

Hepatic Resection for Cavernous Hemangiomas of the Liver

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ABSTRACT

In this report, we evaluate the indications of, and present our recent strategy for, cavernous hemangioma of the liver. Seven patients with cavernous hemangiomas of the liver, who underwent hepatic resection were enrolled in this study. The lesions were located in the right lobe in 3 patients, the left lobe in 2, and in both the right and left lobes in 2. The longest diameter of the lesions ranged from 1.4 to 14.5cm (mean, 8.2cm). The indications for hepatic resection were symptomatic lesions in 3 patients, lesions suspected to be hepatocellular carcinoma in 2, and symptomatic and growing lesions during follow-up in 2. Right lobectomy was performed in 2 patients, left lobectomy with caudate lobectomy in 1 patient, and minor hepatic resection in the other 4 patients. One of the patients who underwent minor hepatic resection had recently received laparoscopy-assisted hepatic resection and one of the three patients who received transfusion during surgery was given an autotransfusion. There were no mortality, and morbidity was minimal. In conclusion, hepatic resection, including laparoscopy-assisted procedures, was considered a safe treatment. Hepatic resection for cavernous hemangioma should be performed only in patients with moderate to severe symptoms, complicated lesions or both, because most benign lesions have a good natural course. Furthermore, in the future, less invasive surgical procedures should be used whenever possible to treat these benign liver tumors.

Key words: Cavernous hemangioma, Hepatic resection, Less invasive surgery

Cavernous hemangiomas of the liver are the most common benign tumor of mesenchymal origin¹⁴⁾. An autopsy series has revealed that the incidence is about 2 % of all autopsies¹⁵⁾. Owing to recent advances in diagnostic techniques, many cavernous hemangiomas are detected incidentally in patients who are either asymptomatic or have symptoms unrelated to tumors in the liver^{2,9,11)}. Cavernous hemangiomas of more than 4cm in diameter are defined as giant hemangiomas¹⁾, and symptoms such as abdominal pain and fullness occur at incidence of about 50%¹⁴⁾. However, serious complications, including rupture, are rare^{3,6,21)}. Moreover, no report has described malignant transformation of cavernous hemangiomas⁸⁾. It is generally accepted that these vascular lesions grow by ectasia rather than by hypertrophy, hyperplasia or neoplasia⁹⁾.

Surgical indications for cavernous hemangiomas,

especially symptomatic lesions, are controversial. Here we present our experience of 7 patients with cavernous hemangiomas of the liver who underwent hepatic resection. We also evaluate surgical indications and present our recent strategy for the management of these benign lesions of the liver.

PATIENTS AND METHOD

From January 1986 through December 1997, 7 patients with cavernous hemangiomas underwent hepatic resection at the Department of Surgery II, Hiroshima University Hospital, Hiroshima, Japan. There was one man and six women; ages ranged from 46 to 55 years, with a mean age of 51.6 years. No patient was pregnant and all denied ever having used oral contraceptives or steroids. All patients except one (case 5) had symptoms that suggested the presence of a liver tumor and prompted their visit to our hospital.

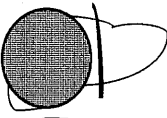





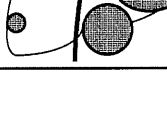
Case	Age	Sex	Symptom	Indication	Location, Resected region	Maximum size (cm)	Blood loss (Replaced)	Complications
1	46	F	Discomfort in the upper abdomen	Symptomatic		14.5	2000 ml (1600)	(-)
2	55	F	R.U.Q. pain	Symptomatic		7.0	220 ml (0)	(-)
3	54	F	Epigastralgia	Suspect of HCC		5.5	1100 ml (600)	(-)
4	55	F	Back pain	Symptomatic Observing enlargement		11.0	700 ml (0)	(-)
5	50	M	(-)	Suspect of HCC		1.4	1100 ml (0)	(-)
6	52	F	L.U.Q. pain Abdominal fullness	Symptomatic		8.0	350 ml (0)	Pneumothrax
7	49	F	Abdominal fullness	Symptomatic Observing enlargement		10.0	900 ml (800)	(-)

Fig. 1. Clinical characteristics of patients undergoing hepatic resection for cavernous hemangioma of the liver. M, male; F, female; R.U.Q., right upper quadrant; L.U.Q., left upper quadrant; HCC, hepatocellular carcinoma

Various symptoms were reported such as abdominal fullness, upper abdominal discomfort, right or left upper quadrant pain, epigastralgia, and back pain. None of these symptoms were serious, and no other lesion which could potentially cause such symptoms was detected by an intensive work-up. Case 5, who had been admitted to another hospital for liver cirrhosis caused by hepatitis C virus, was symptom-free and found to have a liver mass on routine abdominal ultrasonography (US). No patient had spontaneous rupture of their lesions. Before operation, US, computed tomography (CT), and angiography were performed in all patients. On admission, one patient (case 1) had severe anemia, with a hemoglobin value of 8.0 g/dl. One patient (case 5) had liver cirrhosis with moderate thrombocytopenia (platelet count $4.2 \times 10^4 / \text{mm}^3$) caused by hypersplenism. The other patients had no hematologic abnormalities. The indications for hepatic resection in the 7 patients were symptomatic lesions in 4 patients, lesions suspected to involve hepatocellular carcinoma in 2, and symptomatic and growing lesions during follow-up in 2.

Lesions were located in the right lobe in 3 patients, in the left lobe in 2, and in both right and left lobes in 2. Four patients had a single lesion,

and three had multiple ones. The longest diameter of the lesions ranged from 1.4 to 14.5cm, with an average of 8.2cm (Fig. 1).

RESULTS

Right lobectomy was performed in 2 patients, left lobectomy with caudate lobectomy in 1 patient, and minor hepatic resection in the other 4 patients. Case 6, whose largest lesion was located in the left lateral segment, underwent hepatic resection under laparoscopic guidance. Intraoperative blood loss ranged from 220 to 2000 ml, with an average of 910ml. Although four patients required no transfusion, the other three patients did receive transfusion, ranging from 600 to 1600ml, with an average of 1000ml. However, in case 7, the patient lost 900ml of blood during the operation and received autotransfusion of 800ml of whole blood, which was obtained and preserved before the operation. There were no operative or hospital deaths although in one patient, case 6, left pneumothorax accidentally developed during the operation. The other six patients had no intraoperative or postoperative complications (Fig. 1).

Case Reports

A 52-year-old woman, case 6, had suffered from

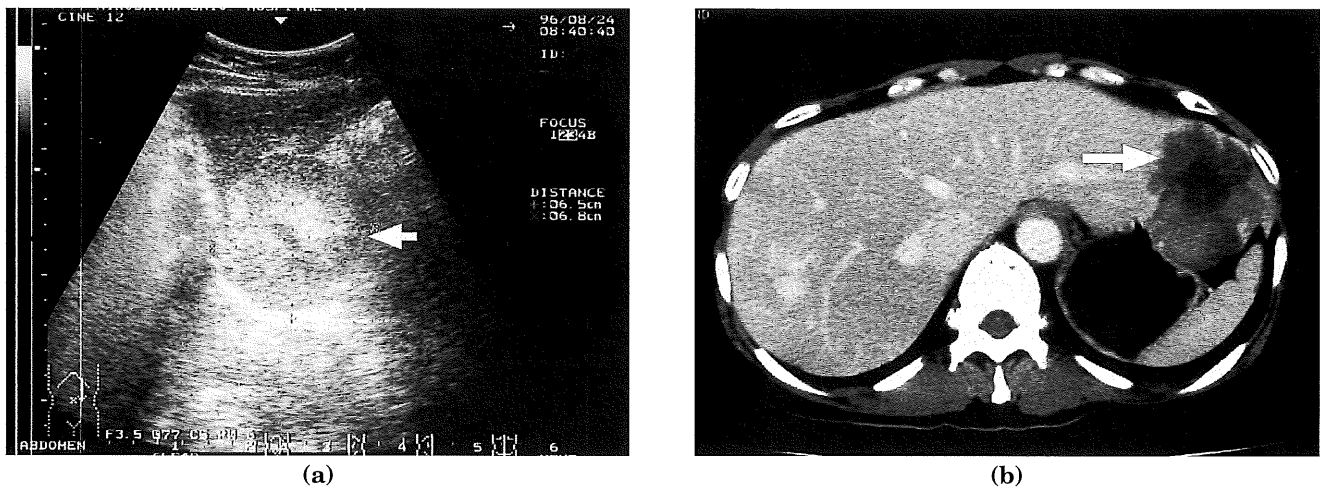


Fig. 2. (a) Preoperative abdominal ultrasonogram of case 6, showing a cavernous hemangioma with a mixed echo pattern located at the edge of the left lateral segment of the liver (arrow). (b) CT scan after intravenous injection of contrast material, showing peripheral enhancement of the lesion (arrow).

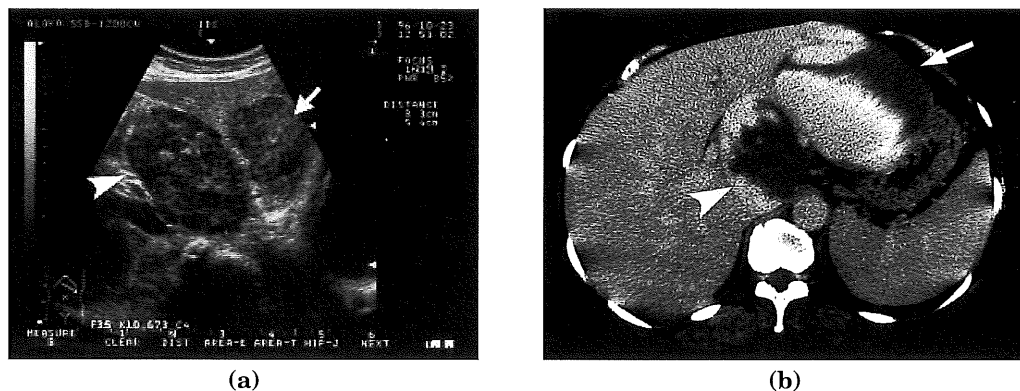


Fig. 3. (a) Preoperative abdominal ultrasonogram of case 7, showing cavernous hemangiomas located in the lateral segment (arrow) and caudate lobe (arrowhead) of the liver. The echo patterns were heterogeneous. (b) CT scan after intravenous injection of contrast material, showing peripheral enhancement of the lesions (arrow and arrowhead).

left upper quadrant pain and abdominal fullness for 1 year. Because these symptoms persisted and general fatigueness subsequently developed, she visited a local hospital and was given a diagnosis of multiple cavernous hemangiomas in July, 1996. She was referred to our department for surgical treatment. On admission, US (Fig. 2a), abdominal CT (Fig. 2b), and angiography revealed cavernous hemangiomas of the liver measuring 8.5cm in diameter and located in the left lateral segment. There was extrahepatic growth, and small hemangiomas were present in the other segments. Laparoscopic partial resection of the left lateral segment of the liver was performed via small skin incisions. The operative time and intraoperative blood loss were 6 hours and 25 minutes and 350ml, respectively. Because left pneumothorax occurred accidentally during the operation, a thoracic drain was placed into the left thoracic cavity. The thoracic drain was removed on the third postoperative day without any complications. She had an uneventful postoperative course and was discharged 22 days after the operation.

A 49-year-old woman, case 7, had abdominal fullness in July 1997 and visited a general practitioner. Ten years earlier, multiple hemangiomas, each measuring 3 or 4cm in diameter, were discovered incidentally in the right lobe of the liver at another hospital. No lesions were detected in the left or caudate lobes of the liver. Since the patient's condition was asymptomatic, she received no medical treatment. In this time, US revealed large masses in the left lobe and caudate lobe of the liver, and she was referred to our hospital and admitted for further examination on July 28, 1997. On admission, US (Fig. 3a) and abdominal CT (Fig. 3b) disclosed that multiple cavernous hemangiomas in the right, left, and caudate lobes of the liver. The lesions in the left lateral segment and caudate lobe were particularly prominent, with diameters of 10cm and 8cm, respectively. The diagnosis was symptomatic giant cavernous hemangiomas of the liver. Left lobectomy with caudate lobectomy was performed on November 18, 1997. Because intraoperative blood loss of one degree was predicted, 800ml of her own blood was collected and was

stored before the operation. Actual blood loss was 900ml, and autotransfusion of 800ml was carried out successfully. She had an uneventful postoperative course and was discharged 15 days after the operation.

DISCUSSION

Which cavernous hemangiomas should be excised? The answer to this question depends on the relative weight of the risk of operation versus the natural history of untreated lesions⁸. With respect to the risks of hepatic resection, recent advances in operation instruments, techniques, and perioperative management now permit hepatic resection to be performed safely, even in patients with concurrent liver disease such as cirrhosis. Furthermore, because most patients with cavernous hemangiomas have no associated liver disease, the risk of hepatic resection for these lesions are minimal. However, with regard to the natural history of untreated lesions, several follow-up studies have reported spontaneous rupture of untreated lesions^{3,4,6,21}, a very serious complication. On the basis of Japanese reports of spontaneous rupture of cavernous hemangiomas and their own experience, Aiura et al⁹ suggested that such lesions of more than 4cm in diameter and located on the liver surface or showing extrahepatic growth have a high risk of spontaneous rupture if the patient is receiving steroid therapy for a coexisting disorder.

Hemangiomas are probably of congenital rather than neoplastic origin, and there is no well-documented report of malignant transformation⁸. Moreover, these vascular lesions grow by ectasia rather than by hypertrophy, hyperplasia, or neoplasia⁸. Therefore, most specialists recommend that "potential for rupture"²¹⁸ is insufficient grounds for surgery in patients with asymptomatic lesions^{5,13,14,16,19}. On the other hand, absolute indications for surgical intervention include hemangiomas associated with conditions such as rupture, Kasabach-Merritt syndrome, or congestive heart failure^{4,6-8,13,16}. Furthermore, there is strong agreement that lesions that cause severe symptoms or grow rapidly require surgery^{5,6,8,16,20}. The presence of a "palpable mass" is also an indication for operation, if there is potential exposure to trauma^{6,16}. However, it is controversial whether or not all symptomatic lesions, especially those with mild symptoms, are sufficiently indicated for surgical intervention. Symptoms, when present, are often nonspecific and include vague abdominal pain, abdominal fullness, early satiety, nausea, vomiting, or continued fever. With respect to the cause of pain, rapid expansion of the lesion with or without thrombosis produces stretching and inflammation of Glisson's capsule, the only well understood mechanism by which pain arises from the liver⁸. Nichols et al¹⁴ reported that although

15% of lesions of 4 to 10cm in diameter are asymptomatic, 90% of those exceeding 10cm in diameter are symptomatic. Foster et al⁹ proposed that patients with chronic pain or disabling symptoms due to a mass are candidates for resection. Furthermore, many authors have reported that when symptoms are present, surgical excision plays an important therapeutic role, and is able to relieve symptoms related to the presence of hemangioma in nearly all patients^{5,8,10,12,17}. Trastek et al¹⁹ studied the natural courses of cavernous hemangiomas of the liver (mean diameter, 8.8cm) in 36 patients followed up for 1 to 15 years. There was no death, rupture of lesions, or progression of symptoms in symptomatic patients, although 4 patients (11%) showed evidence of enlargement. In our opinion, asymptomatic patients and symptomatic patients with non-specific, mild symptoms, such as discomfort, fullness, and early satiety, do not require hepatic resection. However, lesions associated with a tendency to enlargement or with progressive symptoms (or both) during follow-up require surgical intervention. In addition, patients with moderate to severe symptoms such as a palpable mass, persistent abdominal pain, and prolonged fever, should be operated on. Hepatic resection is also absolutely indicated in patients who have lesions associated with rupture, Kasabach-Merritt syndrome, or obstructive jaundice (Fig. 4).

Two of the seven patients in this study underwent hepatic resection for a suspected diagnosis of hepatocellular carcinoma. In particular, case 5 had a small lesion which was difficult to differentiate from a small hepatocellular carcinoma associated with liver cirrhosis caused by hepatitis C virus infection. In the other five patients, all symptoms resolved postoperatively, hepatic resection was indicated in these patients.

The results of our experience indicate that hepatic resection in patients with giant cavernous hemangiomas is a safe procedure when performed by specialized liver surgeons. Four minor hepatic resections, two right lobectomies, and one left

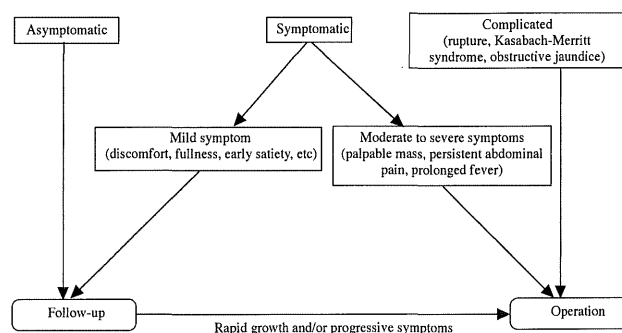


Fig. 4. Strategy for management of cavernous hemangioma.

lobectomy with caudate lobectomy were carried out with no mortality and minimal morbidity. Recently, we have been attempting to minimize surgical invasion in patients with such benign liver tumors. A laparoscopy-assisted hepatic resection was performed with little blood loss in Case 6, in which lesions were located mainly in the left lateral segment. Less invasive procedures should also be used in the management of lesions with extrahepatic growth. When intraoperative blood loss of one degree is expected, preparations for autotransfusion should be made before the operation unless patients have severe anemia. In case 7, with lesions in the caudate lobe and lateral segment of the liver, allotransfusion during the operation could be avoided by collecting blood for autotransfusion before surgery.

In conclusion, hepatic resection for cavernous hemangiomas is indicated only in patients with moderate to severe symptoms and lesions associated with conditions such as rupture, Kasabach-Merritt syndrome, or obstructive jaundice, because most benign lesions have a good natural course. In our seven patients who underwent hepatic resection, there was no mortality and minimal morbidity. Hepatic resection, including laparoscopic procedures, is thus considered a safe treatment. In the future, less invasive procedures should be used whenever possible to manage cavernous hemangiomas of the liver.

(Received August 18, 1998)

(Accepted November 19, 1998)

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