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The Rim Sign in Hepatic Abscess: Case Report and Review of the Literature

Kathleen L. McDonald and Mandana Davani

Department of Radiology, The Mercy Hospital of Pittsburgh, 1400 Locust Street, Pittsburgh, Pennsylvania

We studied a previously healthy patient who presented with a 3-wk history of fever, flu-like symptoms and abdominal pain. **Methods:** Blood cultures were positive for *Escherichia coli*. A computed tomography (CT) scan revealed a 2-cm low-density focus in the right hepatic lobe. A technetium-99m-mebrofenin scan showed a photopenic area in the right hepatic lobe surrounded by a rim of activity greater than the adjacent parenchymal activity. **Results:** Gallbladder visualization was normal and the diagnosis of hepatic abscess was made. CT-guided percutaneous drainage of the lesion yielded six cc of pus, the culture of which grew *E. coli*, *Prevotella* and *Bacteroides fragilis*. Drainage and a 6-wk course of intravenous antibiotics were followed by clinical improvement and resolution of the abscess by CT. **Conclusion:** The rim sign and its possible mechanism of causation in hepatic abscess are discussed in this report, together with a review of the literature.

Key Words: rim sign; hepatobiliary scan; hepatic abscess

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Technetium-99m-labeled iminodiacetic analogs play a clinically important role in the diagnosis of a variety of hepatobiliary disorders. The analogs share the same hepatocyte uptake, transport and excretion pathways as bilirubin. Increased pericholecystic activity due to the inflammation associated with acute cholecystitis is a finding known as the rim sign. Here we present a case of an anaerobic hepatic abscess that ^{99m}Tc -mebrofenin scan demonstrated as a cold region surrounded by a rim of increased activity.

CASE REPORT

A 47-yr-old Caucasian male without a significant past medical history presented with a 3-wk history of fever, chills, night sweats, severe anorexia and malaise. Physical examination at admission revealed no focal abnormalities. The patient's temperature was 38°C, and his pulse was 123 bpm. The white blood cell level was increased at 19,900/mm³. The patient's initial blood cultures at admission reported *Escherichia coli*.

A computed tomography (CT) scan with contrast revealed a 2-cm low-density abnormality within the right hepatic lobe (Figs. 1 and 2). The differential at the time included hepatic abscess or hemangioma, the latter of which was excluded by red blood cell

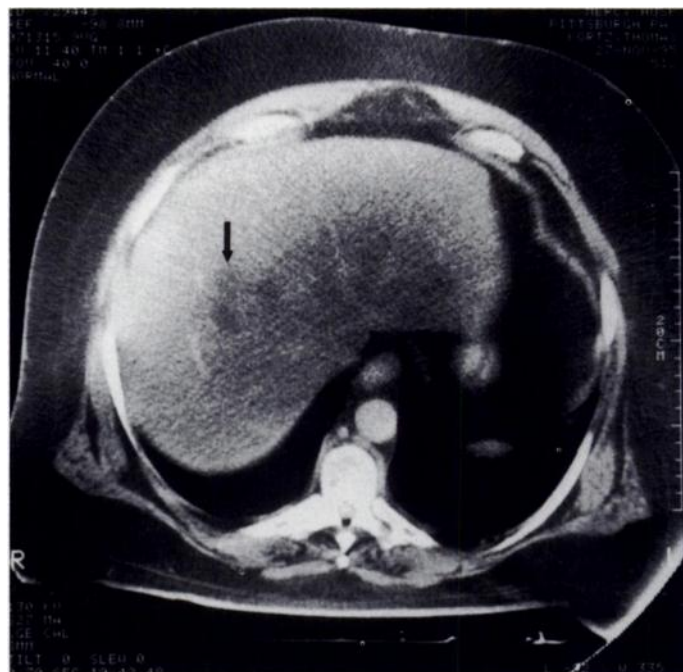


FIGURE 1. The initial contrast-enhanced CT showed a subtle low-density lesion in the right-middle hepatic lobe consistent with early hepatic abscess.

scan. A ^{99m}Tc -mebrofenin scan was performed to rule out acalculous cholecystitis. Technetium-99m-mebrofenin (185 MBq) was injected intravenously. Imaging was performed using a large field-of-view gamma camera equipped with a low-energy all-purpose collimator. This study showed a photopenic area in the right hepatic lobe surrounded by a rim of activity greater than that of the adjacent parenchyma (Fig. 3). The gallbladder filled normally, thus essentially eliminating the diagnosis of acute cholecystitis.

CT-guided percutaneous drainage of the liver abscess was performed on two occasions after the ^{99m}Tc -mebrofenin scan. Cultures grew *E. coli*, *Prevotella* and *Bacteroides fragilis*. The patient was given a 6-wk course of intravenous ampicillin and sulbactam. The hepatic abscess was followed by CT and noted to resolve. Three months after the initial presentation, the patient was readmitted with complaints of abdominal pain and diarrhea. Biopsy of the large bowel disclosed the diagnosis of ulcerative colitis.

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For correspondence contact: Mandana Davani, MD; for reprints contact: Kathleen L. McDonald, MD, Department of Radiology, The Mercy Hospital of Pittsburgh, 1400 Locust Street, Pittsburgh, PA 15219-5166.

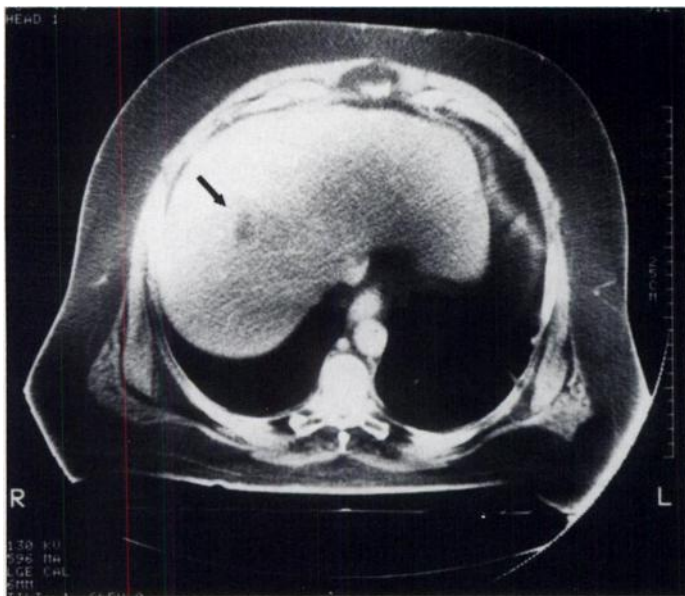


FIGURE 2. Contrast-enhanced CT performed several days after initial CT shows the hepatic abscess within the right hepatic lobe to be more mature and focal. No other hepatic abnormalities are present.

DISCUSSION

Our case demonstrates that a photopenic defect with a surrounding rim of increased activity within the hepatic parenchyma correlates with hepatic abscess. To our knowledge, this phenomenon has not been previously described with bacterial hepatic abscess. Remedios et al. described cholescintigraphic rim enhancement surrounding a photopenic region in 9 of 17 patients with amebic hepatic abscess (1). He suggests that this sign is specific for amebic hepatic abscess because hepatic lesions of other etiology did not reveal similar findings (1).

Pericholecystic hepatic uptake of radionuclide is a useful secondary sign in the cholescintigraphic diagnosis of acute cholecystitis (2-4). Proposed pathogenic mechanisms of development of the rim sign include hyperperfusion, as well as impaired radiopharmaceutical clearance. The latter mechanism is secondary to both hepatocyte dysfunction, with impaired excretion of radiopharmaceutical, and to edema of bile canaliculi, with resultant bile stasis (5-7).

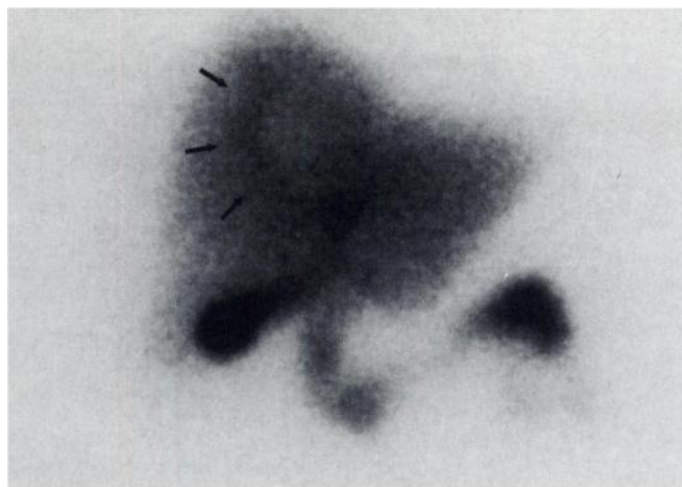


FIGURE 3. Anterior abdominal hepatobiliary image shows a rim of mildly prominent activity within the parenchyma of the right hepatic lobe surrounding a focus of diminished activity; the hepatic abscess rim sign.

CONCLUSION

The mechanisms of increased rim sign in cases of inflammation associated with adjacent gallbladder disease can be applied to the inflammatory changes seen in hepatic abscess. Inflammation leads to hyperemia, impairment of radiopharmaceutical excretion and a rim of increased activity.

The presence of a rim sign of increased activity surrounding an intrahepatic cold defect on hepatobiliary scan should lead to a high index of suspicion for hepatic abscess.

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Leukocyte-Marrow Scintigraphy in Hyperostosis Frontalis Interna

Maria Aurora Torres and Christopher J. Palestro

Division of Nuclear Medicine, Long Island Jewish Medical Center, New Hyde Park, New York

Hyperostosis frontalis interna is the term used to describe the thickening of the frontal bones of the skull. This thickening of the frontal bones is accompanied by an increase in the diploic space which results in an increased quantity of hematopoietically active marrow. Increased frontal bone uptake of labeled leukocytes has

been reported in this condition, and the symmetric appearance of this activity may suggest its benign etiology. We have encountered a case of hyperostosis frontalis interna in which the uptake of labeled leukocytes was asymmetric and marrow scintigraphy confirmed that the activity seen was due to marrow not infection.

Key Words: hyperostosis frontalis interna; skull; marrow scintigraphy

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For correspondence or reprints contact: Christopher J. Palestro, MD, Division of Nuclear Medicine, Long Island Jewish Medical Center, 270-05 76th Ave., New Hyde Park, NY 11040.