

# Effects of Intraoperative Peritoneal Chemotherapy and Portal Vein Infusion Chemotherapy on Progressing Gastric Cancer

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**Abstract Objective** To evaluate the efficacy of intraoperative peritoneal chemotherapy (IPC) and portal vein infusion chemotherapy (PVIC) in prevention and treatment of peritoneal implantation and liver metastases of the gastric cancer. **Methods** 280 patients who had undergone radical excision of advanced gastric cancer were collected and were divided into treatment group and control group, the former (147 cases) received IPC and PVIC during the operation and the latter (133 cases) didn't. Both groups accepted chemotherapy for 1 year of same regimen. **Results** The 3-year survival rate was 54.4% in the treatment group (receiving IPC and PVIC) and 40.6% in the control group (receiving operation only). The incidences of intraperitoneal implantation were 5.4% in treatment group and 13.5% in control group. Liver metastasis rates in both were 4.1% and 12.7% ( $p < 0.05$ ) respectively. **Conclusion** IPC and PVIC is an effective method for prevention and treatment of advanced gastric cancer.

**Key Words** gastric neoplasms; intraoperative peritoneal chemotherapy; portal vein infusion chemotherapy

Learning more and more about its biological behaviour, the measure to treat gastric carcinoma is becoming more and more reasonable. The key factors such as intraperitoneal implantation and distant metastasis especially liver metastasis influence the therapeutic effects of advanced gastric carcinoma. Tianjin medical university cancer hospital adopted intraoperative peritoneal chemotherapy, making the operation going with soak of anticancer drugs, together used portal vein infusion chemotherapy to prevent intraperitoneal implantation and liver metastasis.

## DATA AND METHODS

**Clinical datas** From Dec. 1996 to Dec. 1999, 327 patients accepted operation in Tianjin Medical University Cancer Hospital. Among them 280 cases got radical excision, 47 cases got palliative excision or gastrojejunostomy. Among the 280 patients there were 152 male and 128 female (M-F ratio 1.3:1), Their age arranged from 32 to 78 with mean 61 years old. The ways of operation: 57 cases got total gastrectomy, 175 distant end subtotal gastrectomy, and 48 proximal end subtotal gastrectomy. The tumors all involved or infiltrated into serous membrane, but without distant metastasis. By TNM staging 174 cases belonged to  $T_3N_0-2M_0$ , and

106 cases belonged to  $T_4N_0-2M_0$ . By pathological diagnosis 79 patients were tubular adenocarcinoma, 52 papillary adenocarcinoma, 63 moderately differentiated adenocarcinoma, 38 poorly differentiated adenocarcinoma, 27 undifferentiated carcinoma, and 21 mucus adenocarcinoma.

**Treatments** 280 cases were divided into two groups: treatment group 147 cases and control group 133 cases. The treatment group were infused MMC 20mg together with 20ml NS into their abdominal cavity after exploratory laparotomy, following the radical operation, 10ml NS with MMC 20mg was injected into transverse mesocolon vein, which was called portal vein infusion chemotherapy. The control group didn't accept intraoperative peritoneal chemotherapy and portal vein infusion chemotherapy. Between the two groups, there wasn't significant differences with sex, age, operation way, pathological diagnosis, staging and so on. Both groups accepted chemotherapy for 1 year of same regimen.

## RESULTS

All patients had a follow-up more than 3 years. Among 147 cases of the treatment group, 80 cases survived, the 3-year survival rate was 54.4%. In the control group, 54 patients survived, the 3-year sur-

vival rate was 40.6%(54/133). The difference was significant ( $P=0.0344$ ). During the follow-up, 8 patients of treatment group developed intraperitoneal implantation, the recurrence rate was 5.4%(8/147). 18 cases of control group developed intraperitoneal implantation, the recurrence rate was 13.5%(18/133) ( $P=0.017$ ). The rate of liver metastasis in treatment group was 4.8%(7/147), and in control group it was 15.0%(20/133), the difference was also significant ( $P=0.007$ ).

## **DISCUSSION**

How to deal with the subclinical focus during the operation of advanced gastric carcinoma is the key point to prevent and treat intraperitoneal implantation, hematogenous metastasis and elevate the long-time survival. In the operation, the tumor was crushed repeatedly and the surface of visceral peritoneum, especially the mesentery peritoneum was coarse by touching the operators, which made it easy for the free tumor cell to "nidiation"<sup>[1]</sup>. Documents show when serous membrane was invaded by naked eyes, the positive rate of free cancer cell intraperitoneal implantation is more than 60%. Maechara et al<sup>[2]</sup> analyzed the cause of death for gastric carcinoma and found over 50% patients had metastasis and more than 40% patients had liver metastasis. So we can see that the prevention for intraperitoneal implantation of advanced gastric carcinoma which invaded serous membrane is one of the most important elements to elevate survival after operation.

The naked submesothelial connective tissue of

impaired peritoneum during operation made it easy for the cancer cell to implant. So when the operation began, we infused the anticancer drug into abdominal cavity to prevent intraperitoneal implantation. The 3-year survival rate of two groups in our study was 54.4% and 40.6% respectively. The difference was significant. Otherwise, portal vein infusion chemotherapy through transverse mesocolon vein is the main measure undertaken during the operation. Literatures show the liver metastasis rate of gastric carcinoma is 11%<sup>[3]</sup>, which in our treatment group was 4.8%(7/147), and in the control team was 15.0%(20/133) in 3 years, the difference was significant ( $P=0.007$ ).

On the whole, intraoperative peritoneal chemotherapy for advanced gastric carcinoma make the operation completed with the presence of anticancer drug, which can exactly prevent cancer recurrence. Portal vein infusion chemotherapy before the operation completed is an effective step to prevent liver metastasis. And this method is simple, safe, practical. Of course it has minor side effects.

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