DIAGNOSIS OF HEPATIC HEMANGIOMA USING MULTIPLE-RADIONUCLIDE AND ULTRASOUND TECHNIQUES

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Two cases of hepatic hemangioma are reported in which multiple-radionuclide and ultrasound techniques were combined in the diagnostic process. Blood pool imaging rather than perfusion imaging proved to be the most definitive diagnostic procedure. The application of radionuclide and ultrasound studies in the differential diagnosis of focal lesions of the liver is discussed.

Hemangiomas are the most common benign tumors of the liver (*1,2*). The incidence varies from 0.4% to 7.3%. Neither symptoms, physical findings, nor laboratory investigations help establish the diagnosis. Because of the possibility of massive bleeding after spontaneous rupture or diagnostic percutaneous liver biopsy, prompt and accurate diagnosis of these tumors cannot be emphasized too strongly.

Hemangioma ordinarily presents as a focal hepatic defect on a routine radiocolloid scan of the liver. Since a focal hepatic defect is a nonspecific finding that may indicate any of a wide variety of pathologic lesions, a number of supplementary diagnostic techniques must be employed in the differential diagnosis of such lesions (*3,4*). One widely used secondary scanning agent is ^{67}Ga (*5*). Gallium-67 can be expected to accumulate in hepatomas, in some metastatic tumors, and in pyogenic abscesses, but not in benign tumors such as cysts or hemangiomas.

Blood pool imaging with ^{113m}In-transferrin or ^{131}I-human serum albumin is useful in differentiating some local lesions. Such lesions as cysts, abscesses, and most tumor metastases have little or no blood pool, and hepatomas have normal blood pools (*6*). Hemangiomas, on the other hand, have large blood pools (*6,7*). More recently, perfusion imaging has been used to evaluate tumor blood supply after a bolus injection of radiocolloid (*8–11*). This technique shows the vascularity of most metastatic tumors and hepatomas and the avascularity of pseudotumors of cirrhosis, abscesses, and cysts. Among other techniques employed in the diagnosis of focal hepatic lesions are ultrasound scanning, which may be useful in differentiating cystic from solid lesions, and radiologic angiography, probably the most definitive technique (*12,13*).

In this report, we present two cases of focal hepatic lesions due to the presence of hepatic heman-

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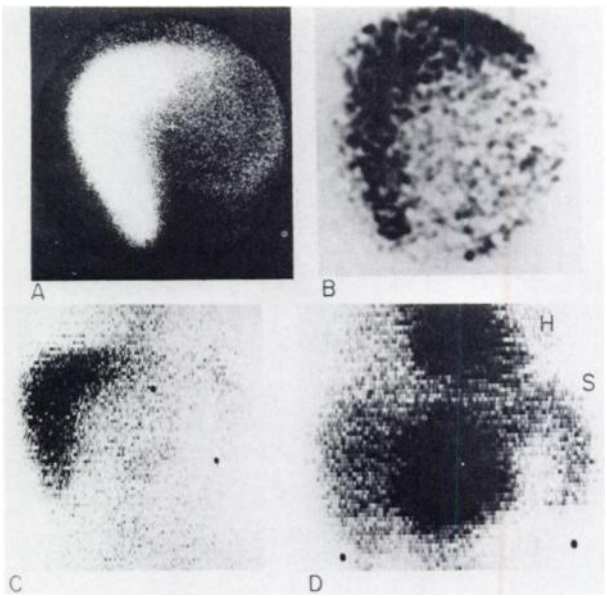

FIG. 1. Case 1. (A) Radiocolloid scan of liver shows large defect in left lobe. (B) Perfusion scan with ^{99m}Tc-sulfur colloid at 10 sec shows nonperfusion of defect. (C) Gallium-67 scan at 48 hr shows no concentration in lesion. (D) Indium-111 blood pool scan of lesion reveals abnormally increased blood pool.

giomas where the above techniques were employed to establish the diagnosis.

CASE REPORTS

Case 1. A 32-year-old man in good health presented with a palpable fullness in his epigastrium. His history gave no evidence of any abdominal disorder. Liver function tests were within normal limits. A radiocolloid liver scan revealed a large focal defect in the left lobe (Fig. 1A). A dynamic perfusion study with 30 mCi of ^{99m}Tc-sulfur colloid showed no increased perfusion (consecutive 5-sec exposures) in the region of the hepatic lesion (Fig. 1B). A ^{67}Ga scan (48 hr after administration) showed decreased concentration in the area of the lesion relative to the surrounding tissue (Fig. 1C). Ultrasound studies indicated that the defect was solid (Fig. 2). A blood pool scan performed with ^{111}In-indium chloride revealed increased uptake in the lesion (Fig. 1D). An hepatic contrast angiogram was consistent with hemangioma. Laparotomy revealed a large cavernous hemangioma, which was completely resected.

Case 2. Hepatomegaly was found in a 47-year-old man admitted for evaluation of syncopal attacks. There was no history suggestive of hepatic disease. Liver function tests were normal. A radiocolloid liver scan revealed a large focal defect in the right lobe (Fig. 3A) and a perfusion scan with ^{99m}Tc-sulfur colloid showed no increased perfusion of the defect (Fig. 3B). Ultrasound studies indicated that the defect was solid (Fig. 4). The hepatic defect was defined by ^{67}Ga scan performed 6 hr after administration (Fig. 5), but decreased uptake in the lesion was observed in the ^{67}Ga scan at 48 hr (Fig. 3C). These findings were thought to indicate that the nearly normal ^{67}Ga concentration in the tumor mass at 6 hr represented an increased blood pool rather than uptake by tumor cells. An ^{111}InCl blood pool scan showed distinct concentration of radioactivity in the lesion (Fig. 3D). An hepatic contrast angiogram gave findings consistent with hepatic hemangioma.

DISCUSSION

The focal hepatic lesion shown by radiocolloid scanning often presents a clinical dilemma, particularly with respect to the propriety of diagnostic needle biopsy. This problem is even more critical when there is no clinical evidence of hepatic disease and hemangioma is suspected. In such cases, every effort should be made to establish the nature of the lesion prior to percutaneous needle biopsy or peritoneoscopy with biopsy, in order to avoid the possibility of catastrophic hemorrhage.

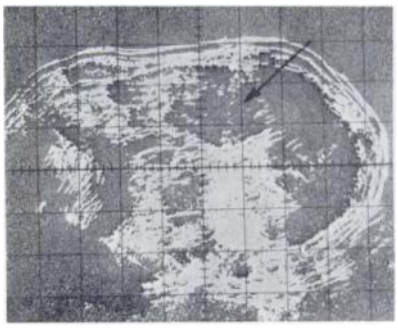

FIG. 2. Ultrasound study of hepatic lesion shows multiple internal echoes indicative of solid mass (Case 1).

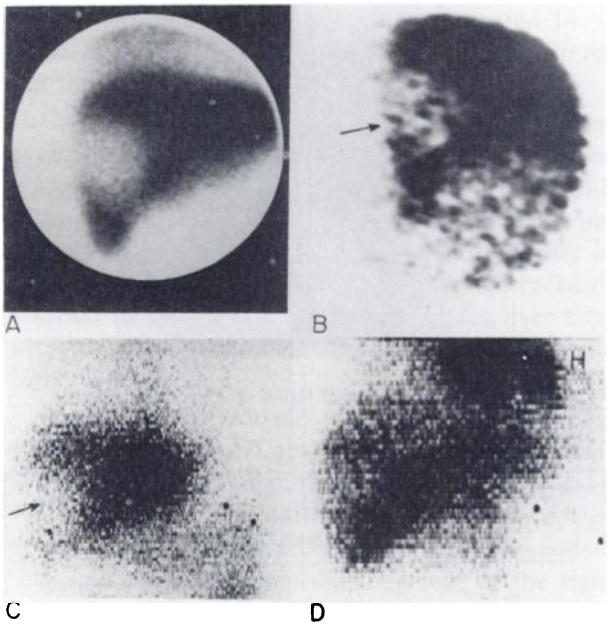

FIG. 3. Case 2. (A) Radiocolloid scan of liver shows large defect in right lobe. (B) Perfusion scan with ^{99m}Tc-sulfur colloid at 10 sec shows nonperfusion of defect. (C) Gallium-67 scan at 48 hr shows no concentration in lesion. (D) Indium-111 blood pool scan shows concentration in lesion.

As shown in the above cases, noninvasive radionuclide and ultrasound techniques can be employed to determine the vascularity, blood pool, and frequently the pathologic nature of focal hepatic lesions, thus often obviating the need for invasive contrast angiography. The findings usually associated with various hepatic diseases are summarized in Table 1. These data are based on the authors' experience and have been supplemented by reports from the recent literature. Although this table may be useful in the differential diagnosis of focal hepatic lesions, it should be understood that it represents only general diagnostic guidelines to which there may be a number of specific exceptions due to pathologic variation.

FIG. 4. Ultrasound study of hepatic lesion shows multiple internal echoes characteristic of solid mass (Case 2).

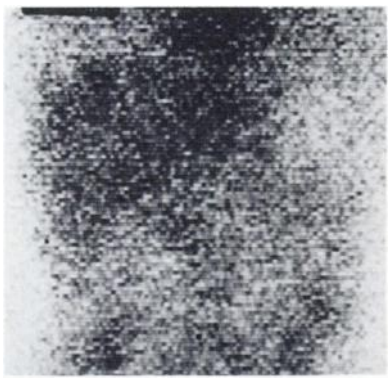

FIG. 5. Gallium-67 scan of lesion at 6 hr (Case 2).

TABLE 1. DIFFERENTIAL DIAGNOSIS OF FOCAL LESIONS OF LIVER

	Early perfusion	Blood pool	^{67}Ga	Ultrasound*
Hepatoma	+	+	+	+
Metastasis	+	−	±	+
Cirrhosis (pseudotumor)	−	−	−	+
Abscess (pyogenic)	−	−	+	−
Cyst	−	−	−	−
Hemangioma	−	++	−	+

* Under ultrasound, (+) indicates an echogenic lesion and (−) indicates a transonic lesion.

The importance of the blood pool scan in the identification of hepatic hemangiomas cannot be emphasized too strongly. In the cases reported, the perfusion study suggested a poorly vascularized mass, whereas the blood pool scan showed that the vascularity of the mass was the same as, or greater than that of adjacent liver parenchyma. These findings suggest that hemangioma comprises a relatively "static blood pool" and that "nonperfusion" cannot always be equated with avascularity.

In the ^{67}Ga study in Case 2, it was noted that images obtained within 6 hr of ^{67}Ga administration could be used to evaluate the blood pool of the lesion in question. Since ^{67}Ga combines with transferrin immediately after injection, an early scan might be expected to show the blood pool of a lesion, whereas the delayed scan will show abnormal uptake in neoplastic or inflammatory lesions. Although inflammatory lesions such as abscesses may show increased uptake in early ^{67}Ga scans, they also remain positive in delayed scans. On the other hand, early ^{67}Ga uptake followed by decreased uptake in delayed scans would suggest a highly vascular benign lesion such as hemangioma.

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