Pancreatectoduodenectomy for periampullary carcinoma

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Objectives: To assess the morbidity, mortality and 1- and 2-year survival rates, and safety of pancreatectoduodenectomy for periampullary (including pancreatic head) carcinomas in a non-oncology surgical set-up. Methods: Records of 45 patients undergoing pancreatectoduodenectomies for periampullary cancers between July 1996 and April 2000 were reviewed. These included ampullary (n=23), pancreatic (14) and duodenal (2) adenocarcinomas, lower-end cholangiocarcinoma (5), and ampullary carcinoma (1). Thirty-seven patients underwent the Whipple procedure and 8 underwent the pylorus-preserving modification. Results: The overall mortality rate was 11% and morbidity rate was 46%. Wound infection was the most common postoperative complication. The 1- and 2-year survival rates for periampullary cancers were 61% and 39% and those for pancreatic cancers were 57% and 36%, respectively. Conclusion: Pancreatectoduodenectomy for periampullary tumors remains a formidable procedure in our set-up. However, it can be performed safely with low mortality and morbidity rates. [Indian J Gastroenterol 2001; 20: 53-55]

Key words: Ampullary carcinoma, cholangiocarcinoma, morbidity, mortality, survival

Over the past few decades pancreatectoduodenectomy has been used as a relatively safe procedure for periampullary and pancreatic cancer, with mortality rate less than 5% in most published series.1,2 Morbidity rates have, however, remained in the range of 25%-50%. In our country pancreatectoduodenectomy is still considered a formidable operative procedure with a few published series highlighting the morbidity and mortality of the procedure;3,4 a few series on pancreatectoduodenectomy have been reported.5,6

We have performed 45 pancreatectoduodenectomies for ampullary and pancreatic cancers over the past 46 months. This series highlights our experience on morbidity and mortality following the procedure.

Methods
Between July 1996 and April 2000, we performed 45 pancreatectoduodenectomies for periampullary cancers. The mean age of the patients was 52.4 years (range 24 to 72); they included 29 men. All patients presented with obstructive jaundice, 36 of them had hepatomegaly and 28 had palpable gall bladder. Cholangitis was the presenting feature in four patients, whereas eight other patients developed it preoperatively in the surgical wards. Preoperative work-up included hemogram, blood biochemistry, HBsAg, and the tumor marker CA 19-9 for suspected pancreatic cancer.

Operability of the tumor was assessed by ultrasonography, CT scan and, in 14 patients, endoscopic ultrasound. Celiac and superior mesenteric artery angiogram were done in two patients in whom portal venous invasion was suspected on CT scan and Doppler ultrasound. ERCP was done in patients with cholangitis (n=12) and in those with serum bilirubin levels over 20 mg/dl (n=17) where preoperative stenting was done. All patients underwent a forward-viewing duodenoscopy. Biopsies were taken if an obvious ampullary tumor was seen. No aspiration cytology or biopsy was done for pancreatic masses.

The surgical procedure involved a standard pancreatectoduodenectomy in 37 patients and a pylorus-preserving pancreatectoduodenectomy in eight patients. A standard lymphadenectomy, which included removal of the anterior and posterior pancreatectoduodenal, pyloric and biliary duct, superior and inferior pancreatic head and body lymph nodes, was performed in all patients. In four patients, lymph nodes along the superior mesenteric artery, celiac axis and interaorticoexcaval group were also removed.

All patients underwent an interrupted 2-layered pancreatectoduodenostomy. For dilated pancreatic ducts an inner duct-to-mucosa layer anastomosis was done, whereas for nondilated ducts the stomach mucosa was anastomosed to the pancreatic tissue; in either case, an outer serosa-to-pancreatic capsule layer suture was taken. The pancreatic duct was stented in all patients. An end-to-side hepaticojunostomy was done without an anastomotic stent. Bowel continuity was established with either an end-to-side or an end-to-end gastrojejunosotomy, or duodenoejunostomy for pylorus procedures. Feeding jejunostomy was done in all patients. Two tube drains were placed, one in the Morrison's pouch and another near the pancreatectoduodenostomy.

Subcutaneous octreotide 100 μg preoperative and 30 μg 8 hourly postoperative was given for 5 days to all

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patients. Six patients with pancreatic adenocarcinoma, in whom histology revealed uncinate process margin or lymph nodes as positive for cancer, received postoperative radiotherapy of 6000 rads to the tumor bed with 5-fluorouracil as a sensitizing agent.

Results
The hemoglobin levels ranged from 9.2 to 15.1 g/dL (mean 11.1), serum proteins 4.0 to 7.1 g/dL (mean 5.2), serum albumin 1.6 to 4.1 g/dL (mean 2.5), and serum bilirubin 4 to 30 mg/dL (mean 16.7). The prothrombin time ranged from 12 seconds to 28 seconds and prothrombin index from 60% to 96%. Ampullary adenocarcinoma was the commonest disease (n=23), four of them were lymph node-positive. Fourteen patients had pancreatic adenocarcinomas (7 node-positive), 5 had cholangiocarcinomas, 2 duodenal adenocarcinomas and 1 ampullary carcinoma (all node-negative). Accurate TNM staging could be done in 39 patients. Of the 21 ampullary tumors staged, 1 was stage IV, 3 stage III, 14 stage II and 3 stage I. Of 12 pancreatic tumors staged, 7 were stage III, 4 stage II and 1 stage I. Of the 4 cholangiocarcinomas staged, one was stage IV and 3 were stage II. Both the duodenal adenocarcinomas were stage II.

The overall postoperative mortality rate was 11% (5/45); there was no death among the last 23 resections. Two patients died of pancreatic leak and sepsis; one had a biliary leak leading to sepsis and death. Of the remaining 2 deaths, one patient had myocardial infarction on the 10th postoperative day and the other a pulmonary embolus on the 8th postoperative day. Thus, the procedure-related mortality was 6.6% (3/45).

Twenty-one patients (46%) developed complications. Four patients developed pancreatic leak: three of them developed external pancreatic fistula and were managed conservatively, whereas the fourth one needed re-exploration and re-suturing of the lateral anastomotic disruption on the 6th postoperative day. All of them had an uneventful recovery. A controlled biliary fistula and delayed gastric emptying were seen in one patient each. Wound infection was the commonest postoperative complication (13 patients). Four patients developed chest infection.

The mean serum total protein (4.3 g/dL) and serum albumin (2.2 g/dL) levels in patients developing complications were significantly lower than in patients with no morbidity (5.4 g/dL and 2.7 g/dL, respectively); the difference in the serum protein value was significant (p<0.001; Student's t test).

Survival
Three patients, including one with pancreatic adenocarcinoma, are disease-free at 3 years. Seventeen patients, including 5 with pancreatic adenocarcinoma, had 2-year disease-free survival; 27 patients (8 pancreatic adenocarcinoma) had 1-year disease-free survival. Seven patients have been followed up for less than a year.

Two patients with stage III periampullary cancers developed liver metastases at 17 and 20 months after surgery. Four patients were lost to follow up but were disease-free at the time of their last visit (12, 6, 12 and 8 months after surgery). The 1- and 2-year survival rates for periampullary cancers were 61% and 39%, respectively whereas those for pancreatic cancers were 57% and 36%, respectively.

Discussion
The mortality of pancreaticoduodenectomy has fallen from around 25% in the 1960s and 1970s to around 5% in the 1990s. In the present study the mortality rate was 23% (5/22) during the initial 22 months, and nil in the last 23 pancreaticoduodenectomies over 24 months. Procedure-related deaths were 3/45, i.e., 7%, which is comparable to that reported from other countries and encouraging in the Indian context where limited published data are available. Mortality has been shown to decrease with gain in experience and high hospital volume.

The morbidity rate of 46% is high as compared to that in the West, this is probably because a majority of our patients were malnourished. The commonest complication was wound infection. Delayed gastric emptying was seen in one patient on whom a pylorus-preserving procedure was done; this complication occurs in 10%-22% of patients undergoing this procedure.

In our study, the 1-year and 2-year survival rates for periampullary tumors (pancreas excluded) were 61% and 39%, respectively, and those for pancreatic carcinomas were 57% and 36%, respectively; the median follow-up duration in both cases was 18 months. Adjunct chemoradiotherapy in some patients with pancreatic adenocarcinoma may be responsible for the comparable survival rates.

We perform preoperative stenting in all patients with cholangitis and those with serum bilirubin >20 mg/dL even though routine preoperative stenting has been shown to not influence morbidity and mortality rates. We believe that there is a high risk of such patients developing cholangitis, especially if the waiting period for surgery is long. We prefer pancreatojejunostomy over pancreatojejunostomy as randomized trails have shown it to be superior. We use octreotide as it reduces the pancreatic secretion, and has been shown to reduce postoperative leak rates.

Finally, we follow the John Hopkins protocol for postoperative adjuvant chemoradiotherapy for pancreatic cancer; some studies have shown improved survival with such therapy.
Pancreatoduodenectomy can be performed for peripapillary tumors in a referral center with reasonable morbidity and low mortality. Our study shows that, with meticulous preoperative work-up and surgical technique, and increasing experience, this procedure is possible even in our set-up, with morbidity and mortality rates that compare favorably with those in Western studies.

References

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