Clinical treatment effect of TACE combined with Focused Ultrasound Knife in advanced liver cancer

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Abstract: Objective: To explore the clinical treatment effect of TACE combined with Focused Ultrasound Knife in advanced liver cancer. Method: Sixty patients with advanced hepatocellular carcinoma admitted to the Second Hospital of Suichang County from October 2011 to October 2017 were selected as study subjects (all patients had no TACE), divided into control group and observation group according to random number table with 30 cases in each group. The control group was treated with single TACE, as well as the observation group plus Focused Ultrasound Knife. The curative effect and adverse reactions of the two groups were compared. Results: After 3 months’ follow-up, the tumor shrinkage > 50% and the complete necrosis rate in the observation group were higher than those in the control group (P < 0.05), as well as the remission rate of the observation group (P<0.05). There was no significant difference in the incidence of adverse reactions between the two groups (P > 0.05). Conclusion: Combination of TACE and Focused Ultrasound Knife can increase the necrosis rate in the clinical treatment of advanced hepatocellular carcinoma.

Keywords: Advanced hepatocellular carcinoma; Focused Ultrasound Knife; Transarterial chemoembolization

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Hepatocellular carcinoma (HCC) is a common malignant tumor, which is difficult to be detected by patients because of the lack of typical symptoms in the early stage of the disease. When diagnosed, most of the patients have been in moderate stage and advanced stage, delaying the best time of treatment. Therefore, the 5-year survival rate was not high. Hepatocellular carcinoma (HCC) has the characteristics of high recurrence rate and easy metastasis, combined with the influence of dual blood supply (portal vein and hepatic artery blood supply) of the liver, using a single treatment method often can not lead to satisfactory results. Transhepatic arterial chemoembolization (TACE) is a commonly used method in the treatment of advanced hepatocellular carcinoma, but there are also problems of insufficient embolization with high recurrence rate (1). This study was designed to investigate the clinical effect of TACE combined with ultrasound focusing knife in the treatment of advanced hepatocellular carcinoma.

1. Information and method
1.1 General information
Sixty patients with advanced hepatocellular carcinoma admitted to the Second Hospital of Suichang County from October 2011 to October 2017 were selected as study subjects (all patients had no TACE), divided into control group and observation group according to random number table with 30 cases in each group. In the control group, there were 20 males and 10 females, aged 30-78 years, with an average age of (53.4 ±12.5) years; 30 cases in observation group included 19 males and 11 females, aged 31-79 years, with an average age of (53.5±13.6) years. All patients suffered primary liver cancer, diagnosed by pathological examination and accorded with diagnostic criteria for liver cancer. In addition, all patients were with non-malignant lesions, prone position, no previous history of drug allergy and complete medical records, who all
signed informed consent. This study was approved by the hospital ethics committee. There was no significant difference in gender and age between the two groups (P > 0.05), which was comparable.

1.2 Treatment method
Control group underwent TACE, operating as follows: Seldinger's method was used to puncture femoral artery and intubate it. The microcatheter was inserted into the proper hepatic artery or celiac artery for DSA, followed by the observation for the blood supply, size and location of the tumor. Then, the microcatheter was inserted to the tumor feeding artery for TACE. Chemotherapy was administered with tetralogy, including 750-1250 mg of 5-fluorouracil, 40-60 mg of cisplatin, 30-50 mg of epirubicin and 8-12 mg of mitomycin, part of which were chosen and mixed with lipiodol as embolic agent whose dosage was determined according to the blood supply, quantity and size of tumors. Usually the dosage of lipiodol is 10 ~ 35ml. Repeat TACE 1 time every 6~8 weeks.

For the observation group, patients underwent the same treatments of congestion group, combined with focused ultrasound knife, which meant to perform ultrasonic location for patients, followed by choosing 2-3 location images, taking supine or lateral decubitus position, taking degassed water as therapeutic medium, determining the effective depth of 3-15 cm, transmitting power of 600-1000 W, transmitting method of HIFU, effect focus of 6 mm × 6 mm × 10 mm, and fixed focus of 3 mm × 2 mm × 8 mm. As with parameters setting, the water temperature was (32.0 ± 1.5)℃, the launch time was 15~25 s, the interval between layers was 8 mm, the interval between points was 5 mm, and the treatment range was extended to 2 cm, 40 min/time. According to the quality and size of tumors, the treatment frequency was determined, meaning 1-2 times / month with 1 course of treatment containing 3 times.

1.3 Observation index
After 3 months, liver MRI, CT or Doppler ultrasound examination were performed for patients to observing the imaging changes and record the tumor's change. The comparison of 2 group's adverse reaction included pain, vomiting and fever.

1.4 Curative assessment standard
Curative assessment: 1) Complete remission (CR): The tumor was completely necrotic, lasting for more than 4 weeks; 2) Partial remission (PR): Tumor necrosis ≥50%, lasting for more than 4 weeks; 3) Progress and Development (PD): New lesions or tumor enlargement ≥25%; 4) Stable: between PR and PD.

1.5 Statistical analysis
SPSS 21.0 was used to analyze data; Quantitative data was expressed with (s), The t test was used for comparison among groups, and the χ² test was used for qualitative data. The difference was statistically significant when P<0.05.

2. Result
2.1 Tumor's change
After 3 months follow-up, the tumor shrinkage > 50% and the complete necrosis rate of the observation group were higher than those of the control group with significant difference. The difference was statistically significant (P < 0.05). See Table 1.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Tumor shrinkage&gt;50% Complete necrosis of lesion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>30</td>
<td>11 (36.67) 5 (16.67)</td>
</tr>
<tr>
<td>Observation</td>
<td>30</td>
<td>19 (63.33) 9 (30.0)</td>
</tr>
</tbody>
</table>

2.2 Curative effect
The remission rate of the observation group was higher than that of the control group, The difference was statistically significant (P<0.05). Seen Table 2.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>CR</th>
<th>PR</th>
<th>STABLE</th>
<th>PD</th>
<th>REMMISION RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>30</td>
<td>0</td>
<td>10</td>
<td>17</td>
<td>3</td>
<td>33.33</td>
</tr>
<tr>
<td>Observation</td>
<td>30</td>
<td>4</td>
<td>18</td>
<td>7</td>
<td>1</td>
<td>73.33</td>
</tr>
</tbody>
</table>

2.3 Adverse reaction
During the treatment, the observation group found 1 case of vomiting, 1 case of heart rate increase, 1 case of fever, the incidence of adverse reactions was 10%; the control group had 1 case of fever, 1 case of vomiting, with the incidence of adverse reactions of 6.67%. There was no significant difference in the incidence of adverse reactions between the two groups (P<0.05).

3. Discussion
At present, the first choice for liver cancer is surgical resection. TACE is the preferred non-surgical treatment for unresectable advanced liver cancer. However, TACE can achieve better results in the treatment of advanced liver cancer, but the risk of long-term recurrence is high with low the long-term survival rate. It has been reported that the 1-year survival rate is 29% ~ 75%, indicating that single TACE treatment can not effectively control the development of the disease, the choice of appropriate combination method is particularly important [2]. Ultra-
sound focusing knife (UFO) is used to treat advanced hepatocellular carcinoma (HCC) by producing a thermal effect in biological tissues, instantly coagulating the tissue in the necrotic focal area, and gradually scarring or absorbing, but it does not damage the tissue outside the focal area, and has high safety. Studies have found that TACE combined with ultrasound focusing knife in the treatment of advanced liver cancer, not only can significantly improve 50% of the symptoms of poor appetite and 70% of pain without affecting liver function, but also can make patients with liver cancer. The survival time of TACE was prolonged, and the effect of ultrasound focusing knife on TACE was also enhanced. Clinical data show that normal cells and malignant cells have distinct differences in thermo sensitivity. Compared with normal tissues, malignant tissues have more thermo sensitivity. In ultrasound focusing knife therapy, the temperature of tumor site increases significantly and the thermos tolerance decreases, especially in hypoxic state, it can increase the ability of killing tumor cells. At the same time, the inactivated tumor tissue showed fibrosis and liquefaction, and some parts even showed calcification, which was gradually absorbed by the surrounding tissues and phagocytized by human cells. The fibrous tissue was encapsulated and organized, and the lesion site was reduced, so as to improve the therapeutic effect. The results of this study showed that the tumor shrinkage > 50% and the total necrosis rate in the observation group were higher than those in the control group after 3 months of follow-up ($P < 0.05$). The remission rate of the observation group was higher than that of the control group ($P < 0.05$). There was no significant difference in the incidence of adverse reactions between the two groups ($P > 0.05$). Ultrasound focusing knife combined with TACE in the treatment of advanced liver cancer can cause fatty necrosis of tumor cells, increase necrosis area of tumor cells, reduce collateral formation and tumor recurrence so as to achieve the purpose of treatment.

To sum up, TACE combined with ultrasound focusing knife can improve the necrosis rate and achieve satisfactory results in the clinical treatment of advanced hepatocellular carcinoma.

Reference


