

A false negative by planar scintigraphy liver hemangioma, diagnosed by technetium-99m-red blood cells and technetium-99m-sulfur colloid single photon emission tomography scan

Abstract

We present a 42-year-old patient who was examined in the Gastroenterology Department of Gaziantep University for chronic abdominal pain, nausea and vomiting. Ultrasonography showed a 4.7 cm solid hepatic mass on the right lateral side of the right lobe of the liver. The patient was then sent to the Nuclear Medicine Department of Gaziantep University for liver scan. After injecting autologous red blood cells labeled with 740 MBq of technetium-99m ($^{99m}\text{Tc-RBC}$), early and delayed anterior planar images of the liver showed no significant findings because of the right kidney shine through the liver. Two days later, after injecting again 740 MBq of $^{99m}\text{Tc-RBC}$, we performed a single photon emission tomography (SPET) scan but still this scan was nondiagnostic even in the delayed images of the liver. Three days later, after the iv injection of 185 MBq of technetium-99m-sulphur colloid ($^{99m}\text{Tc-SC}$), we observed in the delayed SPET images of the liver, a mismatch defect with decreased focal uptake of $^{99m}\text{Tc-SC}$ at 60 min while the uptake of $^{99m}\text{Tc-RBC}$ at the same area was normal or slightly increased. The patient was then operated due to bleeding in the abdominal cavity. A cavernous hemangioma was found, confirmed by histology. The absorbed dose from all three diagnostic scanning procedures was: 4 mSv. *In conclusion*, the mismatch of the SPET delayed images between the $^{99m}\text{Tc-RBC}$ and the $^{99m}\text{Tc-SC}$ scans indicated that this procedure was effective for the diagnosis of liver cavernous hemangioma located in this unusual position.

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Introduction

Hepatic hemangiomas are the most common benign tumors of the liver. In most cases they are asymptomatic and are detected accidentally [1]. Differential diagnosis should exclude other focal hepatic lesions. A follow-up of hepatic hemangiomas is required in order to avoid or to face possible complications like bleeding. Contrast-enhanced magnetic resonance imaging (MRI) is often useful, but there are some cases in which definitive diagnosis is not feasible due to the different content of the haemangiomas [2]. Spiral computed tomography (SCT) is of limited value because it may not differentiate a hepatic cavernous hemangioma from a hepatocellular carcinoma [3]. Ultra-sonography (US) is often difficult to diagnose the nature of a solid lesion, especially when the lesion is small and deeply located [4-7]. Single-photon emission tomography (SPET) is helpful when hepatic hemangiomas are located in depth, close to the kidney, to the inferior vena cava, to the main hepatic vessels, etc. In such cases, the radioactivity of the hemangioma shines through or close to the above organs and makes its identification difficult [8-9]. By using ^{99m}Tc labeled red blood cells ($^{99m}\text{Tc-RBC}$), hepatic hemangiomas may be missed if only planar imaging is used. In doubtful cases, even after the $^{99m}\text{Tc-RBC}$ SPET scan the technetium sulphur colloid ($^{99m}\text{Tc-SC}$) SPET study may support the diagnosis by showing the hemangiomas as a hypoactive "cold" area [10-11]. In this paper we present a case of a "false negative" liver hemangioma by $^{99m}\text{Tc-RBC}$ planar scintigraphy, while final diagnosis was made by the delayed SPET $^{99m}\text{Tc-RBC}$ and $^{99m}\text{Tc-SC}$ images.

Description of the case

A 42-year-old patient with chronic abdominal pain was examined by the Gastroenterology Department of Gaziantep University. Minimal hepatomegaly was detected by physical examination. On US (7.5 mHz, Siemens) a 4.7 cm solid hepatic mass was observed on the right lateral side of the right lobe of the liver (Fig. 1) and the patient was referred to the Nuclear Medicine

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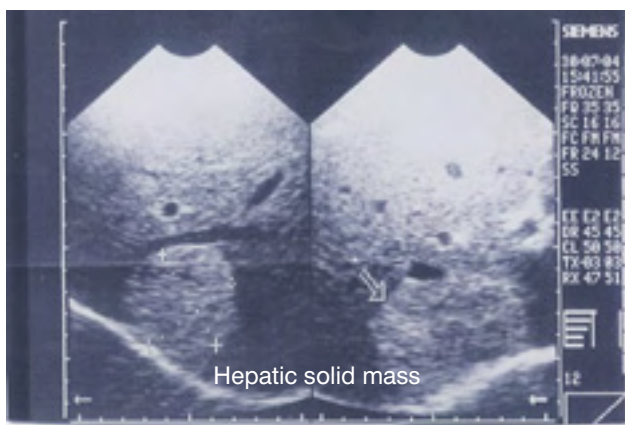


Figure 1. Ultrasonography: A solid hepatic mass was observed (arrow)

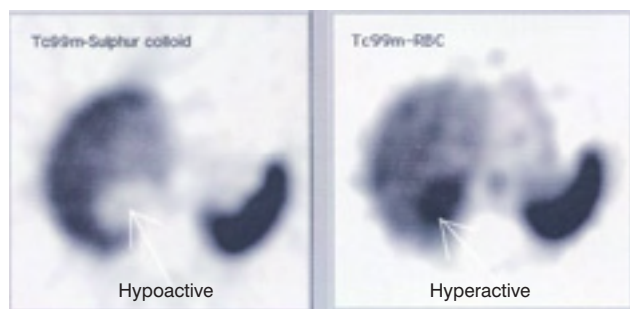


Figure 3. A mismatch defect. Focal uptake increased by using the ^{99m}Tc-RBC SPET and decreased by using the ^{99m}Tc-SC SPET scan was seen at the site of the hemangioma. Both scans were taken at 60 min post injection

Department of Gaziantep University for the differential diagnoses between a tumor, a cyst or a hemangioma. The patient gave his informed consent for the study in our department. After the intravenous (iv) injection of 740 MBq of ^{99m}Tc-RBC, in the early perfusion and blood pool and in the delayed, at 60 min, anterior planar images of the liver, there was no significant finding because of the right kidney shine through the liver (Fig. 2). Forty eight hours later, after the iv injection of 740 MBq ^{99m}Tc-RBC and also 3 days after that, after the iv injection of 185 MBq of ^{99m}Tc-SC, SPET images of the liver at 60 min were obtained (Fig. 3). For the above tests we used a Diacam gamma camera (Siemens, Germany). The patient was operated due to acute bleeding in the abdominal cavity and a cavernous hemangioma was found on the right lateral side of liver. Histology specimens confirmed the diagnosis. The absorbed dose from all three diagnostic scanning procedures was 4 mSv.

Discussion

The incidence of hepatic hemangiomas is from 2% to 7% of all liver lesions [5]. The hepatic hemangiomas are classified as capillary and cavernous. The capillary hemangiomas are not common, and may turn into cavernous hemangiomas. Typically, hemangiomas are blood filled and thus completely delineated during the blood pool imaging. However, incomplete filling is often seen in cavernous hemangiomas due to thrombosis, fibrosis, or bleeding. That's why cavernous hemangiomas are more difficult to see by only using ^{99m}Tc-RBC planar images.

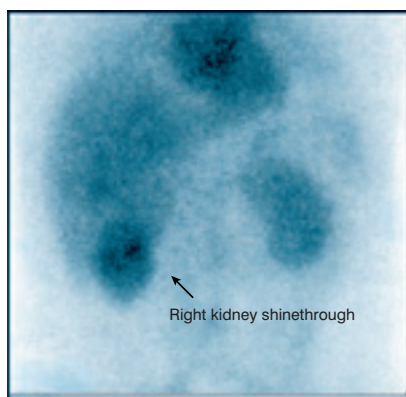


Figure 2. The ^{99m}Tc-RBC planar scintiscan at 60 min. The hemangioma was not identified because of the right kidney shine through the liver

Cavernous hemangiomas constitute the majority of hepatic hemangiomas. When hepatic hemangiomas are small or located at areas in the liver difficult to identify, the ^{99m}Tc-RBC delayed SPET images can identify them with remarkable sensitivity [4]. Birnbaum et al. (1990) have reported that due to reasons mentioned above, six of 18 hepatic hemangiomas examined by ^{99m}Tc-RBC and SPET were missed [2]. Also, Schillaci et al. (2004) by using ^{99m}Tc-RBC and SPET imaging and anatomical data (CT) confirmed the presence of four hepatic hemangiomas while two were considered as false positive [12].

This case is of interest because it shows that liver cavernous hemangioma may be negative in planar and doubtful in ^{99m}Tc-RBC, SPET studies, while it is well detected by applying both ^{99m}Tc-RBC and ^{99m}Tc-SC delayed, SPET images.

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