Transarterial Chemoembolization in Combination with Intraarterial Biotherapy: A Comparative Study in an Animal Model of Hepatocellular carcinoma

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Introduction

Hepatocellular carcinoma is responsible for an estimated one million deaths annually. Prognosis is poor due to its rapid infiltrating growth and occuring liver cirrhosis. Surgical approaches including liver resection, liver transplantation and cryosurgery are regarded as potentially curative treatments for HCC. There is a limitation of the surgical procedures in multicentric tumors, additional extrahepatic metastases, early vascular invasion, shortage of donor organs, and comorbidities.

Transarterial chemoembolization (TACE) is one of the common forms of interventional therapy in the treatment of HCC. It has shown to reduce systemic toxicity and to increase local effects, and thus improve the therapeutic results.

Adjuvant treatments in conjunction with TACE, e.g. imunno- and antiangiogenesis therapy have the potential to enhance the therapeutc effect of TACE alone.

Purpose

To determine whether locoregional biotherapies combined with transarterial chemoembolization (TACE) decrease tumor growth compared with TACE alone in an animal model of hepatocellular carcinoma (HCC).

Materials and Methods

Subcapsular implantation of a solid Morris Hepatoma 3924A in the liver was carried out in 70 male ACI rats. After laparotomy and retrograde placement of a catheter into the gastroduodenal artery (Fig. 1) (14 days after implantation), the following protocols of interventional procedures were performed namely (each group n = 10):

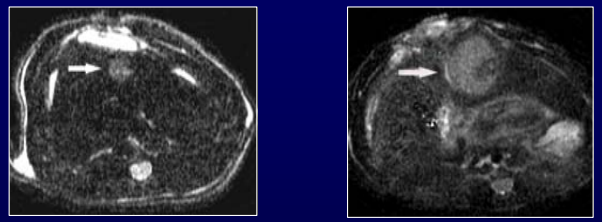

Fig. 1

A: TACE (Mitomycin + Lipiodol) + TNF + IL-2
B: TACE + OK-432 + IL-2
C: TACE + TNP-470
D: TACE + Endostatin
E: TACE + Bletilla striata (Chinese medicine)
F: TACE + Bletilla striata + ligation of hepatic artery
G: TACE alone (control group).

MRI was perfomed prior and post treatment using fast T2-weighted TSE-sequences (TR/TE=3170/90). MR-volumetry was provided via manual organ specific rendering reading areas directly from the monitor. The tumor volumes before treatment (V1) and after treatment (V2) were determined and the tumor growth rate (V2/V1) was calculated.

Therapy model (Group C):

TNP-740 (angio-inhibitor).

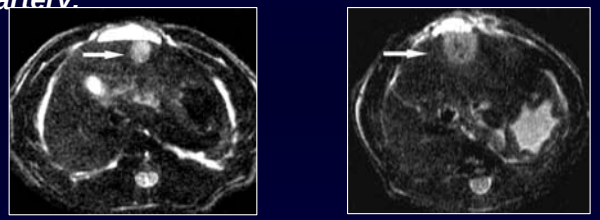


a) initial scanning **b) post therapy**

Using T2-weighted MR imaging pre- and post therapy tumor growth rate of 4.01±0.95 in the overall group was calculated.

Therapy model (Group F):

Chinese medicine and ligation of hepatic artery.

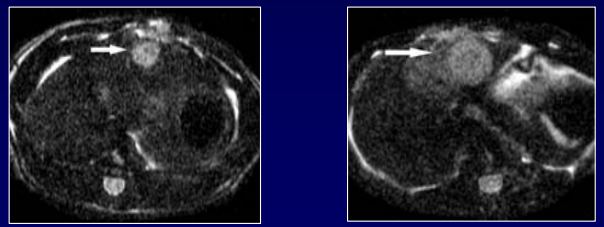


a) initial scanning **b) post therapy**

Depiction of significant lowest increase in tumor growth rate in the overall group compared to the other therapy models.

Therapy model (Group G):

Control group (TACE without biotherapy).



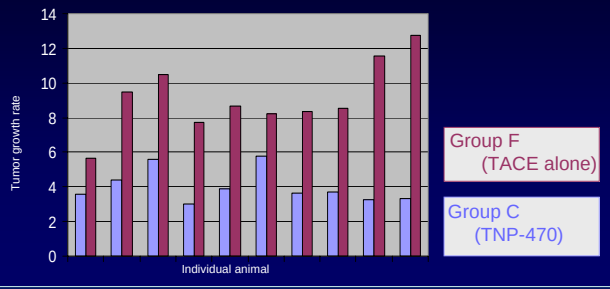
a) initial scanning **b) post therapy**

Documentation of highest tumor growth rate in the overall study.

Results

Compared with the group G, the groups B, C, E and F showed significant reduction of the tumor growth rate ($P<0.05$). Group A and D showed no significant results compared to group G ($P>0.05$). Significant results were observed in group F and C ($P<0.05$) in comparison with the other therapeutic groups. Group F obtained the best therapeutic effect in our experiments.

Tab. 1: Tumor growth rate (V2/V1) comparing TNP-470 and the control group



Conclusions

TACE combined with immunotherapy (OK-432), antiangio-genesis therapy (TNP-470) and Chinese medicinal therapy (Bletilla striata) retards tumor growth compared with TACE alone in an HCC animal model.

References

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