

# INTERNAL DRAINAGE COMBINED WITH INTRAOPERATIVE RADIOTHERAPY AND CHEMOTHERAPY FOR PANCREATIC HEAD CARCINOMA

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## ABSTRACT

**Abstract:** To improve the palliative effect on intermediate or advanced pancreatic head carcinoma. **Methods:** Operations were performed in 26 patients with intermediated or advanced pancreatic head carcinoma. Cholecystojejunostomy or choledochojejunostomy combined with intraoperative radiotherapy with an electron beam on carcinoma were performed from May, 1996 to May, 1998. Meanwhile the catheter of multifunctional implantable drug delivery system was inserted via gastroduodenal artery for postoperative perfusion chemotherapy. **Result:** The 3-27 month follow-up survey suggested that the tumors shrank in different degrees after the course of treatment. All patients were relieved of pain. The 6-month, 12-month and 24-month survival rates were 100%, 93.9% and 20% respectively. The average survival time of the 5 dead patients was 17.8 months. **Conclusion:** This operation is very effect to prolong the life of the patients with intermediate or advanced pancreatic head carcinoma.

**Key words:** Pancreatic carcinoma, Radiotherapy, Operation, Perfusion chemotherapy.

From May, 1996 to May, 1998, 26 patients with intermediate or advanced pancreatic head carcinoma were performed with cholecystojejunostomy or choledochojejunostomy combined with intraoperative radiotherapy, meanwhile the catheter of multifunctional implantable drug delivery system was inserted via gastroduodenal artery for postoperative perfusion chemotherapy in our hospital. We carried out a 3-27 months followed-up survey and found a satisfactory achievement.

## CLINICAL MATERIALS AND METHODS

### General Materials

There were 19 males and 7 females aged from 36 to 69 years old with an average age of 49.2. All cases were diagnosed as unresectable pancreatic head cancer by ultrasound and CT. All patients had icterus and serious pain but no ascites or metastasis to their liver or other organs.

### Surgical Treatment and Intraoperative Radio-therapy

After continuous peridural block anesthesia, we made an incision through the rectus muscle at upper right abdomen. The pancreatic head carcinoma had been confirmed unresectable by laparotomy and ductal cell carcinoma by pathologic examination. The gastrocolic ligament was freed to expose the carcinoma and localize it with silver clips for postoperative radiotherapy. We choose a proper electric tube matching the size of carcinoma to perform radiotherapy with an electric protecting beam on the carcinoma (the Linear Accelerators was made by Siemens Ltd., Germany) with the dose of 30 GY. We ligated the gastroduodenal artery near common hepatic artery. We made a hole at the distal ligature and insert the catheter of multifunctional implantable drug delivery system to superior pancreaticoduodenal artery. Ligated the right gastroepiploic artery. Injected methylene blue for tumor staining from drug delivery bag and 10 mg of adriamycin and 0.5 g of 5-Fu from drug delivery system. Performed cholecystojejunostomy or choledochojejunostomy based on the degree of obstruction of cystic duct.

### Postoperative Treatment

Two weeks after the operation, we began to inject 10 mg of Adriamycin and 0.5 g of 5-Fu once a week. Three weeks after operation, localized with analog machine. Radiated at vertical field and right lateral field with the dose of 1.5 GY/time for 5 times per week, totally DT 60 GY intraoperatively and postoperatively. Stopped the treatment for 3 weeks after the complete course and

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injected the same dose of drug per 2-4 weeks.

## RESULTS

No patient died during treatment or in the hospital and icterus disappeared quickly after the operations. All patients received the complete course of treatment and were followed up for 3-27 months. The survival rates of 3, 6, 12, 18 and 24 months were 100% (26/26), 100% (22/22), 93.9% (14/15), 75.0% (9/12) and 20.0% (1/5) respectively. The 5 patients who died survived 12-23 months (average of 17.8 months). The pain remission rate after the whole course of treatment was 10%. 3 months after the operation, ultrasound and CT scanning showed the pancreatic head carcinoma shrank at different degrees. The carcinoma diameter in two cases shrank from 4.9 cm before operation to 2.1 cm during the 6 months after operation and 4.8 cm to 1.9 cm so that the patients received the opportunity for a second operation (pancreatoduodenectomy).

## DISCUSSION

### The Value of the Combination of Internal Drainage, Intraoperative Radiotherapy and Chemotherapy for Pancreatic Head Carcinoma

Pancreatoduodenectomy could achieve satisfactory results in the early stage of carcinoma.<sup>[1]</sup> Most patients are diagnosed pancreatic head carcinoma at its intermediate or advanced stage so there is no chance to perform this operation, so only the palliative treatment is possible. In another 21 cases we used simple external radiotherapy before and the median survival period was 6.0 months, and in some their pain could be relieved. In another 23 cases who received cholecystojejunostomy or choledochojejunostomy, the medium survival rate was 5.9 months, and could not be relieved their pain at all.<sup>[2]</sup> Being the best palliative treatment, the combination method could make a good use of the these treatments by relieving pain, shrinking the carcinoma and prolonging life. The main advantages are as follows: In the patients with unresectable pancreatic head carcinoma, the total blood bilirubin increases, serious hepatic congestion occurs and the dietary and whole body condition are poor. Radiotherapy and chemotherapy could make it worse because of their side effects. Patients usually die due to the failure of hepatic function and the general body condition before icterus disappears. With the combination treatment, internal drainage could get rid of icterus, and provide good physical condition for chemotherapy and radiotherapy by improving patient's appetite and hepatic function and their body functions.

### The Effect of Intraoperative Radiotherapy in the Combination Treatment

Ozaki et al.<sup>[3]</sup> reported that the resection of pancreatic head carcinoma combined with intraoperative radiotherapy could achieve good results. Nakabi<sup>[4]</sup> also reported the satisfactory effect of intraoperative radiotherapy for advanced unresectable pancreatic carcinoma. But the combination method is much better than the external radiotherapy we used before in the aspects of shrinking carcinoma, prolonging patient's life and relieving pain.<sup>[2]</sup> It is indicated that intraoperative radiotherapy could avoid the damage of organs anteriorly to the pancreas and abdominal wall by radioactive rays as well as could avoid the injury of radioactive rays to the healthy organs and tissue. It could radiate the carcinoma closely and concentratively with a larger dose. It plays a more effective role in killing carcinoma cells.

### The Effect of Perfusion Chemotherapy

There is rich blood supply in the pancreas and the gastroduodenal artery is one of the main sources at pancreatic head, so chemotherapy via this artery is reasonable for pancreatic head carcinoma with the following features: (1) To ligate gastroduodenal artery and right gastroepiplic artery could improve ischemia as well as reduce the stimulation of the drug to the stomach; (2) The catheter could directly reach pancreatoduodenal artery with the drug; (3) The small dose of drug causes less side effect, than whole body chemotherapy; and (4) The injecting method is just the same as a muscular injection, which is accepted by patients. In our study, all cases completed the whole course of chemotherapy with slight side effects. After radiotherapy, they still could receive perfusion chemotherapy every 2-4 weeks for inhibiting continuously the growth of carcinoma. It is indicated that perfusion chemotherapy is one of the main parts of the combination treatment.

### The Combination of Chemotherapy and Radiotherapy

Shibamoto et al.<sup>[5]</sup> believed that the radiation dosage for unresectable pancreatic carcinoma was 55-60 GY and emphasized that the combination of chemotherapy and radiotherapy and the application of a sensitive enhancer were the only hope to improve the effect of radiotherapy for pancreatic cancer. In our study, a small dose of postoperative radiotherapy and the perfusion of a small dose of adriamycin and 5-Fu could effectively inhibit cancer. Its mechanism might be as: (1) Adriamycin and 5-Fu could get into molecular structure of the cells to inhibit the synthesis of DNA enhancing the radioactive sensitivity when DNA is multiplying in carcinoma; (2) Adriamycin and 5-Fu could increase the ratio of sensitive cells to the proliferate stage cell by interfering cellular metabolic kinetics; and (3) Making good use of radiotherapy and chemotherapy could kill chemotherapeutic drug-resistance cells or antiradioactive-ray cells.

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