



# Massive Haemangioma Liver: Detection by Technetium-99m RBC Blood Pool Imaging

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## Abstract

Hemangiomas are benign liver tumors. They are mostly asymptomatic. We report a case of massive hemangioma located in the right lobe of liver and emphasise its detection by Tc-99m Red blood cell blood pool imaging.

## Key Words

Hemangioma, Tc-99m Red Blood Cell, Blood Pool Imaging, Tc-99m Sulphur Colloid Imaging.

## Introduction

Hemangiomas are the most common liver lesions, accounting for nearly 5-7% of all benign tumors (1). They are congenital vascular malformations at birth, which increases in size with the growth of the liver. Hemangiomas affect both sexes, occurring at all ages, but manifest clinical symptoms, if at all, usually in the 3rd and 5th decades of life (2). They are relatively more common in women (especially multiparous) than men, with a ratio of 4:1 to 6:1 (2). They increase in size during pregnancy, and after administration of oestrogens (3).

The real challenge in diagnosing most hemangiomas lies in its differentiation from other types of liver lesions, such as adenoma, focal nodular hyperplasia, and primary or metastatic tumors. Computed Axial Tomography (CAT) scan, Magnetic Resonance Imaging (MRI) and contrast angiography have been traditionally used for diagnosing, however blood pool imaging with Technetium 99m Red blood cell (Tc99m RBC) carries the highest specificity and is considered the diagnostic modality of choice for confirmation of hemangiomas of liver (4).

## Case Report

A 55 yr old married, post menopausal, non diabetic, normotensive, female presented to the Department of Gastroenterology, SKIMS, Srinagar, with chief complaints of pain and swelling in upper abdomen

for approximately 10 yrs. There was no history of jaundice, hematemesis or postprandial distension. She was referred to the Department of Nuclear Medicine, SKIMS, Srinagar, to rule out a possible hemangioma in the liver. Her general physical examination was unremarkable. Systemic examination revealed approximately 13x12cm firm, tender palpable mass in the upper abdomen probably originating from liver.

Her investigation profile revealed normal haemogram. Liver function test and kidney function tests were within normal limits. On abdominal ultrasonography (USG) (Fig 1) a huge lobulated mass measuring 12.4 x 11.3cms of mixed echogenicity arising from right lobe occupying 2/3 of liver was reported. Biliary system was normal. In Plain CT Scan (Fig 2) there was a hypodense lobulated mass involving left lobe and anterior part of right lobe. Mass showed irregular area of central necrosis (fibrotic scar tissue.) Contrast Enhanced CT Scan (Fig 3) obtained at early, middle and late stages showed internal fibrotic components which remain enhanced. The mass showed centripetal contrast filling becoming isodense with surrounding liver parenchyma. Differential diagnosis on CT Scan included haemangioma, focal nodular hyperplasia, fibrolamellar carcinoma. Prior to Tc99m RBC blood pool imaging Tc99m sulfur colloid liver scintigraphy (Fig 4) was done which revealed a grossly

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enlarged liver. Tracer concentration was non-uniform with a large space occupying lesion with ill defined margins of about 16x19cms. Subsequently Tc99m RBC blood pool imaging was done after autologous in vivo labelling of patient's RBC by prior intravenous injection of stannous pyrophosphate, followed 20 minutes later by intravenous injection of 20 mci of Tc99m pertechnetate. Five minutes later patient was imaged under a large field of view gamma camera fitted with a parallel hole leap collimator. Images were acquired on a matrix size of 256 x 256 for a total 500,000 counts in the anterior view. The images were also acquired in the posterior and right lateral views. Tc99m RBC blood pool liver scintigraphy revealed a large perfusion defect occupying most of the enlarged liver in early angiographic images (Fig 5). On the sequential delayed blood pool images there was gradual accumulation of tracer in the said lesion (Fig 6). Therefore, angiographic and blood pool images were consistent with hemangioma liver.



Fig 1. USG Showing lobulated mass of mixed echogenicity arising from right lobe of liver.



Fig 2. Plain CT Scan of liver showing a hypodense lobulated mass involving left lobe and anterior part of right lobe of liver with irregular area of central necrosis.



Fig.3. Contrast enhanced CT Scan shows centripetal contrast filling becoming isodense with the surrounding liver parenchyma.



Fig.4. Tc 99m Sulfur colloid liver scintigraphy showing a grossly enlarged liver with space occupying lesion of about 16x19cm.



Fig. 5. Tc99m RBC perfusion scintigraphy showing no blood

flow through a giant hemangioma occupying most of the enlarged liver.

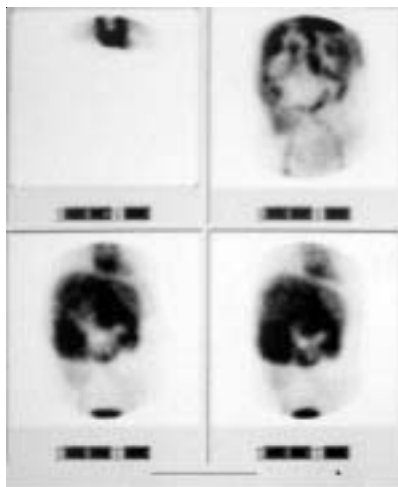


Fig. 6. Tc99m RBC delayed planar images at 2hrs. show complete filling of hemangioma.

### Discussion

Technetium 99m labelled RBCs are used to differentiate hemangiomas (vascular malformation) from other focal liver lesions (non vascular lesions) like adenoma, focal nodular hyperplasia, and fibrolamellar carcinoma.

Hemangiomas typically show a decreased perfusion followed by a delayed filling classically referred to as perfusion blood pool mismatch. Despite an enormous increase in blood pool, blood flow (ml/gm/min) is generally decreased relative to the surrounding normal liver tissue (5). Due to a reduction in blood flow, mixing of radiolabelled RBCs with the unlabelled RBCs within the hemangioma occurs slowly over several minutes or hours, depending upon the size of the hemangioma.

The sensitivity and accuracy of Tc-99m RBC imaging depends very much on the size of the hemangioma. For lesions greater than 2cm, the sensitivity and accuracy of planar Tc99m RBC perfusion and Single photon emission

computed tomography (SPECT) blood pool imaging varies from 89% to 92% and from 89% to 94% respectively (4). For similar size lesions, MRI sensitivity varies from 85% to 100%. For lesions less than 2cm in size, scintigraphy sensitivity is 58% and accuracy 60% and MRI carries a sensitivity of 83% and an accuracy of 84% (4). As MRI often fails to differentiate hemangioma from hypervascular neoplasm or focal nodular hyperplasia, blood pool imaging with SPECT is considered the method of choice for confirmation of hemangioma.(4,6).

### Conclusion

Tc99m RBC blood pool imaging is very sensitive and specific imaging modality for detecting hemangiomas. The specificity and sensitivity increases using SPECT specially in lesions less than 2cms. Therefore all patients suspected of having hemangioma liver must undergo a Tc99m RBC blood pool imaging.

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