



## Research Article

# Feasibility of Transarterial Chemoembolization for Hepatocellular Carcinoma through the Left Brachial Artery

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## Abstract

HCC is the third leading cause of cancer-related death and difficult to diagnose. It is very important that there is high incidence of hepatic cancer on the basis of advanced hepatic cirrhosis in which most of the cancerous cells are invasive. It is difficult to be entirely resected surgically so that many patients lost operable treatment opportunities. Transarterial Chemoembolization (TACE) is the most common procedure for HCC. Now RH catheter is widespread application in TACE. But there are many disadvantages. To explore a new and efficient path is particularly important. The study is to evaluate the superiority of Outlook angiography catheter for Transarterial Chemoembolization (TACE) in HCC. Between March 2008 and June 2012, 100 patients were diagnosed as HCC and scheduled to receive TACE treatment. 52 patients were given Outlook catheter and 48 patients were given RH catheter. Surgery success rate, operation time, postoperative patients comfort and puncture site complications were observed. Compared with RH catheter, Outlook catheter had more successful operation rates, shortened operation time, more patient comfort and fewer complications at 7 days, 1 month and 3 years after treatment. Outlook catheter is better than RH catheter for TACE in the treatment of primary HCC.

**Keywords:** Transarterial chemoembolization (TACE); Primary hepatocellular carcinoma; Outlook catheter; RH catheter; The left brachial artery path

## Introduction

Primary hepatic carcinoma is the third leading cause of cancer-related death worldwide [1]. It is difficult to diagnose because the onset of hepatopathy is occult [2]. The rate of missed diagnosis is very high. Most of patients have been diagnosed at the middle and advanced stages [3]. There is high incidence of hepatic cancer on the basis of advanced hepatic cirrhosis in which most of the cancerous cells are invasive. It is difficult to be entirely resected surgically so that many patients lost operable treatment opportunities [4,5]. Transarterial chemoembolization (TACE) is most common procedure for the treatment of hepatocellular carcinoma the (HCC), especially for advanced carcinoma of the liver at present [6]. To compare the clinical utility of Outlook catheter with RH catheter in TACE, 100 patients with advanced HCC were treated by TACE which some of

them used by Outlook catheter and others by RH catheter but they were all through the left brachial artery path. Now it was reported as follows.

## Methods

### Patients

Patients were recruited from the affiliated hospital of Jiujiang University between March 2008 and June 2012. The middle and advance HCC diagnosis was based on clinical presentations, serological features, histological and radiological findings according to the recent guidelines. Severe hepatocellular jaundice, massive ascites, extensive tumor metastasis, complete thrombosis of the main portal vein and patients with terminal stage were excluded. There were 100 patients including 74 males and 26 females, aged from 33 to 65 years, with an average of 49 years old. The tumor size was about 3.5 cm × 3 cm to 12.0 cm × 14.5 cm, with an average of 6.5 cm × 7.0 cm. 70 cases were Grade A and 30 cases were grade B based on Liver function Child grade. The present study was approved by the Ethics Committee of the Affiliated hospital of Jiujiang University and conformed to the tenets of the Declaration of Helsinki, and written informed consent was obtained from each participant prior to study participation. 100 patients with the middle and advanced primary HCC who underwent TACE were randomly divided into two groups: Outlook angiography catheter group ( $n = 52$ ) and RH angiography catheter group ( $n = 48$ ). Operation method: patients of group A used Outlook angiography catheter and patients of group B used RH angiography catheter, respectively. Two groups used percutaneous angiography through the left brachial artery route TACE Technique. Group A was inserted into the 5-F artery sheath via left brachial artery puncture. 5-F Outlook catheter was implanted into celiac angiography,

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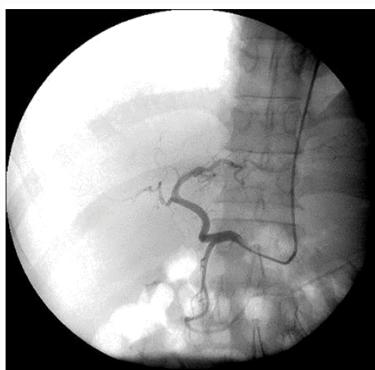
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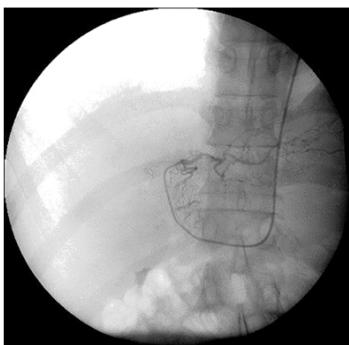
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guided by 035<sup>°</sup> the Loach Guide Wire through the left brachial artery (Figure 1). Then super selective angiography into the blood vessels that help the tumor grow (Figure 2). The Loach Guide Wire was exited and angiography was undergone again to further observe the vessels. Group B was inserted into the 5-F artery sheath via left brachial artery puncture. 5-F RH catheter was implanted into celiac angiography, guided by 035<sup>°</sup> the Loach Guide Wire through the left brachial artery (Figure 3). The next steps were the same as Group A. Two groups were injected pirarubicin (30 mg) and mitomycin (80 mg, emulsified by 10 ml to 20 ml lipiod) under fluoroscopic guidance and then particles of gelation spon were injected. There were at least two times of interventional procedures for each patient, with a interval of 4 weeks. The artery sheath tubes of two groups immediately were removed after the operation. And wristbands were used for hemostasis by compression for 4 h~6 h without staying in bed. The types of guiding catheter and artery sheath are the same for the two groups. Operation time, exposure time under X-ray, success ratio of operation and complications of puncture site and ect. Of two groups were recorded. The operation time of two groups was the time from puncture to sheath extubation.



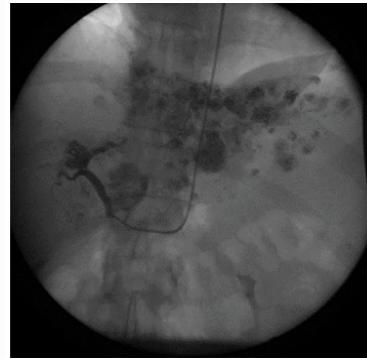
**Figure 1:** 5-F Outlook catheter was implanted into celiac angiography, guided by 035<sup>°</sup> the Loach Guide Wire through the left brachial artery.



**Figure 2:** Then super selective angiography into the blood vessels that help the tumor grow. The Loach Guide Wire was exited and angiography was undergone again to further observe the vessels. Group B was inserted into the 5-F artery sheath via left brachial artery puncture.

#### Statistical analyses

SPSS 13.0 (SPSS, Inc., Chicago, IL, USA) were performed for statistical analyses, and data are presented as mean  $\pm$  Standard Deviation ( SD). Normally distributed data were analyzed using one-way ANOVA followed by Student-Newman-Keuls post-hoc testing. Comparisons between two groups were performed using an independent sample *t*- test. For non-normally distribution



**Figure 3:** 15-F RH catheter was implanted into celiac angiography, guided by 035<sup>°</sup> the Loach Guide Wire through the left brachial artery.

data analyses between groups were performed using the Kruskal-Wallis test. A *P* value  $<0.05$  was considered indicative of statistically significant differences.

#### Results

There were no significant difference in age, gender and complications between the two groups (*P* $>0.05$ ) (Table 1).

Comparison of two groups between operation time, exposure time under X-ray, postoperative patient comfort, vascular super selective rate, success rate of surgery and complications of puncture site (*P* $<0.05$ ) (Table 2).

**Table 1:** Patients clinical characteristics.

Items	Group A	Group B
Patient numbers, n	52	48
Gender, male/female	38/14	36/12
Age range (years)	32 $\pm$ 35	33 $\pm$ 34
Comorbidity [n(%)]		
Hepatic cirrhosis	8 (30.77%)	7 (29.17%)
Hypertension	5 (19.23%)	3 (12.5%)
Diabetes mellitus	2 (7.69%)	1 (4.17%)

**Table 2:** Comparison of some clinical data between outlook angiography catheter group and RH angiography catheter group.

Items	Group A	Group B	P value
Patient numbers, n	52	48	
Operation time (mins)	44 $\pm$ 23	55 $\pm$ 22	$>0.05$
Exposure time under X-ray (mins)	17 $\pm$ 12	21 $\pm$ 14	$<0.05$
Vascular super selective rate, (%)	95.1	81.6	$<0.05$
Success rate of surgery (%)	98.7	96.8	$>0.05$
Complications of puncture site			
Hematoma	0	1	$>0.05$
Pseudoaneurysms	0	2	$>0.05$
Arteriovenous fistulas	0	0	
Others	0	1	$>0.05$

#### Discussion

The liver has two blood supplies-portal venous system and hepatic arterial system, which is different from other organs in the abdominal cavity [7]. The hepatic artery that is rich in oxygen and nutrients is the nutrient vessel of the liver, which supply material metabolism for liver. The amount of hepatic artery blood flow accounts for about 20-30 percent of the total blood flow of the liver. Its pressure is higher than the portal vein to 30-40 times. The portal vein is the functional artery of the liver, which the amount of hepatic artery blood flow accounts for about 70-80 percent of the total blood flow of the liver [8]. During the formation and growth of liver cancer, the blood supply can vary. In the early stage of liver cancer, intratumoral blood supply was not all from hepatic artery that only makes up 42.3%. Portal vein blood

supply still accounted for 19.23% and the rest were hepatic artery and portal vein double blood supply [9]. With the enlargement of the size of tumor, the hepatic artery blood supply gradually increased and the portal vein blood supply gradually decreased [10]. Therefore, blocking the hepatic artery will cause the ischemic necrosis of cancer cells, but has little effect on the normal liver tissue. Most of the hepatocellular carcinoma were diagnosed in the middle and late stage and lost the chance of surgery. Systemic chemotherapy has poor effect on hepatic carcinoma, but TACE provides effective treatment for advanced liver cancer [11]. Various interventional treatments and equipment updates will provide better clinical outcomes for hepatocarcinoma therapy [12-14]. This study compared the difference between the Outlook angiography catheter and the RH angiography catheter via the left brachial artery route using TACE. The results showed that there were no significant difference in operation success rate and operation time. Vascular super selective rate of the outlook type angiography catheter higher than RH type angiography catheter. The exposure time under X-ray for operator of outlook angiography catheter group was significantly less than the application of RH type angiography catheter group. Moreover, catheter selection and operation of Outlook angiography catheter were more familiar and convenient than those of RH angiography catheter approach. The complications of puncture site were similar in two groups without significant difference. The above comparison suggest that the application of outlook catheter has more advantages than RH type catheter through the left brachial artery TACE, such as easier shaping, higher the rate of vascular super selective, shorter exposure time under X-ray and etc. Because of the influence of torque, RH angiography catheter can only enter the tumor vessel through rotation, so its clinical application is limited to some extent. Outlook catheter by TACE in the treatment of liver cancer should be promoted because the puncture site hasn't obvious hematoma was and was not prone to infection, false aneurysm and arteriovenous fistula via outlook catheter. The hospitalization time and costs significantly reduced for the patients who were underwent TACE through outlook type catheter. There will be more benefit for those hepatocellular carcinoma patients who have not opportunity for surgical treatment by outlook type catheter technology.

## Acknowledgments

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