

Original Research Article

Treatment for hepatocellular carcinoma in the caudate lobe: a report of 13 cases

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ABSTRACT

Background: To investigate therapies of hepatocellular carcinoma in the caudate lobe, surgical approach and method, surgical outcome of hepatic caudate lobotomy.

Methods: Clinical data of 13 patients with hepatocellular carcinoma in the caudate lobe who received surgical treatment in the Department of Hepatobiliary Surgery of the Second Affiliated Hospital of Chongqing Medical University from Jan 2010 to Jan 2014 was retrospectively analyzed.

Results: Two patients selected TACE therapy. However, tumor metastasis was observed on them in short term, and the therapeutic effect was poor after several times of treatment. Nine patients received surgical treatment. Surgical approaches included left approach, right approach and combined approaches from the left and right side; surgical method was part or complete caudate lobe resection combining with other liver segments. The operation time was 220.0-350.0 minutes, with the average value of 259.4 minutes. The vascular clamping time was 21.0-45.0 minutes, with the average value of 30.2 minutes. The bleeding volume was 400.0-1800.0 ml, with the average value of 844.4 ml. In all patients, there was no perioperative death and no postoperative liver failure happened, and 4 patients who suffered from interrelated complications were cured or got better by conservative treatments. All patients were followed up for 24 months. The recurrent rates of 1 and 2-year were 44.4%, 88.9% respectively, and the survival rates of 1 and 2 year were 66.7%, 44.4% respectively after surgical resection.

Conclusions: Resection is still the preferred therapeutic method for hepatocellular carcinoma in the caudate lobe. However, long-term outcomes of the therapy for hepatocellular carcinoma in the caudate lobe need further improvement.

Keywords: Caudate lobe, Hepatic carcinoma, Surgical resection

INTRODUCTION

Primary hepatocellular carcinoma (HCC) is one of the most common digestive tract tumors, and surgical resection is the preferred therapeutic method of HCC. However, as caudate lobe is located in the middle of the back of liver, surrounded by a large number of large

vessels, it is difficult and risky to resect.¹ Many doctors attempted to adopt TACE-based non-operative method for the treatment of HCC located in the caudate lobe, but its clinical effects are controversial. In addition, with the continuous improvement of surgical approach, surgical method and surgical instruments, there are more and more reports on caudate lobe resection, but the long-term

outcome of surgical treatment of HCC located in the caudate lobe has been still unknown. This article mainly discusses the surgical treatment as well as the surgical approach and clinical effects of HCC located in the caudate lobe.

METHODS

Clinical data

Thirteen cases of patients with HCC in the caudate lobe aged from 28 to 65 years old, including 11 males and 2 females, were included. All of the 13 patients had a history of hepatitis B, 10 of whom were accompanied with liver cirrhosis and Child's scoring of grade A. Blood tests upon admission included liver function test, two

pairs of semi-hepatitis B test, coagulation profiles test, alpha fetoprotein test, carcinoembryonic antigen test, routine chest X-ray test, abdominal Color Doppler ultrasound, as well as CT or MRI for further examination of lesions, finding that tumors ranged from 1.4 to 1.8cm, averaging at 5.6cm. According to Couinaud's segmental anatomy of HCC in the caudate lobe, 2 tumors were located in I segment, 3 in I segment and invaded left lateral lobe, 1 in I segment and invaded left internal lobe, 3 in IX segment and invaded right posterior lobe of liver, 2 in I+IX segments, and 2 in I+IX segment and invaded left internal lobe (Figure 1).²

Of the 13 patients, 2 patients were not treated for their own reasons, 2 underwent TACE treatment (I and I+XI segments), and the other 9 patients received surgical treatment.

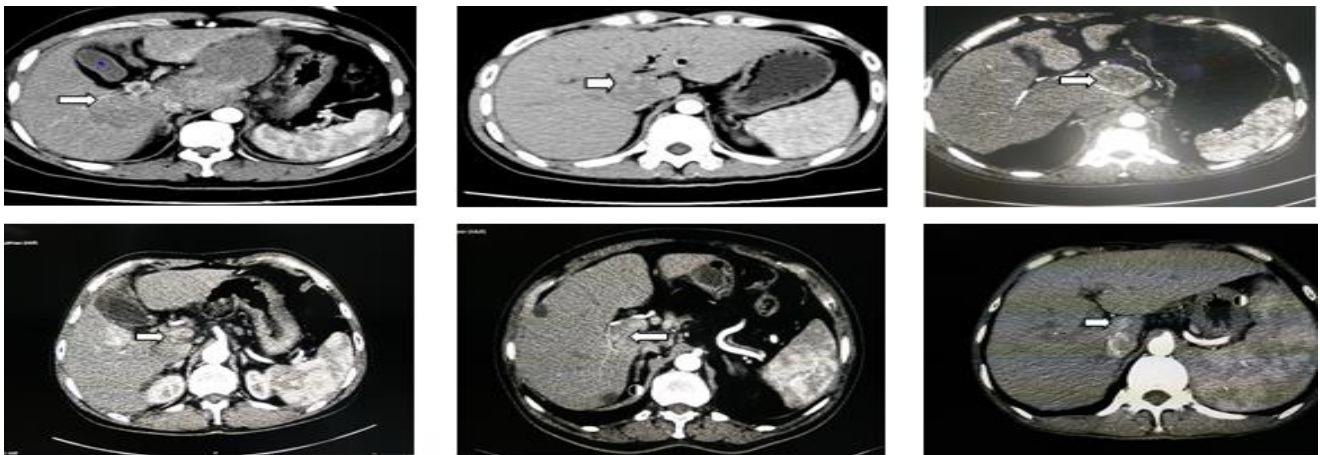


Figure 1: The arterial phase CT images of hepatocellular carcinoma in the caudate lobe.

Therapies

Tace

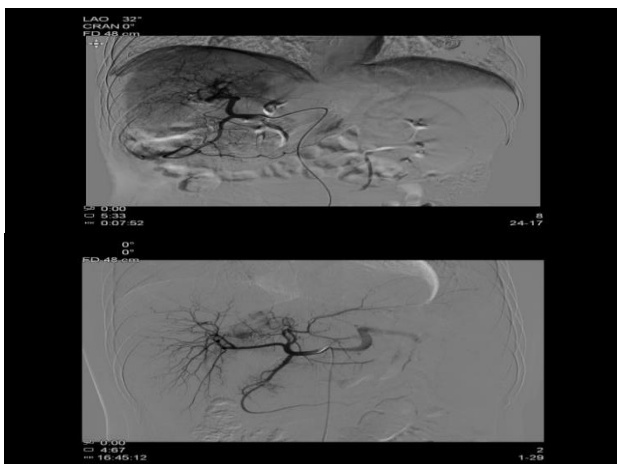


Figure 2: The angiogram image show that the lesions is rich in blood supply.

Seldiner technique was adopted for transcatheter angiography of femoral artery, abdominal aorta, celiac trunk artery and hepatic artery, and chemoembolization were given to patients after the determination of nutrient arteries of tumors (Figure 2).

Materials for embolization: iodized oil (2-5ml) and polyvinyl particles (150-350um). Chemotherapy drugs: pirarubicin (40mg). Multiple interventional treatments with an interval of 4-6 weeks were conducted to patients.

Resection

Appropriate surgical approach methods and surgical methods were selected based on image findings, whole body condition and liver function of patients. Patients underwent partial or total caudate lobectomy combined with resection of other hepatic segments in reverse "L" incision. The surgical approaches included left surgical

approach, right surgical approach as well as combined left and right surgical approach, and anterior surgical approach was excluded (Table 1).

Intermittent hepatic blood flow occlusion was adopted as the major blood flow occlusion method, and sometimes was combined with half hepatic blood flow occlusion. The challenge of the surgery was to make suprahepatic and infrahepatic vena cava blood flow occlusion zone.

Table 1: Surgical method and approach of 9 patients with hepatocellular carcinoma in the caudate lobe.

Tumor location	Approach	Surgical method
IX+VI	Left approach	Part of the caudate lobe and right posterior lobe
IX+VI+VII		Part of the caudate lobe and right posterior lobe
IX+VI+VII		Part of the caudate lobe and right lobe
I	Right approach	Part of the caudate lobe and left lateral lobe
I + III		Part of the caudate lobe and left lateral lobe
I + II + III		Part of the caudate lobe and left lateral lobe
I + IV		Part of the caudate lobe and left lateral lobe
I + III	Bilateral approach	Caudate lobe and left lateral lobe
I + XI		Caudate lobe and left lateral lobe
I + XI+IV		Caudate lobe and left lateral lobe

RESULTS

Two cases of patients who underwent TACE well tolerated the treatment, and only had mild symptoms such as fever, nausea and abdominal distension after operation, which alleviated in short term after symptomatic treatment. One patient was found metastasis to the right posterior lobe of liver during postoperative reexamination for another TACE after one month; and the other patient found left hepatic lobe metastasis during the third time of TACE after two months; primary lesions changed slightly. After that, the 2 patients continued to receive TACE treatment for 3-4 times, which had poor effects. Nine patients received operation successfully with operative time ranging from 220 minutes to 350 minutes, averaging at 259 minutes; intraoperative vascular occlusion time was 21-45 minutes, averaging at 30.2 minutes; intraoperative bleeding amount reached 400-1800 ml, with an average of 844 ml; 5 patients (55.6%) received blood transfusion during operation. Postoperative pathological examination results showed moderately and poorly differentiated or milled-low differentiated hepatocellular carcinoma. Postoperative complications included 2 cases of diaphragmatic effusion, 1 case of bile leakage and 1 case of upper gastrointestinal bleeding, without liver failure. 4 cases (44.4%) had complications and all recovered after symptomatic treatment, no patient died in the hospital (Figure 3).

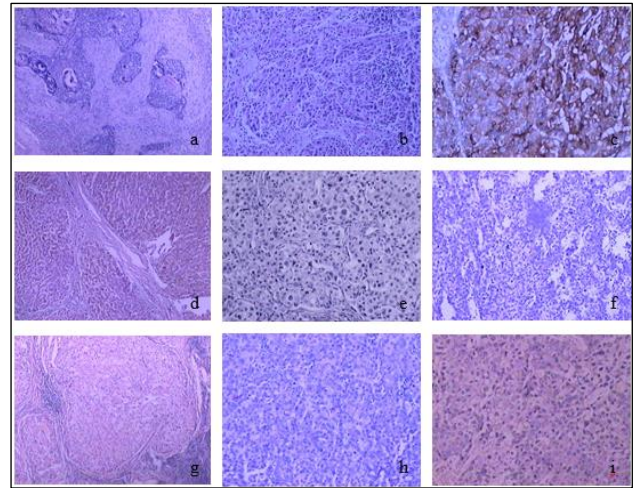


Figure 3: Pathological diagnosis of 9 surgery patients.

The 9 patients were followed up for 2 years, and their 1-year and 2-year recurrence rate were 44.4% and 88.9% respectively, and 1 patient presented pulmonary metastasis; and their 1-year survival rate and annual survival rate were 66.7% and 44.4%, respectively.

DISCUSSION

Caudate lobe has complex anatomic structure and grows deeply in the liver, so operation of HCC in the caudate lobe is difficult with high risk, and many scholars attempted to treat HCC located in the caudate lobe by non-operative methods such as TACE, radiofrequency ablation and ethanol ablation, to avoid risks of operations.³ Studies have shown that TACE is effective in the treatment of caudate lobe HCC, and the key is to accurately understand the blood supply to tumors and select appropriate embolization.⁴ However, there are many feeding arteries and nutrient arteries of tumors in the caudate lobe of the liver, so the effect of TACE is not very ideal. In this study, 2 cases of patients underwent TACE treatment and had poor treatment results and presented intrahepatic metastasis in the short term, indicating that the clinical effect of TACE for the treatment of HCC located in the caudate lobe is controversial. In addition, caudate lobe is surrounded by a large number of vessels, improper puncture may lead to massive bleeding, and it is relatively difficult to select appropriate approach to reach lesions, which limits the application of radio frequency and ethanol ablation. Therefore, surgical resection is still the first choice for the treatment of HCC in the caudate lobe.

Patients included in the study mainly adopted left approach method - the major approach method for the treatment of Spiegel liver cancer, and were combined with the resection of left lobe of liver if the tumor was large or involved left lobe of the liver. Right approach method is mainly used for the resection of HCC located in the right caudate lobe and close to paracaval portion of vena cava or caudate process, and the right lobe of liver is

also removed when the tumor is giant or invades hepatic lobes; and combined left and right approach is mainly suitable for the resection of HCCs which invade whole caudate or those which are too big to be exposed by simple left or right approach methods.⁵ In addition, anterior approach, also known as median approach (middle approach), is another common approach method mainly for the removal of giant caudate lobe tumors and those invading hepatic vein or patients with severe hepatic cirrhosis (to retain non-tumor-bearing hepatic tissues to the maximum and thereby preventing postoperative liver failure).⁶

Yang et al. shown that anterior approach method is most optimal for single caudate lobectomy due to the advantages of full exposure of caudate lobe and low risks.⁷ At present, people are constantly exploring surgical approach, and Vigano et al.⁸ proposed ultrasound guided side surgical approach or top surgical approach method for the resection of HCC located in caudate lobe of liver cancer in combination with intraoperative ultrasound for precise positioning, to treat HCC located in caudate lobe with large poor liver function, providing a new idea for clinical treatment of HCC in caudate lobe.

This group of patients all received resection of part or whole caudate lobe along with other hepatic segments, although 2 cases of patients only grew tumors in caudate lobe, we still resected other hepatic segments without affecting liver function. Due to special anatomical location of the caudate lobe, it is very difficult to remove all margins of tumor through caudate lobectomy alone. Although there are more and more reports about single caudate lobectomy, it still needs to remove other liver segments in addition to caudate lobe without affecting liver function, so as to remove all margins of tumors. In addition, caudate lobectomy combined with removal of other hepatic segments could reduce operation difficulty due to full exposure of caudate lobe.

Recurrence and metastasis of HCC greatly reduce long-term curative effect of surgical treatment. Studies have found many risk factors of the recurrence of hepatocellular carcinoma after resection, including hepatitis B virus infection, tumor diameter, tumor number, tumor capsule, vascular invasion, portal vein tumor thrombus, surgical margin width, intraoperative bleeding and blood transfusion.⁹⁻¹¹ It has been reported that 1-year and 2-year recurrence rates of HCC in our country are 38.7% and 57.9%, respectively.¹² In this study, 1-year and 2-year recurrence rates of patients with HCC in caudate lobe were 44.4% and 88.9%, significantly higher than average recurrence rate as mentioned above, suggesting that the prognosis of surgical treatment of HCC in the caudate lobe is worse than that of HCC in other parts of liver, consistent with the results of similar studies.¹³ Factors leading to worse prognosis of surgical treatment of HCC in caudate lobe than in other parts of liver are as follows: complex anatomical structure of caudate lobe, small growth space,

invasive growth and easy to invade blood vessels; Insufficient removal of tumor margins due to poorly defined lesion boundary or lesion in the proximity of hepatic portal vein and hepatic vein; difficulty of peeling and exposure of caudate lobe during operation, and excessive turning and pulling of liver lobes increases the possibility of metastasis of HCC through portal vein and hepatic vein; more bleeding in caudate lobe surgery than non-caudate lobe surgery, as studies have shown that intraoperative bleeding and excessive bleeding is the independent risk factor of recurrence and metastasis of hepatocellular carcinoma after operation.¹⁴⁻¹⁶ On the other hand, compared with other similar studies, this study showed that the recurrence rate of HCC was higher and the survival rate was lower.¹³⁻¹⁴

The possible reasons are as follow: small sample size which led to information bias; all patients included in the study had a history of hepatitis B, and some patient included in similar studies did not suffer from secondary hepatitis B; patients with HCC in caudate lobe had relative large sizes with diameter of 1.8-14 cm, averaging at 5.6 cm, most of which involved other hepatic segments. While patients with HCC in caudate lobe included in other similar studies had smaller tumors, most of which only involved partial or total caudate lobe; Intraoperative blood loss and blood transfusion were higher in the study than others.

CONCLUSION

The resection of caudate lobe is difficult and risky, surgical resection is still the first choice for the treatment of HCC located in caudate lobe of liver. However, compared with HCC in other parts of liver, HCC in caudate lobe has poor surgical treatment effects, which may be related to excessive turning and pulling of hepatic lobes as well as more blood loss. It is hoped that with the development of medical technology and continuous accumulation of related surgical experience, it is possible to improve accuracy in dealing with major vascular areas and isolating liver tissues to reduce the risk of tumor metastasis. However, as a single center study, this study included few cases and did not compared with clinical control group, so research performed by more multi center with large sample sizes are needed to make more precise conclusions in the future

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