Radioimmunoscintigraphy in the differential diagnosis of hepatic mass lesion

Rojana Sirisiriro, E. Edmund Kim, Donald A. Podoloff

Department of Nuclear Medicine, Division of Diagnostic Imaging, The University of Texas, M.D. Anderson Cancer Center, Houston, Texas, USA

Received 25 November 1994

Abstract. A patient with suspected recurrent cancer of the colon underwent a variety of imaging procedures for the differential diagnosis of a hepatic mass lesion. Computed tomography (CT) showed a low-density lesion in the left hepatic lobe, and the initial CT-guided biopsy of the liver mass was reported to demonstrate a benign lesion. Ultrasonography (US) showed a hypoechoic lesion, and technetium-99m red blood cell (RBC) scan failed to suggest a hemangioma. However, radioimmunoscintigraphy (RIS) using 99mTc-labeled anti-carcinoembryonic antigen (CEA) monoclonal antibody clearly demonstrated increased uptake of antibody in the liver lesion. Scheduled hepatic angiography was canceled and subsequent exploratory laparotomy confirmed liver metastasis. RIS appears most helpful in the diagnosis of hepatic metastasis in patients with colorectal cancer and a rising CEA level. CT, US, and 99mTc-RBC studies for the investigation of hepatic masses are briefly discussed.

Key words: Radioimmunoscintigraphy – Liver mass – Monoclonal antibody imaging – Metastatic colorectal carcinoma


Introduction

In the follow-up of patients with colorectal cancer, a rising carcinoembryonic antigen (CEA) level often signals a recurrence and calls for extensive screening studies to identify the site of recurrence [1]. These studies include computed tomography (CT) of the chest, abdomen, and pelvis; bone scan; and other studies that may address specific symptoms. However, some cases of benign or malignant hepatic masses present a typical appearance on CT and ultrasonography (US). Hepatic hemangioma is a common benign liver neoplasm which often creates such a problem. We present a colorectal cancer patient with a hepatic mass suggesting hepatic hemangioma on routine radiological examinations. However, the correct diagnosis was successfully achieved by radioimmunoscintigraphy (RIS) using technetium-99m anti-CEA monoclonal antibody.

Fig. 1. A CT of the liver showing a low-density mass lesion (arrow) in the left hepatic lobe. B Ultrasonography demonstrating a round hypoechoic mass (arrow) posterior enhancement in the left lobe of the liver.
Case report

A 44-year-old white male with a history of Dukes B1 cecal carcinoma operated on in 1989 had subsequent problems with anastomotic leakage and sepsis. However, he thereafter recovered completely and had been doing well until December 1991, when he developed an elevated CEA level of 10.5 ng/ml. CT scan showed a 2.5-cm liver lesion suspicious for metastatic disease, but CT-guided biopsy on 26 March 1992 was interpreted as indicating a benign lesion. The patient was referred to the M.D. Anderson Cancer Center for re-evaluation and further treatment in May 1992.

The patient's principal symptom was minimal fatigue. His Zubrod performance status was 0–1. He denied nausea, vomiting, fevers or chills. His bowel movements were regular with no bloody stool. His appetite was good and his weight, stable. On physical examination, there was no mass or organomegaly. The laboratory findings revealed a threefold increase in serum CEA to 35.1 ng/ml as compared with the previous value obtained 2 months previously.

CT scan of the abdomen and pelvis was performed as routine protocol after the patient had ingested three cups of 2% barium sulfate suspension. Intravenous contrast of 120 ml (300 mg/ml iodine) was injected at 2 ml/min for 60 s. CT scan was then started with 10-mm slice thickness continuously. The liver demonstrated a low-density lesion in the left lobe which was filled in somewhat on the post-contrast scan (Fig. 1A). There was no evidence of retrocrural, retroperitoneal, or pelvic lymphadenopathy. US of the liver showed a definite hypoechic 2.5-cm lesion with posterior enhancement (Fig. 1B); atypical hemangioma remained a diagnostic consideration.

Technetium red blood cell (RBC) liver scan was performed on the next day. The early perfusion and sequential delay planar images and single-photon emission tomography (SPET) of the liver demonstrated no area of increased activity suggestive of hemangioma. The patient was subsequently enrolled on an ongoing clinical protocol of RIS using 20 mCi of $^{99m}$Tc anti-CEA monoclonal antibody (Fab' fragment). The 2- and 5-h planar images did not show any significant abnormality in the liver. However, subsequent SPET (Fig. 2B) revealed a round area of homogeneously increased radioactivity in the left hepatic lobe. The scheduled hepatic angiography was canceled, and exploratory laparotomy and biopsy confirmed a 3x3 cm metastatic adenocarcinoma in the left lateral segment of the left hepatic lobe (Fig. 3).

The patient subsequently underwent six cycles of Taxotere therapy with eventual progression and more recently was treated with 5-FU and leucovorin. Despite the progressive hepatic disease as well as the development of a lytic bone metastasis to the posterior right rib, he has continued to feel well and to work daily.