative mortality, less than 5% [**1**], the apparent improvement in long-term survival, 21-28% 5-year survival rates [**2,3**], and the opportunity to resect a more favourable periampullary tumor, most surgeons continue to recommend pancreaticoduodenal resection for the management of patients with resectable adenocarcinomas of the head of the pancreas [**4**].

This report describes the results of different techniques of pancreaticoduodenectomy in eleven patients with carcinoma of the head of the pancreas.

Material and Methods

Eleven patients with carcinoma of the head of pancreas, distal common bile duct, periampullary region and duodenum were subjected to pancreaticoduodenal resection in the period from 1980 to 1991. They

were seven males and four females, their age ranged from 9 to 61 years (mean : 51.4 yr). Six patients presented with obstructive jaundice, deep in three (bilirubin more than 20 mg%). Two had preoperative stenting of the distal common bile duct and one had two stage procedure to relieve the obstruction prior to resection. The preoperative diagnosis was correctly made using ERCP and computerized tomographic scanning.

Pancreaticoduodenectomy was the standard procedure in eight patients and the pylorus-preserving whipple procedure was carried out in 3 patients. Exploration to assess the resectability of the tumor was done through a right paramedian incision. The plane between the neck of pancreas and the anterior surfaces of the portal vein above and superior mesenteric vein below was assessed and dissected free. Actually the eleven patients studied in this report were those found to have resectable tumors among 31 explored patients for carcinoma of the region of the head of pancreas. Five out of twenty one patients with carcinoma of the head proper were found resectable. Five out of nine patients with periampullary and distal common bile duct carcinoma were amenable to resection. The patient with duodenal lymphoma was also found resectable.

Resection started by dividing the common bile duct below the cystic duct. The right gastroepiploic artery was divided near its origin from the gastroduodenal artery. The stomach was divided at the incisura for a hemigastrectomy. For the pylorus preserving resection, the mobilized duodenum was divided 2 cm distal to the pylorus. The gastroduodenal artery was then ligated and divided taking care not to be mistaken for a right hepatic artery arising from the superior mesenteric artery.

The neck of pancreas was then divided. The portal and superior mesenteric veins were dissected from the uncinate process of the pancreas ligating and dividing several small venous branches. The fourth part of duodenem was mobilized. The jejunum was divided 10 cm distal to the ligament of Treitz, dividing its mesentery near the bowel wall. The ligament of Treitz was mobilized and together with the fourth part of duodenum and proximal jejunum were passed beneath the superior mesenteric vessels.

The uncinate process was then dissected from the superior mesenteric artery ligating several small arterial branches. The specimen was now freed and removed. The gall bladder was removed with the specimen in 3 patients.

Reconstruction was done using retrocolic Roux-y jejunal loop. The first three patients in the series had their reconstruction carried out in the classic way of starting with the pancreatico-jejunal anastomosis, then the hepatico-jejunostomy, 10cm distal to first anastomosis and fiinally the gastrojejunostomy 25 cm distal to the biliary-enteric anastomosis[**4**].

In the following 8 patients, reconstruction started by an end-to-side hepatico jejunal anastomosis using 3.0 vicryl inserted in single interrupted layer without a

stent. Then an end-to-side pancreatico-jejuostomy was meticulously performed 5-7 cms distal to the bilio-enteric anastomosis. A seromuscular disc was removed from the jejunal wall equal to, and opposite the cut pancreatic surface. The posterior layer was inserted first between the capsule of pancreas and seromuscular coat of jejunum using continuous 2.0 silk.

The pancreatic duct was anastomosed to a small opening made in the jejunal mucosa using 4 interrupted 5.0 prolene or vicryl sutures. The 4 stitches should better be preplaced in the wall of the pancreatic duct before getting the pancreas close to the jejunal loop. A stent was left crossing the anastomosis and allowed to pass later through the alimentary tract. The posterior continuous silk layer was continued anteriorly to complete the anastomosis. Finally an end-to-side gastro-jejunostomy without a valve was done 50 cm distal to the pancreatico-jejunostomy. If pylorus preserving procedure was contemplaed, a duodeno-jejunal anastomosis was performed in two layers instead of the gastrojejunostomy. Two clossed gravitational drains were left near the site of anastomosis.

During the postoperative period, the nasogastric tube was usually removed on the fourth postoperative day following formal resection and on the 7th day after pylorus preserving resection. The drains were removed when drainage almost stopped usually in a week's time. The patients did not receive postoperative radiotherapy nor chemotherapy except for the patient with duodenal lymphoma.

Results

Pancreaticoduodenectomy was carried out as one stage procedure in 10 patients including five jaundiced patients, two of them had stents inserted to drain the common bile duct prior to surgery (Table 1). Resection was done one week later. Two-stage procedure was done in one deeply jaundiced patient before stents became available. Cholecysto-jejunostomy was done and the second stage of resection was carried out after three weeks dismantling the anastomosis and removing the gall bladder.

Eight patients had formal Whipple procedure (4 with cancer head proper, two with carcinoma of distal common bile duct and two with periampullary carcinoma).

Three patients had pylorus-preserving pancreaticoduodenectomy (one for cancer head proper, one for periampullary carcinoma and a child with non-Hodgkin lymphoma of the duodenum). This 9 years old boy who had a duodenal lymphoma, was treated from lymphoblastic lymphoma affecting his mediastinal lymph nodes two years before. No visceral involvement occurred at that time and he was considered cured. He presented to us by recurrent alarming upper G.I. bleeding following a short period of vomiting and loss of weight. Upper G.I. endoscopy revealed an ulcerating necrotic friable infiltrating mucosal lesion extending from below the region of the ampulla of Vater to reach down to the junction of the second and third parts of the duodenum. Biopsy proved the same nature of the lymphoblastic lymphoma. Barium follow through showed normal small and large intestines.

Table (1) : Patients Treated with Pancreaticoduodenectomy.

Patient No.	Age yr	Sex	Jaundice	Preoperative Procedure			Histologic diagnosis	Mortality		Follow up duration
				stent	Staged	Type		Early	Late	
1	52	M	+	—	—	Fr	ad CBD	—	+	4 yrs
2	49	M	—	—	—	Fr	adp	—	+	3.5 yrs
3	59	F	+	—	+	Fr	adhp	+	—	
4	61	M	+	—	—	Fr	adhp	—	+	2 yrs
5	60	M	—	—	—	Fr	adp	—	—	6 yrs
6	61	F	—	—	—	Fr	adhp	—	+	11 months
7	43	M	+	+	—	Fr	adhp	—	—	
8	58	M	+	+	—	Fr	ad CBD	—	+	18 months
9	56	F	—	—	—	Pp	adp	—	—	2.5 yrs
10	9	M	—	—	—	Pp	nHd	—	—	20 months
11	57	M	+	—	—	Pp	adhp	—	—	1 yr

M = male F = female yrs = years.
Fr = Formal resection adCBD = adenocarcinoma distal CBD adp = periampullary
Pp = Pylorous preserving adhp = adenocarcinoma head proper.
nHd = Non-Hodgkin lymphoma of duodenum.

No enlargement of the lymph nodes, nor splenomegaly were notd. Bone-marrow aspiration and skeletal survey were free. Computerized tomographic scanning of the thorax, abdomen and pelvis showed only a tumor mass 5 cm in diameter affecting the second part of duodenum without any lymph node enlargement or liver affection. ERCP revealed normal biliary and pancreatic ducts. It was decided to proceed to Whipple's procedure since it was considered to be the only way to stop bleeding from the ulcerating lesions. He is now well and free for 20 months after surgery.

One patient died on the twelfth postoperative day because of pancreatic fistula and fulminating subphrenic infection with severe nutritional depletion. Among the ten surviving patients, temporary billary leak occurred in one patient and closed spontaneously after one week. One patient developed pancreatic fistula which closed in 5 weeks after nutritional support with total parentral nutrition. One patient developed slight subphrenic collection that resolved in 8 days on antibiotic only. Two patients developed wound infection. The longterm follow-up showed five patients who are alive and recurrence-free. Marginal ulcers were not noted among the survivors. The shortest period of follow-up among survivors is one year and the longest is 6 years. Two patients only are alive more than 5 years. Among the five survivors, two had cancer head proper, and two had periampullary carcinoma. All deaths were due to recurrence.

Discussion

The outcome of pancreaticoduodenal resection has recently shown marked improvement. The morbidity has sharply declined from 40% to 20%[**5,6**], and the mortality has been reduced to 5-10%[**7,8**], for periampullary tumors. The better results are due to improved techniques, less operative time and less blood loss. Improved preoperative and postoperative care, better anaesthetic management and aggressive nutritional supports are other important factors.

Careful pancreaticojejunal anastomosis is mandatory to avoid pancreatic fistula which still is a menace to patients undergoing this operation[**9**].

Performing the bilio-enteric anastomosis prior and proximal to the pancreaticojejunostomy has facilitated and fixed the jejunal loop for more adequate pancreatic anastomosis. It does not seem to disturb the physiologic function if this sequence is followed. Stenting of the biliary anastomosis was not found essential for a safe anastomosis. Suction drains are better avoided since one of the patients who developed pancreatic fistula had suction tube left near the anastomosis. Pylorus preserving resection is less time consuming and can be accomplished safely compared to the formal Whipple procedure[**9**]. Delayed gastric emptying was not a problem in our patients having intact pylorus. Vagotomy was not added to our procedure [**10**], and marginal ulcers were not encountered among the survivors.

Recurrence is still high but cancer head proper does not seem to fare much worse than periampullary carcinoma and should continue to be offered the chance of radical resection.

Localized visceral lymphoma even if affecting the duodenum deserves the painstaking of resection hoping for cure.

Pancreaticoduodenectomy is now considered to have an acceptable morbidity and mortality and the long-term survival is possible even for patients with cancer head proper of the pancreas[**6,7**].

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