

THE "HOT" HEPATIC ABSCESS

Zev Chayes, Mordecai Koenigsberg, and Leonard M. Freeman

*Albert Einstein College of Medicine of Yeshiva University
and The Hospital of the Albert Einstein College of Medicine, Bronx, New York*

A case of hepatic abscess appearing as a "hot" lesion on the radiocolloid scintigraph is presented. Local stimulation of reticuloendothelial elements is suggested as the probable explanation for this unusual finding.

Focal liver lesions demonstrating increased radiocolloid uptake have been described over the past few years in association with hemangioma and various venous obstructions. In this report an abscess is documented as another lesion producing a focal increase in hepatic radiocolloid concentration.

Liver abscesses similar to other intrahepatic space-occupying lesions almost always present as focal defects on radiocolloid liver scans. The purpose of this communication is to present an abscess appearing as a "hot" rather than "cold" lesion on scintigraphy.

CASE REPORT

On Nov. 14, 1972 JC, a 61-year-old white man, was admitted with an acute onset of pyrexia, tachycardia, diaphoresis, and hypotension which had developed after a 2-month period of intermittent low-grade fever, malaise, and progressive weight loss. About 1 year before (Oct. 1971), he had a cholecystectomy for cholelithiasis at another hospital. Postoperatively he developed low-grade fever, jaundice, and anorexia which recurred intermittently until July 1972 when a hepatic abscess was surgically drained.

On physical examination no significant abnormalities were noted other than a nontender liver edge protruding about one finger breadth below the right costal margin.

Laboratory data revealed a hemoglobin of 9.0 gm%, hematocrit 31%, WBC 24,800/mm³ with a differential showing a shift to the left. Blood chemis-

tries were normal except for an elevated alkaline phosphatase of 300 K.A. units (normal 30-85). Radiographic study of the chest showed mild infiltrative changes above the right diaphragm.

Since septic shock appeared imminent, the patient was placed on intensive antibiotic therapy on an empirical basis.

Liver scintigraphy with ¹⁹⁸Au-colloid showed a focal area of increased radionuclide concentration in the upper medial portion of the right hepatic lobe (Fig. 1). A combined liver-lung study failed to show any subdiaphragmatic defect. Hepatic angiography confirmed the presence of a relatively avascular mass lesion in the same area. The abscess cavity was

Received July 20, 1973; original accepted Nov. 6, 1973.

For reprints contact: Zev W. Chayes, Dept. of Nuclear Medicine, Albert Einstein College of Medicine, 1825 Eastchester Rd., Bronx, N.Y. 10461.



FIG. 1. Liver scintigram with ¹⁹⁸Au-colloid during acute illness. Focal area of increased radionuclide concentration is noted in upper medial portion of right hepatic lobe. Note smaller cold area immediately lateral to region.

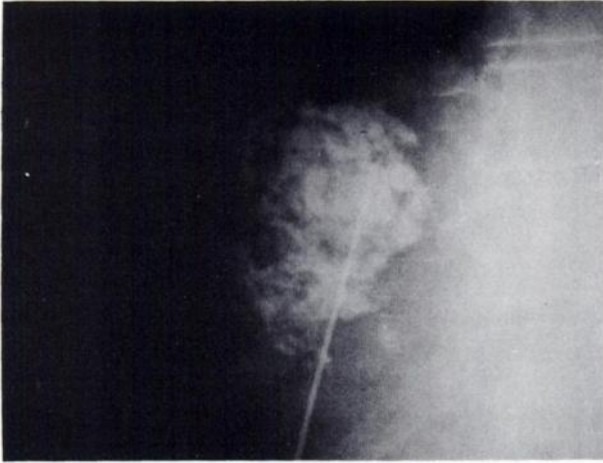


FIG. 2. Roentgenographic visualization of abscess cavity after injection with radiographic contrast at open surgical drainage.

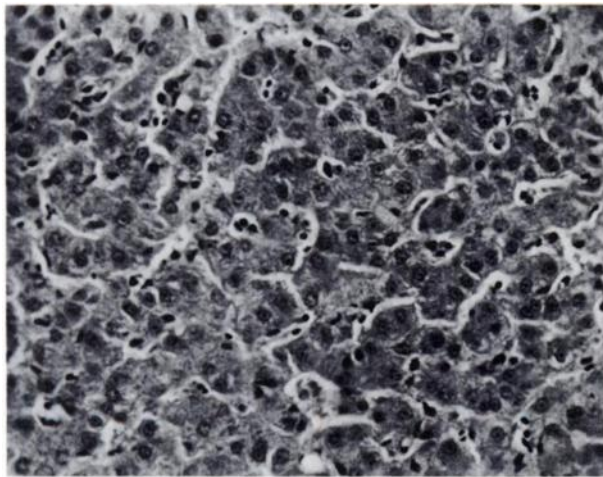


FIG. 3. Photomicrograph of liver biopsy specimen showing abundance of Kupffer cells in sinusoids. Parenchyma and sinusoids are otherwise normal in appearance (H and E, X340).

demonstrated by direct injection with contrast material during open surgical drainage on Nov. 22 (Fig. 2). A liver biopsy obtained from adjacent tissue revealed an abundance of reticuloendothelial cells (Fig. 3). Cultures of the evacuated material did not produce bacterial or fungal growth.

The patient's postoperative course was complicated by pneumonia and bleeding from a probable gastric stress ulcer. Both problems responded to conservative therapy, and he was discharged 3 weeks after surgery. Followup liver scintigraphy 1 month later with ^{99m}Tc -sulfur colloid was negative.

DISCUSSION

Volpe and Johnston (1) described a "hot" hepatic lesion in a surgically proven case of hemangioma. Histologically, the lesion did not seem to differ in

appearance from similar lesions in cases showing decreased concentration of radiocolloid. Several other authors (2-4) have described a similar scintigraphic phenomenon in patients with venous obstruction (superior vena cava, hepatic veins). In these cases the unexpected focal increase in colloid uptake was felt to be due to hemangiomatous proliferation or abundance of collateral vasculature, and/or stasis, respectively.

In this report an unusual increase in radionuclide uptake is noted in a liver abscess. However, no angiographic or histologic increase in vascularity was demonstrated. In fact, the involved area was shown to be relatively avascular and no increase in sinusoid width or number was noted in the surrounding liver parenchyma. The major histologic finding was a significant increase in the number of Kupffer cells about the abscess site. This proliferation of reticuloendothelial cells may explain the increased radiocolloid concentration in the abscess area. Though this phenomenon would be expected to occur in most inflammatory lesions with abscess formation, these lesions almost always present as "cold" areas on the colloid liver study. This implies that in most abscesses the Kupffer cells are relatively diminished in number or show impaired phagocytosis as compared with the surrounding normal liver.

Stuart (5), in an extensive review of the reticuloendothelial system, lists numerous factors which stimulate RES activity, including bacteria and their products (e.g., *E. coli* endotoxin), estrogen, lipids, and yeast extracts. RES inhibition, on the other hand, is far more difficult to achieve experimentally and requires the administration of cytotoxic agents or steroids in doses exceeding those occurring in vivo or used in clinical practice. It must therefore be assumed that the "cold" areas usually seen in abscesses are the result of physical destruction or displacement of normal RES cell-containing structures. In the odd case of a "hot" lesion, a fortuitous set of circumstances results in stimulation and/or proliferation of the RES cells.

In general, when a systemic circulating RES stimulating agent is present, the entire liver area will be uniformly exposed to it as long as the normal vascular perfusion pattern is preserved. This may lead to diffuse stimulation and/or proliferation of the Kupffer cells throughout the entire liver thereby producing a "normal" appearing liver image which would convey no specific information about the status of the reticuloendothelial cells unless quantitative methods are employed. By the same token, when a "patchy" hepatic distribution of radionuclide is observed, a question may arise as to whether the "cool" or the "warm" regions respectively represent areas

of relatively decreased or increased RES activity. The answer perhaps will be found when parameters for quantitating hepatic RES function are more widely used. A more complete evaluation may then be obtained by comparing regional hepatic function with baseline values of normal activity.

In this particular case, the abscess was identifiable as a solitary "hot" area on the scintiphoto due to the focal RES proliferation about the abscess site. Had multiple lesions or diffuse inflammation been present, the increase in radiocolloid uptake may well have escaped detection.

REFERENCES

1. VOLPE JA, JOHNSTON GS: Hot hepatic hemangioma: A unique radiocolloid-concentrating liver scan lesion. *J Surg Oncol* 2: 373-377, 1970
2. COEL M, HALPERN S, ALAZRAKI N, et al: Intra-hepatic lesion presenting as an area of increased radiocolloid uptake on a liver scan. *J Nucl Med* 13: 221-222, 1972
3. JOYNER JT: Abnormal liver scan (radiocolloid "hot spot") associated with superior vena cava obstruction. *J Nucl Med* 13: 849-851, 1972
4. HELBIG HD: Focal iatrogenic increased radiocolloid uptake on liver scan. *J Nucl Med* 14: 354-355, 1973
5. STUART AE: *The Reticuloendothelial System*, London, E & S Livingstone, 1970, pp 89-121