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Combined resection with radiofrequency ablation for bilobar hepatocellular carcinoma: a single-center experience

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ABSTRACT

Background: Bilobar hepatocellular carcinoma (HCC) is not rare and curative resection often cannot be achieved. However, the long-term results of nonsurgical treatments remain unsatisfactory. This study investigates the safety, efficacy, and long-term outcome of hepatic resection (HR) and resection combined with radiofrequency ablation (RFA) in treating patients with bilobar HCC.

Materials and methods: A retrospective study of 364 patients with bilobar HCC was carried out. Among them, 89 received HR, 114 received resection combined with RFA, and 161 received transarterial chemoembolization (TACE). The clinicopathologic parameters, surgical results, long-term outcomes, and prognostic factors were analyzed.

Results: The median follow-up time was 28 mo (range, 3–84 mo). The 1-, 3-, 5-y overall survival rates were better after HR and resection combined with RFA than those of patients after TACE, that is, 78.9%, 49.4%, and 34.4%; 70.7%, 40.7%, and 22.3%; and 47.2%, 17.4%, and 8.6%, respectively ($P < 0.001$). Overall survival and recurrence-free survival rates were comparable between the two surgical groups. Child–Pugh stage, liver cirrhosis, and tumor number were identified as significant prognostic factors for overall survival by using the multivariate Cox model.

Conclusions: HR combined with RFA provided a chance for cure to patients with bilobar HCC who were traditionally deemed unresectable and yielded better long-term outcomes than TACE in a subset of patients. With preserved liver function, patients can receive aggressive treatment and survival could be prolonged.

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1. Introduction

Hepatocellular carcinoma (HCC) is one of the most common neoplasms in the world especially prevailing across Asia and Africa [1]. It is well known that HCC tends to occur in patients with chronic hepatitis or cirrhosis caused by hepatitis B virus (HBV) or hepatitis C virus (HCV) infection [2,3]. Multiple lesions are frequently detected in virus-induced cirrhotic livers with a reported incidence ranging from 26%–30% [4–6]. The multiple lesions are classified as intrahepatic metastasis or multicentric occurrence, which is difficult to distinguish only by routine clinical examinations before surgery [7].

Irrespective of the carcinogenesis mechanism, complete eradication of all lesions *via* hepatic resection (HR) can offer the

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best chance for a cure. As the refinements of surgical techniques and perioperative managements, the long-term survival has been achieved with minimal postoperative morbidity and mortality [8]. The policy of our center on treating multiple HCC is aggressive with the attempt to resect all lesions disregarding the tumor number, provided that complete resection is deemed achievable. The primary obstacle to complete resection is the need to treat disseminated lesions and the need to preserve sufficient future remnant liver volume (FRLV) to prevent liver failure after the surgical procedure. Especially when patients are found with bilobar diseases, most of them are not candidates for curative resection because of tumor location, inadequate FRLV, or both.

In an attempt to provide treatment for those patients who are not candidates for HR, a number of ablative techniques have been explored; of them, the radiofrequency ablation (RFA) is the most widely used, which has been proven to be safe and effective [9–11]. RFA has been proposed as an adjunctive modality to HR for colorectal liver metastases when complete resection is impossible and provides better survival than nonsurgical treatment [12]. Over the past decade, we combined HR and RFA to treat patients with bilobar HCC, who were deemed unresectable by HR alone. With limited study reported, it is necessary to evaluate the safety, efficacy, and long-term outcome of HR and HR + RFA in treating patients with bilobar HCC.

2. Material and methods

2.1. Patients

The present retrospective study was carried out with the medical record of patients who were diagnosed with HCC and received their initial treatments in our center between January 2005 and March 2010. The diagnosis of HCC was mainly based on the combination of ultrasonography and computed tomography (CT) or magnetic resonance imaging showing characteristic features of HCC and elevated serum α-fetoprotein (AFP) level. The diagnosis was subsequently confirmed by pathologic examination of the resected specimens in all surgically treated cases. A total of 1963 patients with HCC were collected. Among them, 364 patients with multiple tumors (including satellitosis, multicentric tumors, and intrahepatic metastases) involving both lobes of the liver were enrolled in our study. According to the treatments they received, 364 patients were divided into three groups: HR group, patients underwent HR alone; HR + RFA group, patients underwent HR combined with RFA; TACE group, patients underwent transarterial chemoembolization (TACE). Clinicopathologic factors, recurrence, and survivals were compared among the groups.

Before surgery, all patients underwent routine physical examination, serum laboratory tests, and radiographic studies. The liver functional reserve was tested by the indocyanine green (ICG) retention rate. Intraoperative ultrasonography (IOUS) was performed routinely to estimate the number, size, and location of the lesions, assess the relation of the tumor to vascular structures, and to find possible occult lesion. Resectability was evaluated on the number and location of tumors, estimated FRLV, and functional hepatic reserve. Patients were considered for surgical treatment if they met the following conditions: (1) dominant lesion could be resected *en bloc*, whereas minor lesion(s) in the contralateral lobe could also be resected or ablated; (2) Child–Pugh class A or B, the ICG retention rate at 15 min <20% and adequate FRLV could be preserved; (3) no tumor thrombosis involved portal trunk or inferior vena cava; (4) no previous or simultaneous malignancies; and (5) no extrahepatic

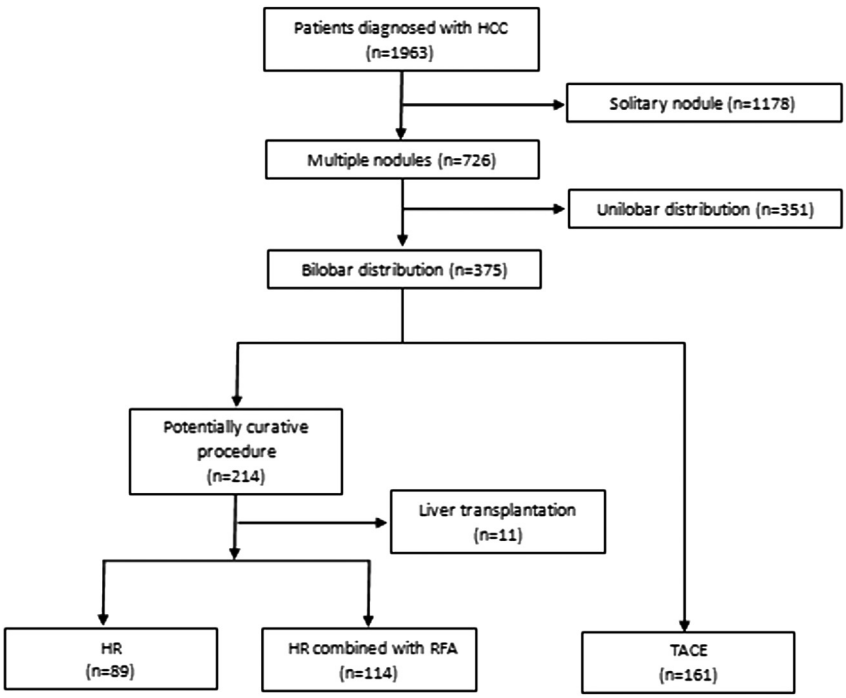

Fig. 1 – The flow diagram of inclusion of patients.

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