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The significance of surgical resection for pulmonary metastasis from hepatocellular carcinoma

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Abstract

Background: Pulmonary metastasis, which is the most common type of extrahepatic recurrence of hepatocellular carcinoma (HCC), has been considered unsuitable for surgical resection because most pulmonary metastases are multiple. Until now there have been few reports about surgical resection for pulmonary metastasis from HCC. The aim of the present study was to evaluate the significance of surgical resection for pulmonary metastasis from HCC.

Methods: Among 615 patients who underwent radical hepatic resection for HCC in our hospital over the past 15 years, 8 patients who had developed 1 or 2 pulmonary metastases underwent pulmonary resection for the pulmonary metastases (resection group), the other 6 patients who had developed 1 or 2 pulmonary metastases did not undergo pulmonary resection (nonresection group). The clinicopathologic features and long-term prognosis of the resection group were examined and compared with those of the nonresection group.

Results: In the resection group, although intrahepatic recurrences were present before the diagnosis of pulmonary metastasis in 4 patients, they were well controlled by repeated transarterial chemoembolization and/or further hepatic resections. The average survival periods after the pulmonary resection and after the initial hepatic resection were 29 months (range, 5–80 mo) and 61 months (range, 24–133 mo), respectively. No patients in the resection group showed pulmonary recurrence after the pulmonary resection, and the cause of death of the patients in the resection group was not pulmonary metastasis. The survival rate of patients in the resection group was significantly better than that in the nonresection group.

Conclusions: It may be concluded that surgical resection for pulmonary metastasis from HCC might be beneficial in selected patients.

Keywords: Hepatocellular carcinoma; Pulmonary metastasis; Pulmonary resection

In the past, long-term prognosis of hepatocellular carcinoma (HCC) after hepatic resection was poor because of the high rate of intrahepatic recurrence. However, recent advances in treatment modalities for intrahepatic lesions such as surgery, interventional radiology, ethanol injection, and ablation have improved the prognosis of HCC significantly [1–5]. To further improve long-term survival after hepatic resection, more active treatment of extrahepatic recurrence seems to be required. Pulmonary metastasis is the most common type of extrahepatic recurrence of HCC [6]. In general, pulmonary metastasis is considered unsuitable for surgical resection because most pulmonary metastases are multiple [7], and until now there have been few reports about surgical resection for pulmonary metastasis from HCC [8–11]. This article evaluates the significance of surgical resection for pulmonary metastasis from HCC.

Patients and Methods

Over the 15 years between May 1990 and May 2004, 615 patients with HCC underwent curative hepatic resection in the Department of Surgery at the Osaka Medical Center for Cancer and Cardiovascular Diseases. The patients were

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followed-up after hepatic resection at regular intervals of 3 to 4 months with physical examinations, liver biochemistry tests, abdominal ultrasonography, abdominal computed tomography to check for intrahepatic recurrence, and chest radiographs to check for pulmonary metastasis. A chest computed tomography was performed when the chest radiograph showed abnormalities.

Among the 615 patients, 392 (63.7%) developed recurrence, and of the recurrent patients, 34 (5.5%) developed pulmonary metastases. Eight of 32 patients underwent pulmonary resection for the pulmonary metastases (resection group). Adjuvant therapy such as systemic chemotherapy was not given to the patients in the resection group after pulmonary resection. The remaining 26 patients did not undergo pulmonary resection. The reason for inoperability of 20 patients among the 26 was multiple pulmonary metastases (≥3). The remaining 6 patients had 1 or 2 pulmonary metastases but did not undergo pulmonary resection (nonresection group). The reasons why the 6 patients in the nonresection group who had 1 or 2 pulmonary metastases did not undergo surgical resection were as follows: high risk for surgical resection in 3 patients (heart failure in 2 patients, severe cirrhosis in 1 patient), and refusal of surgery in 3 patients. All the patients in the nonresection group were treated with systemic chemotherapy. If new recurrent foci did not emerge more than 6 months after the treatment we considered the recurrence to be managed well.

The clinicopathologic features of the resection group were examined and compared with those of the nonresection group to evaluate the significance of surgical resection for pulmonary metastasis from HCC. In our hospital the standard surgical mode of pulmonary resection for lung metastasis is partial resection. When the patient had pulmonary metastases bilaterally and respiratory function of the patient was allowed, the bilateral tumors were resected simultaneously. Survival rates were calculated according to the Kaplan and Meier method and compared using the log-rank test. The significance of differences among the groups was analyzed by the chi-square test, the Fisher exact test, or the Mann-Whitney U test. Statistical analysis was performed using Statview (version 5.0; SAS Institute Inc., Cary, NC). A P value of less than .05 was considered statistically significant.

Results

The clinical features of the 8 patients in the resection group and the 6 patients in the nonresection group are summarized in Table 1. Intrahepatic recurrence was present before the diagnosis of pulmonary metastasis in 7 patients (patients 2–5, 11, 12, and 14), and they were treated by repeated transarterial chemoembolization (TACE). Four patients (patients 2, 4, 12, and 14) had second hepatic resections, 1 (patient 2) had the removal of a peritoneal metastatic nodule, and 1 (patient 3) had radiotherapy for sacral metastasis. The average period from hepatic resection to pulmonary metastasis was 32 months

Table 1
The clinical features of 8 patients who underwent surgical resection for pulmonary metastasis from HCC (patients 1–8) and 6 patients who did not undergo surgical resection for pulmonary metastasis (patients 9–14)

Patient number	Age/sex	Treatments for intrahepatic recurrence before PM	Treatments for intrahepatic recurrence after PM	Extrahepatic recurrence before PM (treatment)	Extrahepatic recurrence after PM (treatment)	Months from HR to PM/ survival after PM/ survival after HR	Outcome
1	67/M	(−)	TACE: 1 time	(−)	(−)	5/29/34	Dead of LF
2	67/M	HR: 1 time, TACE: 3 times	TACE: 1 time	Peritoneal nodule (OP)	(−)	33/9/42	Dead of LF
3	62/M	TACE: 3 times	(−)	Bone (RT)	Bone (CT)	51/28/79	Dead of LF
4	64/M	HR: 1 time, TACE: 4 times	TACE: 8 times	(−)	(−)	53/80/133	Dead of LF
5	65/M	TACE: 2 times	TACE: 1 time	(−)	(−)	25/25/50	Dead of LF
6	49/M	(−)	(−)	(−)	Peritoneal nodule (OP)	26/46/72	Alive
7	51/M	(−)	(−)	(−)	(−)	47/6/53	Alive
8	79/M	(−)	(−)	(−)	(−)	19/5/24	Alive
9	72/M	(−)	CT: 1 time	(−)	(−)	75/22/97	Dead of PF
10	52/F	(−)	(−)	(−)	Brain (none)	8/2/10	Dead of BM
11	55/M	TACE: 1 time	(−)	(−)	(−)	4/2/6	Dead of LF
12	72/F	HR: 1 time, TACE: 4 times	(−)	(−)	Brain (none)	61/11/72	Dead of BM
13	25/M	(−)	(−)	(−)	(−)	8/18/26	Dead of PF
14	64/M	HR: 1 time, TACE: 4 times	(−)	(−)	(−)	50/6/56	Dead of LF

PM = pulmonary metastasis; HR = hepatic resection; LF = liver failure owing to intrahepatic recurrence; OP = operation; RT = radiotherapy; CT = systemic chemotherapy; PF = pulmonary failure due to pulmonary metastasis; BM = brain metastasis.