

COMPUTED TOMOGRAPHY OF HEPATIC CAVERNOUS HEMANGIOMA

W S Chin

SYNOPSIS

The discovery of an intrahepatic mass lesion is most disquieting, especially in regions where hepatoma is prevalent. The cavernous hemangioma of the liver, being the most common benign tumour in the liver, will be increasingly encountered with wider use of abdominal imaging modalities. It is very important to appreciate that the computed tomography (CT) findings of this benign lesion are sufficiently characteristic for a confident diagnosis and to avoid invasive diagnostic confirmation. 8 Asian Chinese patients were found whose CT features were typical.

INTRODUCTION

As the use of ultrasonography and computed tomography (CT) become widespread, benign hepatic masses like cyst and hemangioma will be increasingly encountered. The cavernous hemangioma in particular will be a diagnostic problem. It appears as a solid complex mass lesion for which a hepatoma has to be seriously considered. Hepatic angiography is specific for the cavernous hemangioma and has always been necessary to establish the diagnosis. But with experience, it has been shown that there are CT features to make the diagnosis without calling for angiography or biopsy. 8 Chinese Asian patients were found and whose CT features are typical of the lesion.

Department of Diagnostic Radiology
Mount Elizabeth Hospital
Mount Elizabeth
Singapore 0922

W S Chin, MD, DMRD, FRCR
Radiologist

MATERIALS AND METHOD

There were 8 patients, all Asian women from age 35 to 47 years. 6 were asymptomatic, 1 had vague right upper quadrant pain and 1 presented as a mass in epigastrium. 3 of them had ultrasonography as the initial examination and the rest CT. Finally, all had CT; one of whom had a repeat CT with a different machine because of disbelief over the initial diagnosis of hepatoma. 7 patients had angiography with one patient declining it after being informed of the high certainty of a cavernous hemangioma following CT. She was seen to be very well after a year. Only the patient who presented as an epigastric mass had surgical intervention in the form of a laparoscopy.

RESULTS

There is no pathognomonic sign but the overall features are quite consistent. The tumour is hypodense to normal liver tissue and easily seen except where there is associated fatty infiltration of the liver (case JT). The hypodensity can be inhomogeneous with small pockets of very low attenuation resembling cysts within the hypodense mass (case LHT, WJ, TJ).

There is no particular location for the tumour. Following intravenous contrast medium, there is always enhancement and the tumour margin becomes indistinct. There is characteristic dense enhancement in the periphery, shown in varying size and shape from curvilinear to round. The central tumour remains hypodense to varying extent and the cystic foci appears unchanged. The varying degree and extent of enhancement is due to contrast in the blood space of the hemangioma affected by progressive degeneration and fibrosis with age. Hence follow-up scans are expected not to be exactly the same as earlier ones. Small lesions can be isodense (case LNJ, TJ) and be missed on CT scans but not in angiography. The CT findings in our Asian patients are similar to those reported in the literature (1, 2, 3, 4, 5).

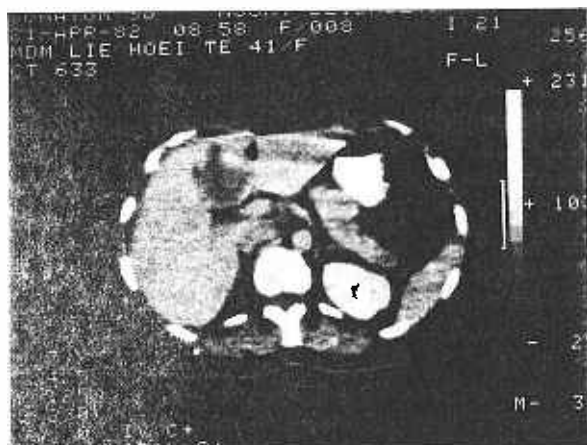
The angiographic features of a cavernous hemangioma are very definitive (6, 1, 3). The hepatic arteries remain normal size. There are no abnormal vessels, no arterio-venous shunting and no early draining veins. The pathognomonic finding is the circular or C-shaped contrast stains which appear in the late arterial phase and persist over 25 to 30 seconds. The 7 cases which had angiography had classical angiography features.

Fig. 1

(a) LHT. Well defined hypodensity with central cystic component.



(b) Post-contrast. Less defined margin. Peripheral dense enhancement at 2 o'clock position. Central cystic focus persists.



(c) Corresponding angiogram.

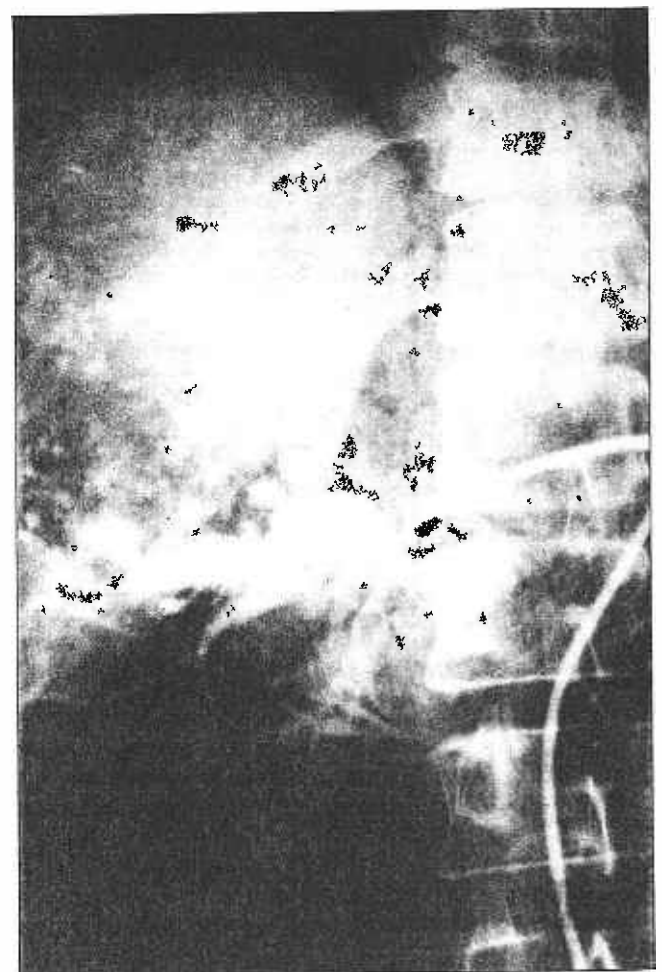


Fig. 2
 (a) WJ. Large well defined hypodensity with multiple cystic foci.

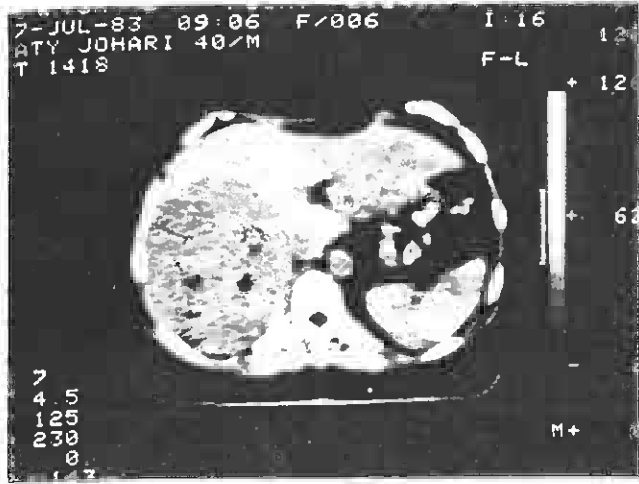
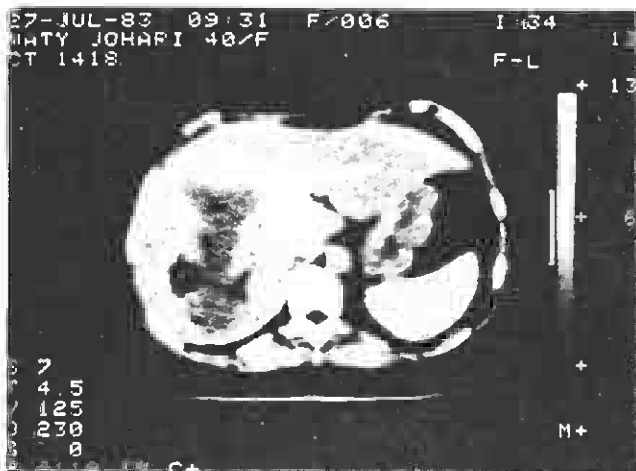


Fig. 3
 (a) TJ. Well defined inhomogeneous hypodensity lesion.



(b) Post-contrast. Margin less defined. Varying degree and extent of enhancement. Cystic foci persist.



(b) Post-contrast. Less defined margin. Irregular peripheral areas of enhancement.



(c) Corresponding classical angiogram.

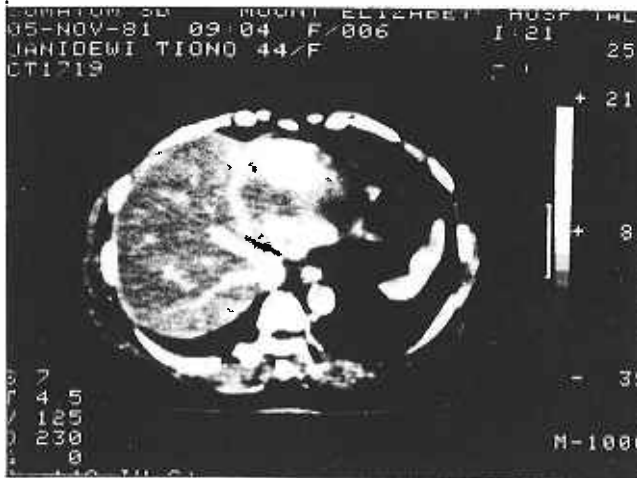


(c) Classical confirmatory angiogram.



Fig. 4

(a) JT. Fatty liver with a huge left lobe lesion. Post-contrast image showing very dense large area of enhancement anteriorly.



(b) Angiogram confirming huge hemangioma with characteristic pools of contrast.

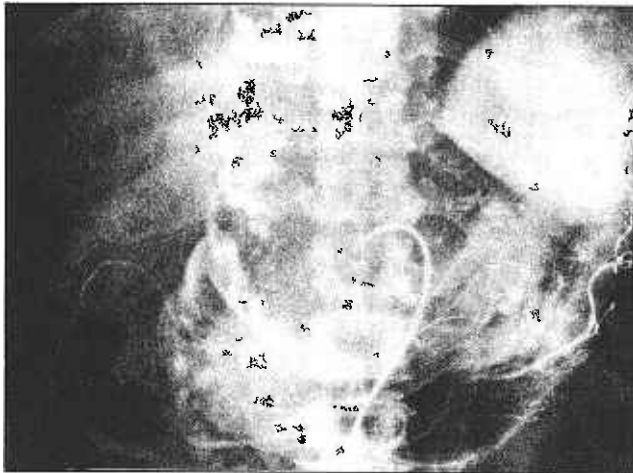


Fig. 5

AYC. Typical homogeneous hypodensity lesion, which in the post-contrast decubitus scan shows peripheral curvilinear enhancement and a dense central round focus.



DISCUSSION

The cavernous hemangioma, of unknown etiology, is the most common benign tumour of the liver. It occurs in 0.4 - 7.3% of the population (7) and an autopsy series from 1949 - 1957 (8) showed a 2% incidence. Patients are encountered in the 3rd to 5th decade of life with a 5:1 predominance of females. The lesion is single with 10% cases having additional smaller lesions. They are largely asymptomatic and presents either as an epigastric mass or vague pressure symptoms. It is creating a diagnostic problem with wider use of radionuclide scanning, ultrasonography and computed tomography. Radionuclide scanning and ultrasonography are non-specific and only points to a hepatic lesion for further investigation (9, 1, 4, 5).

Presently, CT is the single best non-invasive method of diagnosis (1, 2, 3, 4, 5). The CT findings are that of a roundish, well-defined low-density lesion with distinctive enhancement with intravenous contrast medium. The enhancement is peripheral but in-

complete and of irregular thickness. There is usually a low-density centre, sometimes associated with a hyperdense focus within the centre. The CT findings, including dynamic CT (10) are sufficiently characteristic for a confident diagnosis without resorting to hepatic angiography. Angiography is definitive and should be reserved for doubtful cases. Biopsy is unsafe and not necessary (11).

The cavernous hemangioma is slow-growing and treatment is usually not required. Growth appears to be by ectasia (12) and the hemangioma undergoes degeneration and fibrosis with age. There is a remote possibility of spontaneous hemorrhage (7). Surgical resection and radiation therapy are the two main treatment modalities but there may be a place for angiographic embolization.

It is anticipated that the cavernous hepatic hemangioma will be increasingly encountered with the proliferation of abdominal CT. There is always the fear of hepatoma in our Asian patients and this benign tumour must be kept in mind all the time.

TABLE 1

Patient	Age/Sex	Lesion - Shape, size, location	Margin Tissue Density	
			- Pre-contrast	- Post-contrast
KAK	47/F	Round 4 cm R lobe	well defined homogeneous hypodensity	less defined Peripheral enhancement
TLS	35/F	Round 3 cm R lobe	well defined homogeneous hypodensity	less defined Peripheral and central linear enhancement
JT	43/F	Enlarged left lobe 8 - 12 cm	ill defined diffuse fatty infiltration	Better defined Peripheral 5 cm enhance- ment with irregular extensions
AYC	46/F	Oval 5 - 7 cm R lobe	well defined homogeneous hypodensity	less defined Peripheral curvilinear and a central round enhance- ment
LNJ	47/F	Round 2 cm R lobe	well defined homogeneous hypodensity	less defined Peripheral enhancement
LHT	41/F	Round 6 cm R lobe	well defined inhomogeneous hypodensity with central cystic focus	less defined Peripheral enhancement. focus persists
WJ	41/F	Oval 12 cm R lobe	well defined inhomogeneous hypodensity with irregular cystic foci	less defined Inhomogeneous enhance- ment. Cystic foci persist
TJ	44/F	Oval 3 - 5 cm R lobe	well defined Inhomogeneous hypodensity with cystic foci	Defined Peripheral enhancement. Cystic foci persist

REFERENCES

1. Freeny PC, Vimout TR, Barnett DC: Cavernous hemangioma of the liver. Ultrasonography, arteriography and computed tomography. *Radiology* 1979; 132: 143-8.
2. Barnett PH, Zerhoni EA, White RI Jr, Siegelman SS: Computed tomography in the diagnosis of cavernous haemangioma of the liver. *AJR* 1980; 134: 439-47.
3. Johnson MC, Sheedy PF, Stanson AW, Stephens DH, Hattery RR, Adson MA: Computed tomography and angiography of cavernous hemangiomas of the liver. *Radiology* 1981; 138: 115-21.
4. Itai Y, Ohtomok, Araki T, Furuis, Iio M, Atomi Y: Computed tomography and sonography of cavernous hemangioma of the liver. *AJR* 1983; 141: 315-20.
5. Bree RL, Schwab RE, Neiman HL: Solitary echogenic spot in the liver: Is it diagnostic of a hemangioma? *AJR* 1983; 140: 41-5.
6. Abrams RM, Beranbaum ER, Santos JS, Lipson J: Angiographic features of cavernous hemangioma of the liver. *Radiology* 1969; 92: 308-12.
7. Ishak KG, Rubun L: Benign tumours of the liver. *Med Clin North Am* 1975; 59: 995-1013.
8. Ochsner JC, Halpert B: Cavernous hemangioma of the liver. *Surgery* 1958; 43: 577-8.
9. Taylor RD, Anderson PM, Winston MA, et al: Diagnosis of hepatic hemangioma using multiple radionuclide and ultrasound techniques. *J Nucl Med* 1976; 17: 362-4.
10. Araki T, Itai Y, Furius, Tasaka A: Dynamic CT densitometry of hepatic tumours. *AJR* 1980; 135: 1037-43.
11. Kato M, Sugawara I, Okada A, et al: Hemangioma of the liver. Diagnosis with combined use of laparoscopy and hepatic arteriography. *Am J Surg* 1975; 129: 698-704.
12. Adson MA: Diagnosis and surgical treatment of primary and secondary solid hepatic tumours in the adult. *Surg Clin North Am* 1981; 61: 181-95.