

# Surgical treatment of pancreatic carcinoma

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**OBJECTIVE:** To evaluate the surgical treatment of pancreatic carcinoma.

**METHODS:** 101 patients with pancreatic carcinoma admitted from 1995 to 2002 were studied retrospectively. Of 83 patients undergoing surgery, 56 (64.5%) were subjected to tumor resection. Whipple's procedure was performed in 48 patients, extended regional pancreatectomy and autograft intestinal transplantation in 2, combined resection of pancreatic body or tail carcinoma in 6, and 27 patients with unresectable pancreatic carcinoma were given inner drainage.

**RESULTS:** Wound dehiscence and digestive bleeding were found in one patient respectively. Pancreatic fistula was found in one patient undergoing extended regional pancreatectomy and autograft intestinal transplantation. Other patients recovered uneventfully.

**CONCLUSIONS:** Most patients with pancreatic carcinoma could undergo tumor resection. Blood vessel repair or transplantation can be used if the tumor adherent to the superior mesenteric-portal vein.

Extended regional pancreatectomy and autograft intestinal transplantation are feasible. Simple inner drainage should be used in the patient whose neoplasm is unresectable.

(*HBPD Int* 2003; 2: 139-141)

**Key words:** pancreas; neoplasm; operation

## Introduction

Pancreatic carcinoma as one of the most malignant tumors is usually not evident at its onset. As recognized, it is at its late stage with a low resection rate and poor prognosis. In recent years, surgical procedures for pancreatic carcinoma have been improving, and the outcome of this treatment has been much improved too. In this study, we summarized the 83 patients with pancreatic cancer treated from 1995 to 2002 at our hospital.

## Methods

### Patients

Of 101 patients with pancreatic cancer treated be-

tween July 1995 and July 2002 at our hospital, 83 patients (82.2%) underwent surgery. In this group, 62 were men and 21 women, with a mean age of 60.5 years (range, 31 to 77 years). Neoplasms were found in the head of the pancreas in 76 patients and in the tail, 7 patients.

### Methods

Fifty-six (64.5%) of the 83 patients underwent tumor resection. Whipple's procedure was performed in 48 patients, extended regional pancreatectomy and autograft intestinal transplantation in 2 (i. e., under the basis of Fortner regional pancreatectomy, the whole intestine and the right half colon were resected and autograft intestine was transplanted), combined resection of pancreatic body or tail carcinoma in 6. Pancreatic carcinoma in 27 patients was unresectable; involvement of the superior mesenteric vein or portal vein (11), metastasis to the liver (9), and metastasis to somewhere else in the abdominal cavity (7). All these patients received internal drainage; cholecystojejunostomy (17), choledochojejunostomy (Roux-en-

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Y) (6), and inner drainage (bridge drainage) (4).

## Results

Of the 57 patients, one developed wound dehiscence, for which decompression suture was made, and one experienced digestive bleeding, which was cured conservatively. The remaining patients recovered uneventfully. The 27 patients receiving inner drainage recovered well without any complications. Pancreatic fistula in one patient undergoing extended regional pancreatectomy and autograft intestinal transplantation was cured by drugs. The first patient lost to follow-up after 6 months, and the second one has been followed up for 3 months after operation.

## Discussion

### Resection of pancreatic carcinoma

The reported rate of radical resection of pancreatic carcinoma in China is about 20%.<sup>[1]</sup> It is the involvement of the superior mesenteric vein or the portal vein prevents the neoplasm from being resected. Some data<sup>[2]</sup> showed an unresectable rate of more than 30%. However, the carcinoma adherent to the superior mesenteric or the portal vein does not always belong to the advanced phase of the tumor.<sup>[3]</sup> If it is not metastasized to the retroperitoneal region or other organs, the tumor invading the superior mesenteric vein or portal vein is considered contraindicated for surgery only, so giving up surgery means that the patient will lose the potential chance of curing. Following the improvement of surgical procedures including those of vasosurgery, organ transplantation and preservation, it is possible to resect the carcinoma adherent to the superior mesenteric vein or portal vein thoroughly. In China, some scholars<sup>[4]</sup> preferred Whipple's procedure including the removal of the superior mesenteric or portal vein, end-to-end anastomosis, or autograft saphenous vein bypass. But they found similar surgical effect in the cases without involvement of vessels. Others<sup>[5]</sup> performed successfully extended radical resection (the pan-

creas, duodenum, superior mesenteric vein and parenchyma, and the organs nearby). In our series, extended regional pancreatectomy and autograft intestinal transplantation were performed in 2 patients with advanced pancreatic carcinoma invading the root of the superior mesenteric vein. The resection involves the greater part of the stomach, pancreas, duodenum, spleen, gallbladder, common bile duct, intestine, as well as the ascending, descending and transverse colons. In our series, we used liquid University of Wisconsin to perfuse the intestinal artery and metronidazole to perfuse the intestinal cavity. After clearing out the pancreatic fossa and its surrounding tissue, the intestine was transplanted to the abdominal cavity, and the intestinal mesenteric artery was anastomosed to the root of the superior mesenteric artery, and the intestinal vein to the portal vein without transplantation of the transverse colon, and anastomosis of the near end of the intestine to the stomach, and its far end to the transverse colon. The first patient we treated recovered uneventfully and the second one developed pancreatic fistula, which was cured by medication. For such patients, pancreatectomy or regional pancreatectomy is radically effective, but technically extended regional pancreatectomy plus autograft intestinal transplantation is feasible to clear out the focus thoroughly. It was reported that extended radical resection could prolong postoperative survival.<sup>[6]</sup> Two patients in our series are doing well, and are being subjected to long-term follow-up.

### Prevention of pancreatic fistula after Whipple's procedure

Pancreatic fistula is a common severe complication after pancreatoduodenectomy with an incidence of 5%–25%. As the major cause of infection, hemorrhage and death,<sup>[7,8]</sup> it is hard to deal with. We adopted three measures in combination to prevent pancreatic fistula in this series. First, pancreatic fluid was externally drained through the pancreatic duct. Before we cut off the pancreas, the superior and inferior edges of the pancreas were sutured with a needle, and incise the membrane of the pancreas and parenchyma carefully from its

surface while sucking hemorrhage in the field of operation. The main pancreatic duct was found close to the back of the pancreas at its mid-inferior part. Immediately, a drainage tube was inserted and fixed after incision of the main pancreatic duct to prevent trouble to find the cutting end. After incision of the rest of the pancreas, the cutting end was sutured in U-shape to prevent hemorrhage and pancreatic fistula. The drainage tube was withdrawn out from the intestine wall. Second, the pancreas and intestine were anastomosed in sheath. We modified Peng's method of anastomosis for preventing pancreatic fistula or leakage of pancreatic fluid. The occurrence of pancreatic fistula may be due to anastomotic tension, blood circulation, nutritional status, clearance of local leakage fluid and others. In this series, we used intermittent suturing according to Peng's method. Stitch distance was not too strict without "binding" for the sake of less tension and better blood circulation. Third, somatostatin was prescribed preventively after operation. The combined use of the three measures ensured no occurrence of pancreatic fistula during Whipple's operation in our series.

### Resection of carcinoma in the pancreatic body and tail

The carcinoma of the pancreatic body and tail which is not involved the superior mesenteric vein and artery is highly resectable, but its local recurrence is frequent. In our series, one patient with unresectable tumor received no operation because of its metastasis to the liver, and the other 6 patients were subjected to extended combined resection. The resection involved the stomach, spleen, right kidney and right adrenal gland. They recovered well after operation, and were followed up for 2 to 3 years without tumor recurrence.

### Selection of internal drainage

Most of our patients with unresectable tumors underwent cholecystojejunostomy, which is characterized by simplicity, less complications and rapid improvement of jaundice. Within a week, the level of total bilirubin and alkaline phosphate may be decreased by over 50%. For the patients with diffi-

culty in exposure of the porta hepatis, we placed a drainage tube into the common bile duct through the dilated bile duct on the hepatic surface, then directed the tube into the intestine. Thus, complicated operative procedures were avoided without complications but marked improvement of jaundice. It is an ideal procedure for the patients with obstructive jaundice when it is difficult to expose their porta hepatis.

### Competing interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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Received July 26, 2002

Accepted after revision November 10, 2002