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RAPID COMMUNICATION

Hepatoma with cardiac metastasis: An advanced cancer requiring advanced treatment

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Abstract

AIM: To investigate the clinical and pathologic findings, and to discuss the pathophysiology of hepatocellular carcinoma with cardiac metastasis.

METHODS: Eight hepatoma patients with cardiac metastasis, who were treated by surgical excision from 1993 to 2006, were retrospectively studied. Detailed clinical parameters were analyzed.

RESULTS: Of those eight patients, two (25%) were women and six (75%) were men, with the mean age of 50 years (range, 40-70 years). The presentations included: asymptomatic (75%), heart failure (25%), and pulmonary embolism (12.5%). All lesions involved the right atrium, and extended to the lung (12.5%), inferior vena cava (25%), and left atrium (12.5%). The level of tumor marker, alpha-fetal protein, was not correlated with the severity of metastasis or disease prognosis. Moreover, the availably estimated doubling time was less than 3 mo. The pathological findings included variable hemorrhage and necrosis. The survival time following surgery also varied from one month to more than 30 mo.

CONCLUSION: Hepatoma metastasis to the heart was detected in all eight patients. This study demonstrates that surgery might help the outcome in such cases.

Key words: Hepatoma; Cardiac metastasis, Alpha-fetal protein

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INTRODUCTION

Hepatocellular carcinoma (HCC) is the most common primary malignant tumor of the liver. At least 372 000 new cases of HCC occur worldwide every year, comprising 4.6% of all new human cancers[1]. Extra-hepatic metastasis is frequently recognized as advanced HCC and prognosis is poor. Heart metastasis is rarer in advanced HCC patients. This group of patients often exhibits symptoms of heart failure owing to flow obstruction or thromboembolism upon diagnosis[1-3]. Surgical treatment is generally reserved for symptomatic patients because of poor prognosis[4-6]. This study reviews eight cases of hepatoma with heart metastasis in our hospital during 14 years and highlights the importance of early monitoring and surgery for the prognosis of these patients.

MATERIALS AND METHODS

Patients

A retrospective review of the archived material at Chang Gung Memorial Hospital identified eight HCC patients with cardiac metastasis, including six males and two females, from January 1993 to December 2006.

Methods

The medical charts, surgical pathology reports and microscopic slides were reviewed[7-10]. The clinical

Table 1 Characteristics of the eight hepatoma patients with cardiac metastatsis

Number	1	2	3	4	5	6	7	8
Age, yr	54	40	53	40	50	41	70	59
Gender	Male	Male	Female	Male	Male	Male	Male	Female
Symptoms	No	No	HF, PE	HF	No	No	No	No
HBV/HCV	+/-	-/+	+/-	-/-	NA/NA	NA/NA	NA/NA	NA/NA
AFP, ng/dL	< 100	< 100	< 100	> 100	NA	NA	NA	NA
TACE	No	No	3	No	11	No	No	No
Location	RA, Lung	RA, RV, IVC	RA	RA, IVC, Scalp	LA, RA	RA	RA	RA
DT, mo	NA	NA	< 3	< 3	< 3	NA	NA	NA
ST, mo	NA	3	> 30	3	> 3	1	NA	NA
Hemorrhage (%)	5	0	0	NA	60	NA	5	5
Necrosis (%)	90	5	50	NA	20	NA	20	10

AFP: alpha-fetal protein; DT: estimated hepatoma doubling time; HB/HCV: hepatitis B/hepatitis C virus; HF: heart failure; IVC: inferior vena cava; NA: not available; RA: right atrium; RV: right ventricle; PE: pulmonary embolism; S: scalp; ST: survival time; TACE: transcatheter arterial chemoembolization.

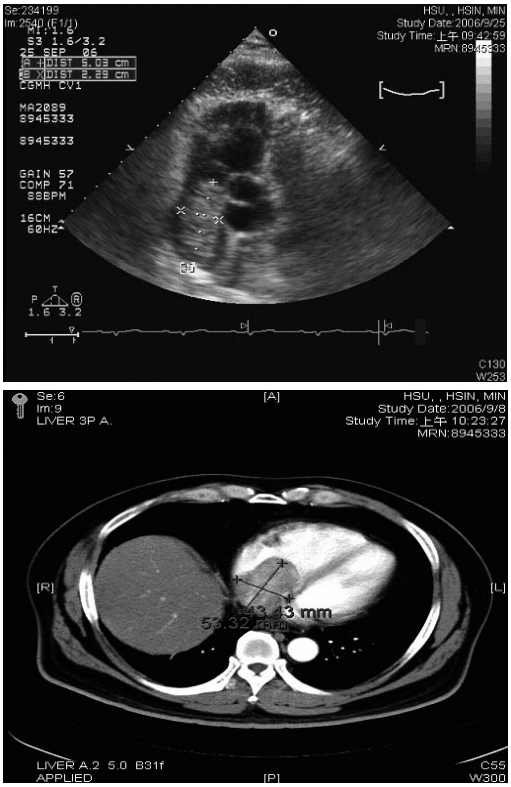

Figure 1 A representative huge right atrial mass demonstrated by cardiac echocardiogram (**A**) and computed tomography (**B**).

chart provided data on age, sex, presenting symptoms, abdominal echocardiography, computed tomography, echocardiography and surgical procedures. Follow-up data were obtained from the patient clinical records and a standardized telephone interview.

Surgery was performed in all eight patients after diagnosis. Formalin-fixed and paraffin-embedded surgical specimens pathologically confirmed the diagnosis. All patients survived following surgery and received formulary treatment and follow-up including transcatheter arterial chemoembolization (TACE), routine abdominal echocardiography or computer tomography. The estimated doubling time was confirmed as previously mentioned[3,4].

RESULTS

Eight patients, including two (25%) women and six (75%) men, aged 50 ± 10 years (Table 1), were reviewed. The mean age of the patients was 50 years (range, 40-70 years). The presentations included: asymptomatic (75%), heart failure (25%), and pulmonary embolism (12.5%). All lesions involved the right atrium, with extension to the lung (12.5%), inferior vena cava (25%), and left atrium (12.5%). The tumor marker alpha-fetal protein level was not correlated with severity.

All eight patients underwent surgery, with one surviving for more than 30 mo, and another male patient remained alive at the time of writing. During follow-up echocardiogram and CT, a single asymptomatic cardiac mass was detected (Figure 1), and this mass rapidly progressed over the subsequent 6 mo period (Figures 2A and 2B). After discussion of the potential risks and benefits of the surgery, the patient decided to undergo surgery, and HCC with cardiac metastasis was confirmed following resection. The patient remained symptom-free with regular clinical follow-up for more than 3 mo since then.

Moreover, the availably estimated doubling time was less than three months. The pathological findings included variable hemorrhage and necrosis. The survival time after surgery varied from one month to more than 30 mo.

DISCUSSION

Advanced HCC is a disease with poor prognosis and median survival time of 4 to 7 mo[2]. Metastatic HCC with involvement of the heart is even rarer and routine monitoring and surgical treatment have not been suggested in previous studies except in the presence of heart failure or pulmonary embolism. Concerns regarding surgical treatment are due to short life expectancy and systemic spread of cancer associated with cardiac bypass procedure. Previous reports also suggest that HCC doubling time is difficult to calculate, particularly in cases involving small cancer size, and one of these reports calculated the possible doubling time as 6.5 mo[3,11], possibly accelerating with increasing tumor size.

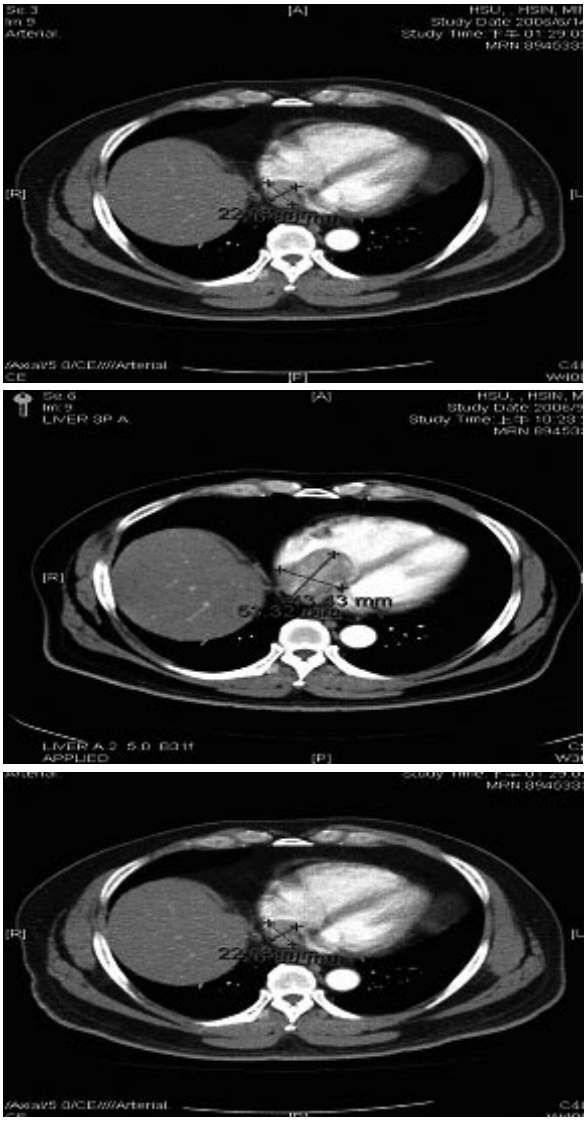

Figure 2 An enlarging right atrial metastasis. **A**: at the time of initial diagnosis; **B**: at 6 mo after diagnosis; **C**: after surgery.

In the view of cardiology, the possibility of heart failure and pulmonary embolism increased rapidly when intra-cardiac mass size exceeded 1 cm[3][2-6]. HCC with cardiac involvement always has malignant presentation and the worst outcome. We reviewed eight cases from our hospital with advanced HCC involving the heart, and found that at least three patients (Cases 3, 4, and 5) exhibited the evidence of rapid HCC doubling time of less than 3 mo. On the other hand, following aggressive therapy involving surgery and further formal treatment, at least one patient (Case 4) experienced over 24 mo of HCC remission and survival time exceeded 30 mo, while another patient (Case 5) remained symptom-free for more than 2 mo at the time of writing.

Based on the review of the eight patents studied at our hospital, we hypothesized that advanced HCC with involvement of the heart may have shorter doubling time and more malignant presentation than usual advanced HCC even when the main tumor is controlled by local therapy[3,4]. Therefore, more cautious monitoring of heart metastasis by echocardiography (maybe for 3-6 mo) in advanced HCC patients[12], and surgical treatment even in cases without significant cardiac symptoms may prolong the survival of advanced HCC patients with cardiac involvement. Another consideration could be identifying meaningful proliferation factors or tumor growth indicators in rapid progressing HCC patients to provide targets for guiding future treatment[13-15].

Finally, it is important to note some limitations to the current review. First, data about non-bypass cardiac surgery or simultaneous resection of main tumor and cardiac metastatic tumor, or concurrent resection of pulmonary metastasis[4-6] remain unavailable, but these improved surgical techniques may offer better results for advanced HCC patients with cardiac involvement. Second, this study only considers retrospective results, but a prospective study or more data may be necessary to confirm the long-term mortality. Third, different prognosis trends may exist between the sexes and thus further prospective study may be necessary. Finally, the rarity of advanced HCC with cardiac involvement means that the problem of the small patient group is difficult to overcome. However, aggressive treatment could prolong patient's survival.

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