

## Clinical application of radiofrequency ablation in the treatment of unresectable pancreatic cancer

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**Abstract.** To evaluate the clinical value of radiofrequency ablation for the treatment of unresectable carcinoma of pancreatic body and tail. Eighteen cases of unresectable pancreatic body and tail cancer were treated with radiofrequency hyperthermia. The changes of clinical symptoms, serum CA19-9 and CA242 levels before and after treatment for 3 months were observed and the complications were observed. The pain symptoms were relieved after radiofrequency ablation, and the serum levels of CA19-9 and CA242 decreased more significantly after 3 months of RFA treat than before treatment ( $t=9.873, 5.978, P<0.001$ ); None of the postoperative complications, improve the survival rate of tumor. RFA can control the clinical symptoms of pancreatic cancer, and improve the quality of life, and has a certain short-term clinical treatment effect.

### 1 Introduction

Pancreatic cancer is a malignant tumor of the digestive system of an occult onset, rapid progression and therapeutic effect and prognosis. In recent years, the incidence of pancreatic cancer has increased year by year, It is ranked second in the United States digestive tract fatal diseases, the incidence of mainland China is close to 1/10000, and most patients in the diagnosis of advanced stage has been developed, surgical resection rate is only about 15-20% [1]. So far, radical resection is the only treatment that promises to cure pancreatic cancer, but most pancreatic cancer patients are in advanced stages and lose opportunities for surgery. Radiofrequency ablation (RFA) is a palliative method rising in recent years, a kind of RFA belongs to the heat treatment technology, It leads to tissue coagulation necrosis by heat to kill tumor cells to achieve aim. Radiofrequency ablation has been widely used in the treatment of solid tumors both at home and abroad due to its advantages of high safety and high quality of life, A few scholars try to apply the technique in the treatment of unresectable pancreatic cancer [2]. In our hospital, 18 cases of resectable pancreatic cancer treated with RFA have been studied in recent years, and have achieved certain results.

### 2 Objects and methods

#### 2.1 object

From January 2015 to June 2016 in our hospital treatment of patients with advanced pancreatic cancer in 18 cases, the clinical symptoms were abdominal pain, back pain, jaundice, weight loss, 8 cases of 10 cases of men and women, the average age of 43+5.64 years old, underwent rapid pathological diagnosis in intraoperative diagnosis, and was identified as advanced pancreatic unresectable carcinoma. Tumor 7.5-10.4 cm in diameter, were diagnosed as adenocarcinoma.

## 2.2 methods

The patients in the observation group were treated by radiofrequency ablation with radiofrequency ablation apparatus (model WE7568) produced by Beijing electronic company. CT scan was used to determine the puncture point and direction of the needle. First of all, general anesthesia, given certain sedative, patients take supine, lateral position, prone position, the electrode plate of radiofrequency ablation instrument close to the patient's lower extremities. After a CT scan to identify the tumor position, repeat CT scanning process to determine the correct position, will be launched from the needle sheath after 10 gold microelectrode showed internal umbrella tumor implantation in ultrasound guidance and monitoring, connected with the EVB electrode, and a heating control in computer program. Each treatment area of control in the hemisphere in the range of 2 cm, depending on the size and conformation of the cancer treatment for many times, the first ablation function is set to 30 W, then the appropriate changes according to the patient's tolerance, then complete tumor ablation. According to the location and size of the tumor, the treatment conditions and treatment time were set up. The common treatment conditions were temperature 90~100 degrees, time 10~20 minutes. Close monitoring of vital signs during operation, postoperative supine rest for 24 hours.

## 3 results

### 3.1 general condition and abdominal pain conditions

Postoperative pain relief. The group of 18 patients with varying degrees of abdominal pain and back pain before surgery, except 4 cases of abdominal pain don't have significant relief, the remaining 14 cases began to show varying degrees of relief after about 3 weeks. 8 patients were completely relieved after 1 month's treatment. The overall pain relief rate was 80.15% ( $P < 0.05$ ). In addition, the 14 patients who needed analgesia before operation, 6 cases had no need for analgesia at one month after operation, and the rate of taking analgesics was 33.33%.

### 3.2 Patients' serum CA19-9 and CA242 change levels before treatment and of after 3 months treatment.

Table 1 shows the changes of CA19-9 and CA242 level before treatment and 3 months after treatment. It can be seen that using video ablation therapy for three months, the two serum tumor markers decreased compared with before treatment, the difference was significant.

Table1 Patients' serum CA19-9 and CA242 change levels before treatment and after 3 months treatment (U/mL)

Item	Before	After 3 month's treatment	difference	<i>t</i>	<i>p</i>
CA19-9	247.19±112.41	77.34±64.07	163.21±97.87	9.873	<0.01
CA242	65.42±44.60	39.31±32.03	22.74±26.60	5.978	<0.01

## 4 Discussion

Pancreatic cancer is a malignant tumor with poor prognosis. So far, radical surgical resection is still the only way that can hopefully cure pancreatic cancer [2]. However, only about 20% of patients with pancreatic cancer have opportunities for surgical resection due to tumor involving the celiac and superior mesenteric artery and other organizations can not be surgically removed, so relative treatment for pancreatic cancer has great significance. Radiofrequency ablation (RFA) has been successfully applied in the treatment of liver tumors, and it has been a good application in lungs, kidney and other solid organ tumors in the clinical treatment. In recent years, some scholars at home and abroad began to apply RFA for the treatment of pancreatic cancer and achieved a positive effect [3].

The principle of radiofrequency ablation is to emit high frequency radio frequency waves through the radio frequency electrodes to excite the tissue cells to perform plasma oscillation. As the ions

collide with each other to generate heat, the temperature in the treatment area reaches 50 ° C. and the central temperature reaches 80-100 ° C., so as to kill local tumor cells quickly and effectively [4]. Radiofrequency ablation can also make local tumor blood vessels coagulation, blocking tumor blood supply, thereby further aggravating cell ischemia and delay tumor growth. Radiofrequency ablation should be performed under the guidance and monitoring of B-ultrasound. The depth and direction of the puncture needle into the tumor can be clearly observed throughout the operation, and the relationship with the surrounding large blood vessels, pancreatic ducts and adjacent organs can be observed at the same time. Fully show the border of the tumor. The 18 electrodes at the tip of the radio-frequency needle were completely open like "umbrella", diameter 3.5 cm, a thermal coagulation range up to 5.0 cm [5]. The ions in the tissue around the electrode constantly change direction and generate heat by friction under the action of the electromagnetic field, thereby forming a local high temperature, vaporizing the water inside and outside the cell tissue and denaturing the protein to cause coagulation necrosis. The therapeutic effect of hyperthermia on solid tumors has been affirmed [6].

After radiofrequency ablation treatment, this group of patients' pain is significantly relieved and tumor growth is inhibited. It's mainly due to RFA effectively destroyed the tumor tissue, the thermal effect of peripheral vascular coagulation, the embolization of small blood vessels, blocking the blood supply to the tumor, which in turn controls tumor growth and metastasis [5]; meanwhile, hyperthermia also enhances the immune function of tumor patients, especially the immune function of T lymphocytes, natural killer cells and macrophages, thereby activating the body's immune system, To achieve the purpose of killing tumor cells [7].

In short, radiofrequency ablation cure unresectable pancreatic tumors is feasible, to some extent, can effectively improve the patient's clinical symptoms, improve patients' life quality, and extend the life cycle. Because of the small number of patients in this study, which is mainly aimed at the clinical treatment of advanced pancreatic cancer and lack of randomized, controlled studies with other palliative care and no prospective study of long-term follow-up, radiofrequency ablation of pancreatic cancer still in the exploratory stage, there are still many concerns about its safety and long-term efficacy. Therefore, the assessment of surgical risks and benefits should be fully performed during the radiofrequency of the pancreas.

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