

Surgical Treatment of Giant Cavernous Hemangiomas of the Liver — Analysis of 7 Patients —

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Seven patients with giant cavernous hemangioma of the liver were treated surgically with success at Pusan Gospel Hospital, Kosin Medical College, Pusan, from 1980 through 1989. They were 3 males and 4 females, and their ages ranged from 6 to 59 years. The tumors were located on the right lobe of the liver in 5 patients and on the left lobe in 2. The lesions were solitary in all patients, and their sizes varied from 4cm to 15cm in diameter. All patients underwent hepatic resection: 1 right hepatic lobectomy and 4 partial resections for tumors on the right lobe, and 1 left lobectomy and 1 left lateral segmentectomy for tumors on the left lobe. There was no surgical death, but 1 patient had a postoperative complication: multiple stress ulcers on the stomach and ileum. The pathologic diagnosis was cavernous hemangioma in all cases. In the long-term follow-up, there was no recurrence of preoperative symptoms in any patient.

Key Words: Cavernous hemangioma, Benign hepatic tumor, Vascular tumor, Hepatic resection

INTRODUCTION

Hemangioma is the most common benign tumor of the liver and is generally classified into capillary or cavernous. The former is small, often multiple, and may involve other organs. In contrast, the latter is usually large, solitary, and limited to the liver. Most of the hemangiomas, including the cavernous type, are asymptomatic because of their small sizes and are found incidentally at laparotomy or autopsy (Grieco and Miscall, 1978). A hemangioma more than 4cm in diameter was defined as "giant" by Adam et al. (1970), and the giant hemangioma occasionally catches the attention of clinicians because of its accompanying symptoms or complica-

tions. A preoperative diagnosis of hepatic hemangioma has rarely been made in the past, but recently it has been possible with the advent of selective hepatic angiography, which shows the characteristic findings of hemangioma. Most surgeons agree that a symptomatic or complicated giant hemangioma of the liver should be treated surgically when the size and location of the tumor are suitable for surgical resection. Surgically-treated hemangioma of the liver was occasionally reported in English literature, but most of the reports were dominated by a single case. In Korea, only 7 cases of hepatic resection for cavernous hemangioma of the liver have so far been reported (Yoon and Chang, 1964; Kim et al., 1985; Seong and Kim, 1986).

We here report our experience with 7 cases of hepatic resection for cavernous hemangioma of the liver and compare them with cases in previous publications.

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CASE MATERIALS

During the 10 years from 1980 to 1989, 7 patients with giant cavernous hemangioma of the liver were treated by hepatic resection (Table 1). They were 3 males and 4 females. Their ages ranged from 6 to 59 years with a median of 51.

Initial complaints were right-upper abdominal or lower chest pain in 4 patients and a palpable mass in 3. Four patients had clinically evident hepatomegaly. Weight loss and gastrointestinal symptoms such as anorexia, nausea, or vomiting were found in 2 patients, but congestive heart failure or cutaneous hemangioma was not encountered in any patient.

Routine hematologic tests were within normal limits in all patients except for 1 who had moderate anemia with a hematocrit of 23% (Case 2). Liver function tests were within normal range in all patients except for 2 with mild elevation of GOT/GPT and alkaline phosphatase. Tumor markers such as

α -fetoprotein and carcinoembryonic antigen were normal in all patients.

Liver radionuclide scans were performed on 5 patients and space-occupying lesions were found in each scan. Ultrasonography done on 5 patients revealed 4 hyperechoic masses and 1 sonolucent. Computed tomography (Fig. 1) was helpful in diagnosis for 2 patients out of 6. Selective hepatic angiography (Fig. 2) was obtained in 5 patients and diagnostic in 4 but misinterpreted as hepatoma in 1 (Case 5). Percutaneous liver biopsy was performed repeatedly without complication in the latter case because of the pathological report of chronic persistent hepatitis. Four patients were preoperatively diagnosed as hepatic hemangioma, but an inaccurate diagnosis was made in 3, that is, 2 hepatic cysts and 1 hepatoma.

RESULT

All patients underwent hepatic resection (Table 1). The tumors were located on the right lobe of the liver in 5 patients and on the left

Table 1. Summary of Surgically Resected Cavernous Hemangioma of the Liver (7 Cases)

Case/Age/Sex	Symptom & Duration	Diagnostic Procedures	Preoperative Diagnosis	Site (lobe)	size (cm)	Operation	Follow-up
1 49 M	Rt chest pain 4 mo	CT	Hepatic cyst	Rt	4	Partial Resection	9 yr
2 6 M	Mass palpation 15 days	US LS	Hepatic cyst	Rt	15	Right lobectomy	5 yr
3 42 M	Rt-upper abdominal pain 1 mo	LS US, CT HA	Cavernous hemangioma	Rt	5×8	Partial resection	5 yr
4 51 F	Rt-upper abdominal pain 20 days	LS US, CT HA	Cavernous hemangioma	Rt	5×5	Partial resection	3 yr
5 52 F	Rt-upper abdominal pain 5 yr	LS US, CT HA	Hepatoma	Lt	9×6	Left lateral segmentectomy	2 yr
6 59 F	Mass palpation 1 mo	LS CT HA	Cavernous hemangioma	Lt	15×13	Left lobectomy	6 mo
7 56 F	Mass palpation 1 yr	CT HA	Cavernous hemangioma	Rt	10×6	Partial resection	5 mo

CT : computed tomography; US : ultrasonography; LS : radionuclide liver scan
HA : hepatic angiography

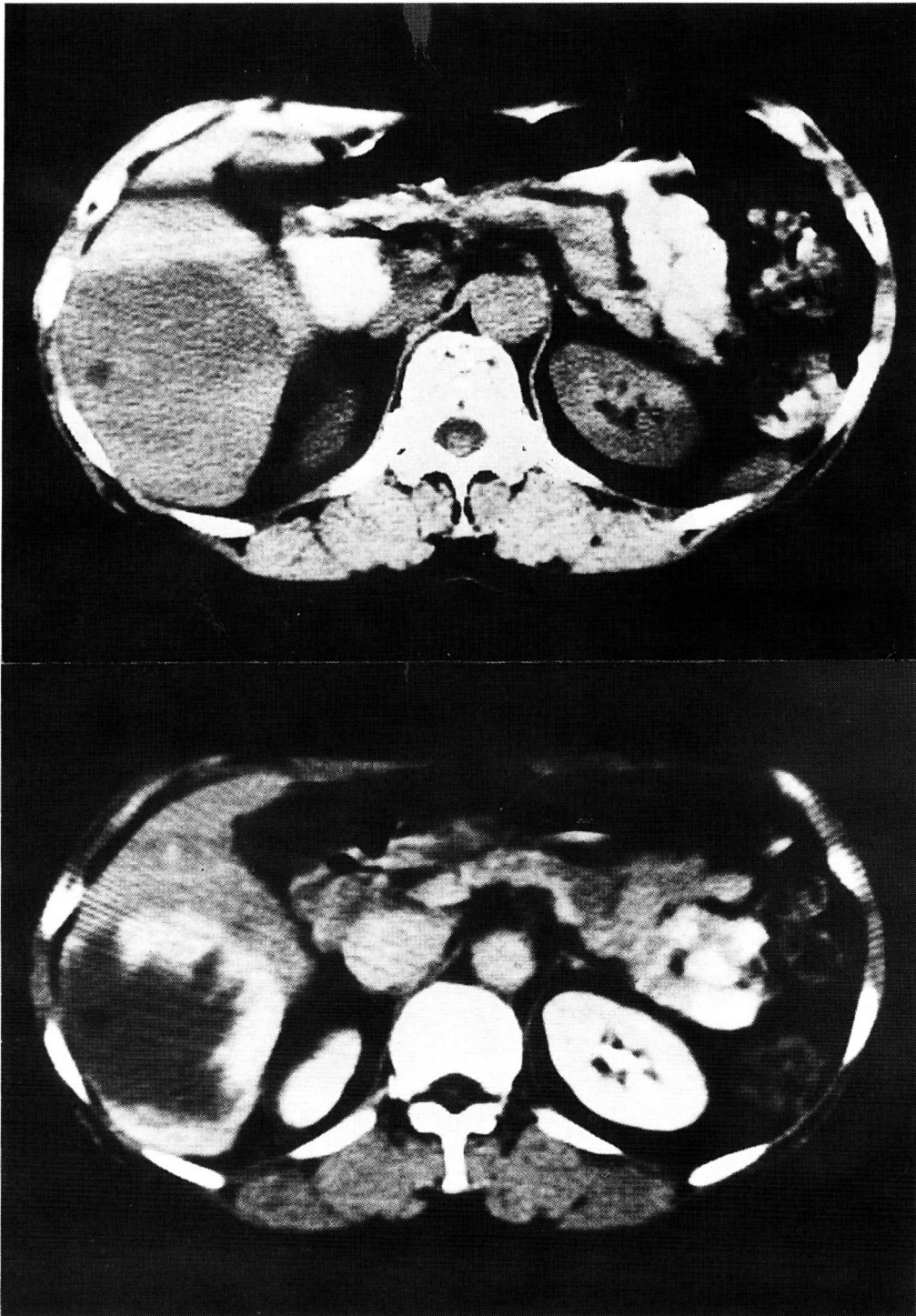


Fig. 1. Computed tomography. Above, precontrast scan ; below, postcontrast scan. A large, homogeneous round lesion with low density is seen in the right lobe. The border between the main tumor and hepatic parenchyma is smooth(above). On postcontrast scan, irregular enhancement occurs in the periphery of the lesion with higher density than that of the hepatic parenchyma(below).

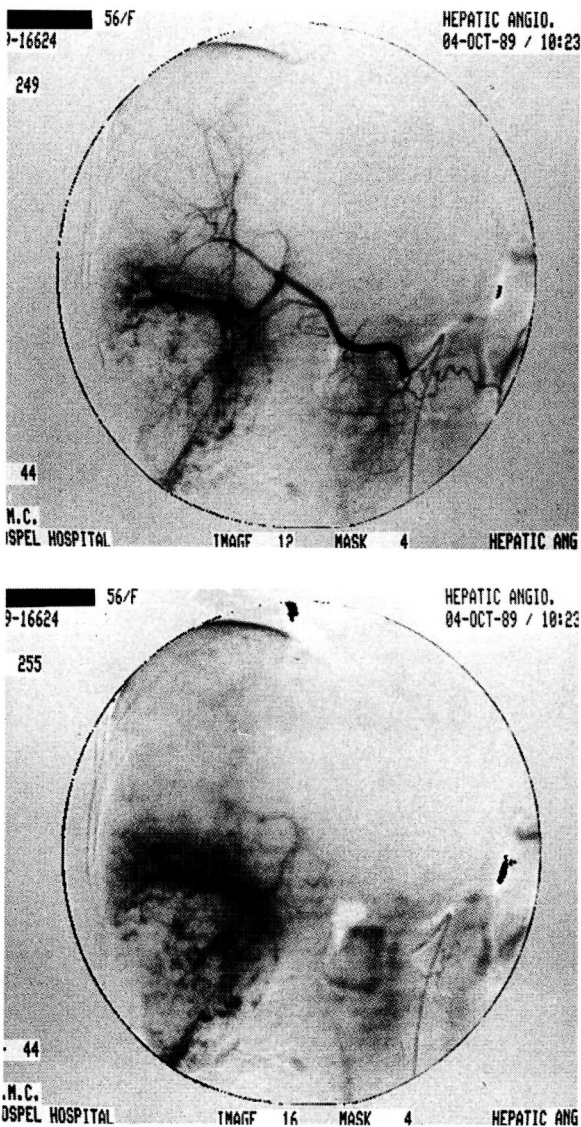


Fig. 2. Selective hepatic angiography.

Hepatic angiogram shows a large vascular tumor of which the feeding vessels are from the right hepatic artery. But there is no neovasculature or arteriovenous shunting (above). Late venous hepatic phase demonstrates a prolonged accumulation of contrast medium in this tumor (below).

lobe in 2. The lesions were solitary in all patients, and their sizes varied from 4 cm to 15 cm with a median of 9 cm in diameter. For 5 tumors on the right lobe, 1 right hepatic lobectomy and 4 partial resections were per-

formed. One left lobectomy and 1 left lateral segmentectomy were done for 2 tumors on the left lobe.

In our series there was no surgical death, although one patient had some postoperative complications: multiple stress ulcers on the stomach and ileum with massive gastrointestinal bleeding, which required a secondary operation.

The pathologic report revealed cavernous hemangioma of the liver in all patients (Fig. 3). All patients were postoperatively asymptomatic, and there was no death during a follow-up study of up to 9 years (mean 3.6 years).

DISCUSSION

Hemangioma is the most common benign tumor of the liver but is rarely found in a clinical setting because of its small size and slow growth (Henson *et al.*, 1956; Grieco and Miscall, 1978). The etiology of the hemangioma is not well-defined, but several authors agree that this vascular tumor is a benign, congenital hamartoma or tissue malformation that grows slowly from birth (Kato *et al.*, 1975; Grieco and Miscall, 1978). The growth is due to ectasia rather than by a new growth of cellular tissue (Trastek *et al.*, 1977).

The actual incidence of hemangioma of the liver is unknown, but it has been found in about 2% of autopsied livers (Ochsner and Halpert, 1958). In the adult, hemangioma occurs most frequently in the 4th, 5th, and 6th decades of life with an average age of about 45 years when symptoms present (Grieco and Miscall, 1978; Kawarda and Mizumoto, 1984). It is prevalent in the female with a 5:1 ratio, except for two Japanese series (Kato *et al.*, 1975; Takagi *et al.*, 1984). Abram *et al.* (1969) report that hepatic hemangiomas occur more frequently in older multiparas. Our patients' ages ranged from 6 to 59 years with a median of 51, and there were 3 men and 4 women.

The great majority of hepatic hemangiomas smaller than 4 cm in diameter are asymptomatic and are encountered as incidental find-

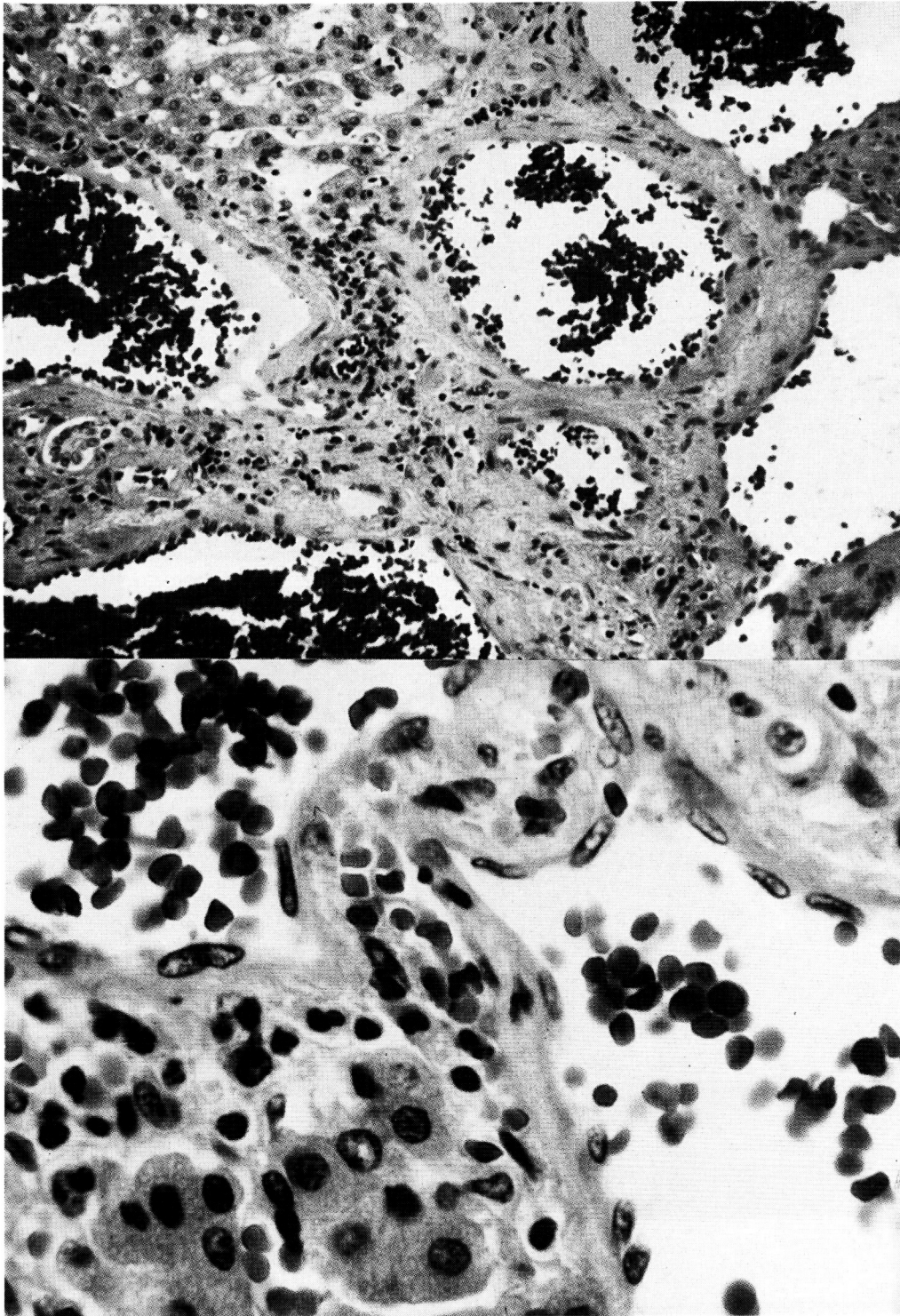


Fig. 3. Microscopic finding of cavernous hemangioma.

A typical microscopic finding of cavernous hemangioma of liver illustrating large, dilated vascular structures filled with red blood cells. The liver cell cords are replaced by proliferating vessels(above, H-E, x100). A high power view of the neoplastic vessels which are lined by a single layer of endothelial cells(below, H-E, x400).

ings during laparotomy or imaging diagnostic procedures in the course of general medical evaluation. In contrast, about half of the giant hemangiomas are symptomatic (Trastek *et al.*, 1983). The symptoms or complaints ascribed to giant hemangioma include palpable mass, abdominal pain or discomfort, dyspepsia, and a feeling of fullness. Congestive heart failure is rarely encountered in cavernous hemangioma in contrast to hemangioendothelioma where it frequently occurs because of large arteriovenous anastomosis. The most serious complication of cavernous hemangioma is a spontaneous or traumatic rupture carrying about a 70% mortality rate (Sewel and Weiss, 1961; Trastek *et al.*, 1983; Kim *et al.*, 1985), but the rupture rarely occurs in an asymptomatic patient, and the treatment for ruptured hemangioma is essentially the same as for trauma to the liver. Other complications are Kasabach-Merritt syndrome (Kawarda *et al.*, 1984), abscess and thrombosis formation (Berlinear *et al.*, 1983), and jaundice due to diffuse invasion of the liver by the hemangioma (Kato *et al.*, 1975). Among our patients, abdominal pain or discomfort was the main complaint in 4 patients and a palpable mass in 3, but no complication was encountered preoperatively. Routine preoperative hematologic and liver function tests are normal or nearly normal in patients with hepatic hemangioma. In this report, one patient (Case 2) had moderate anemia, which was thought to be related to ischemic infarction with intracavitary bleeding. Selective hepatic angiography is the most informative diagnostic method (Freeny *et al.*, 1978; Good *et al.*, 1978). The characteristic findings of cavernous hemangioma include a large feeding vessel with displacement and large, dilated varix-like spaces which are rapidly filled with contrast medium and remain densely opacified throughout the examination making a so-called "irregular cotton wool like pooling" (Abrams *et al.*, 1969; Good *et al.*, 1978). In our series, 5 patients underwent hepatic angiography, and 4 were diagnosed as hemangioma, but an incorrect diagnosis of hepatoma was made in 1 to whom long-term intravenous chemotherapy was given. Starzl *et al.* (1980) report that they

had experienced two cases of misdiagnosis of hepatic hemangioma by angiography, and thus they performed angiography less frequently in recent years for diagnosing cavernous hemangioma of the liver. Itai *et al.* (1980) insisted that most hepatic hemangioma could be accurately diagnosed by CT alone. In the authors' cases, CT was performed on 6 patients but suggestive of hemangioma in only 2.

Percutaneous needle biopsy should be avoided in hepatic hemangioma because of the danger of fatal hemorrhage (Sewel and Weiss, 1961; Adam *et al.*, 1970; Starzl *et al.*, 1980). Furthermore, an accurate diagnosis of hemangioma is often impossible through needle biopsy as reported by Trastek *et al.* (1980), who had obtained a correct diagnosis in only 3 out of 7 patients.

Most surgeons agree that a symptomatic or complicated giant hemangioma of the liver should be treated surgically, but the potential for rupture per se is not an indication for excision (Trastek *et al.*, 1983). When the size of the tumor and its location are suitable for surgical resection, resection of the lesion plus a rim of normal tissue is the treatment of choice. In our series, all patients received hepatic resection; 1 right lobectomy, 1 left lobectomy, 1 left lateral segmentectomy, and 4 partial resections.

When resection is not feasible, ligation of the hepatic artery or portal vein should be considered to reduce the vascularity of the tumor and therefore prevent serious hemorrhage (Kato *et al.*, 1975; Takagi *et al.*, 1984; Peveretos and Panoussopoulos, 1986). But Trastek *et al.* (1983) are against hepatic artery ligation because of the danger of ischemia, intracavitary bleeding, and infection. When multiple tumors are scattered in both lobes, radiation therapy is recommended by some investigators (Issa, 1968; Adam *et al.*, 1970; Kawarda *et al.*, 1984). Steroid therapy is occasionally employed with some benefits in treating large hepatic hemangiomas in infants but it does not have the same effect in adults.

The prognosis for hepatic resection in these tumors is excellent. In our series, there were no surgical deaths and only one patient had

a postoperative complication of multiple stress ulcers. Trastek et al.(1983) report that 49 cases of giant hemangioma were followed for up to 15 years(13 patients with surgical resection, 36 without surgery) with neither surgical death nor late death attributable to hemangioma. In our cases, all patients were postoperatively asymptomatic and doing well during a follow-up period of up to 9 years.

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