
A Case of Metastatic Malignancy Masquerading as a Hepatic Hemangioma on Labeled Red Blood Cell Scintigraphy

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A 36-yr-old woman with a past history of gastric neuro-endocrine carcinoma (carcinoid tumor) underwent ^{99m}Tc -red blood cell (RBC) scintigraphy for evaluation of a 2-cm echogenic liver mass demonstrated on ultrasound. Scan findings were typical of a cavernous hemangioma. On follow-up, however, there was progressive lesion enlargement; histopathology of the resected mass revealed neuro-endocrine carcinoma. This case report, one of the few examples of a false-positive ^{99m}Tc -RBC scan, highlights the need for cautious evaluation of focal liver masses, even when there are typical scintigraphic features of cavernous hemangioma.

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Tchnetium-99m-red blood cell (RBC) scintigraphy plays an important role in the investigation of patients with focal liver lesions because of its ability to distinguish hemangiomas from other masses (1-4). We present a case of malignant neuro-endocrine carcinoma of the stomach where a liver metastasis displayed the typical appearance of a hepatic hemangioma on ^{99m}Tc -RBC imaging.

CASE REPORT

A 36-yr-old Caucasian female presented in January 1989 with fatigue, upper abdominal pain, melena and a left upper quadrant abdominal mass. At laparotomy there was a 20 × 15-cm lesion originating from the posterior stomach wall. Histopathology revealed this to be a neuro-endocrine carcinoma of low-grade histologic appearance with involvement of an adjacent lymph node. The liver was free of disease as assessed by direct palpation and a computed tomography (CT) scan. The tumor was composed of fairly uniform elliptical cells, arranged in sheets or clusters, with round or elliptical nuclei. There was scanty fibrous stroma and little evidence of necrosis or mitoses. Tumor cells stained positively for neurone-specific enolase and negatively for actin and desmin. Electron microscopic examination showed the presence

of cytoplasmic neuro-endocrine type dense core secretory granules.

The patient remained clinically well with normal liver function tests. In February 1991, ultrasound showed a solitary 2-cm echogenic mass high in the right lobe of liver. Accordingly, scintigraphy was performed following injection of 886 MBq of ^{99m}Tc -RBCs using a modified in vivo labeling technique. Two million count planar views were acquired immediately after the flow phase and 2 hr later. Single-photon emission computed tomography (SPECT) was then performed using a circular orbit, with 64 stops at 40 sec per stop; data were acquired into a 64 × 64 matrix study using a Siemens Orbiter gamma camera with a high-resolution collimator. Filtered backprojection was undertaken with uniformity and center of rotation correction, and one-pixel thick (6.6 mm) images were presented in transaxial, sagittal and coronal planes on hard copy and computer screen display.

The ^{99m}Tc -RBC scan demonstrated perfusion to blood-pool mismatch and an increase in blood-pool activity from the early to the late images at a site corresponding to the sonographically demonstrated lesion (Fig. 1). SPECT images better demonstrated the site and degree of delayed blood pooling (Fig. 2). Because these features were regarded as typical of a hemangioma, the patient was managed conservatively and a biopsy was not performed. However, subsequent CT scanning showed that there was progressive lesion enlargement and smaller satellite foci became visible. Preoperative angiography showed relative lesion hypovascularity. A resection of the right lobe of the liver was performed in April 1992. Several metastases were found (Fig. 3), measuring up to 8 cm diameter with similar histopathology to the primary gastric neuro-endocrine carcinoma. There was no evidence of hemangioma.

DISCUSSION

This patient with known metastatic neuro-endocrine carcinoma was investigated because of a focal liver lesion demonstrated on ultrasound. Technetium-99m-RBC scintigraphy revealed the typical appearance of a hepatic hemangioma (1-5) with perfusion to blood-pool mismatch and an increase in blood-pool activity from early to delayed images. The subsequent histopathological findings indicated, however, that this appearance was due to metastatic neuro-endocrine malignancy and not hemangioma.

There are only a few reported cases of "false-positive" ^{99m}Tc -RBC scans; perfusion to blood-pool mismatch has

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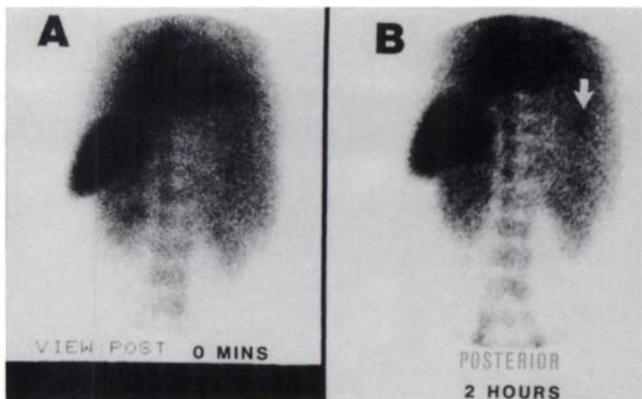


FIGURE 1. Posterior two million count planar views demonstrate normal blood-pool activity on the early image (A) and a small focus of marginally increased activity on the delayed image (B, arrow).

been demonstrated in a hepatic angiosarcoma (6) and in association with metastatic carcinoma of the colon (7). Review of the latter, however, reveals an unusual distribution of labeled red blood cells, with renal activity greatly exceeding cardiac blood pool. We believe that this biodistribution confounds accurate assessment and interpretation of this case.

Several cases of hepatomas with increased delayed blood pooling have also been reported (1,8,9). However, two of these were noted in patients with severe parenchymal liver disease where there was no normal hepatic blood-pool activity for comparison (1). In the other two reports (8,9), lesions with increased delayed blood pooling also had increased arterial flow. Thus, none of these four hepatomas had typical scintigraphic features of hemangioma. In a re-

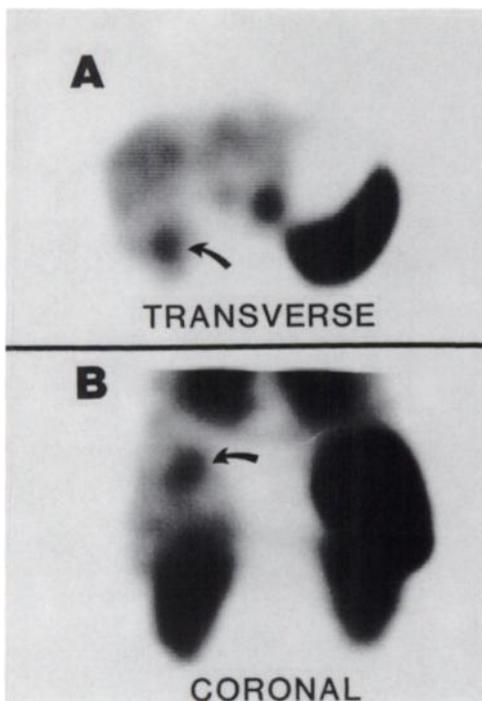


FIGURE 2. (A) Transverse and (B) coronal SPECT images reveal a rounded focus of increased blood pooling in the posterior portion of the right lobe of liver (arrows).

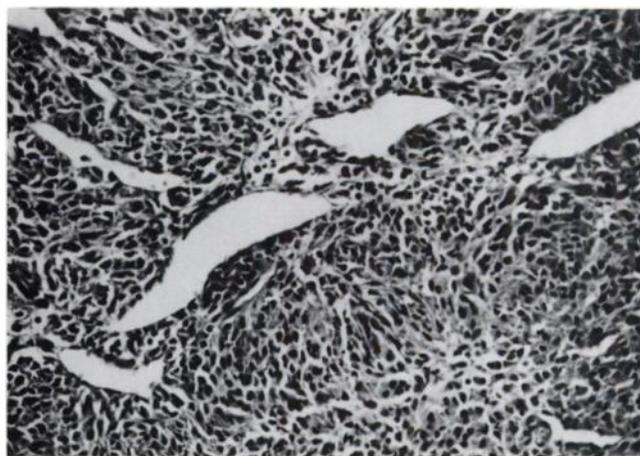


FIGURE 3. Microscopic examination of the liver metastases shows a histologically low-grade neuro-endocrine carcinoma with multiple small and medium sized thin walled vessels. Hematoxylin and eosin 384x.

cent series of 46 consecutive hepatomas, none displayed the delayed blood pooling characteristic of hemangiomas (10). Previous work from our institution supports this finding (3).

In the assessment of patients with focal liver lesions, a firm diagnosis of hemangioma is important because, in most cases, the need for further investigation or treatment is obviated. Technetium-99m-RBC scintigraphy has successfully filled this role, principally because of high sensitivity (for lesions larger than 1.5 cm) and a specificity approaching 100% (1-4,8,10,11).

Hemangiomas demonstrate increased blood-pool activity on delayed images because of their capacious vascular spaces. The tumor described in this report showed mild to moderate vascularity of the deposits in the stomach and lymph node, whereas the vascularity of the resected liver metastases was more prominent. However, this vascularity is considerably less than is usually seen in a hemangioma. Thus, we are unable to offer a plausible hypothesis for the ^{99m}Tc -RBC scintigraphic appearance in our patient.

In summary, we have described one of the few examples of a false-positive labeled ^{99m}Tc -RBC scan. This case serves as a reminder that cautious evaluation of focal liver lesions may be worthwhile even when ^{99m}Tc -RBC scintigraphy is typical of hemangioma.

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