

FOCAL IATROGENIC INCREASED RADIOCOLLOID UPTAKE ON LIVER SCAN

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Increased focal hepatic uptake of ^{99m}Tc -sulfur colloid was observed in a patient in whom the tracer dose was injected through a central venous catheter malpositioned in one of the hepatic vein branches. A followup scan was negative. It is postulated that the "hot-spot" was caused by flooding of a localized area of liver reticuloendothelial cells with radiocolloid or by adherence of the radiocolloid to clot or inflamed venous endothelium.

Lesions of any etiology viewed as areas of increased tracer concentration on the radiocolloid liver scan are very rare. Virtually all space-occupying lesions create negative defects or "cold" areas on the radiocolloid scan (1-5). The following is a case report of the production of an area of increased activity by the inadvertent injection of the tracer dose directly into the hepatic vein through a malpositioned central venous catheter.

CASE REPORT

A 53-year-old woman was admitted to the Duke University Medical Center two months before the request of the liver scan as a result of an auto accident in which she sustained multiple fractures and a spinal cord injury with flaccid paralysis below T6.

Her recovery had been generally satisfactory, although she occasionally spiked a low-grade fever which was thought to be secondary to a urinary tract infection. Twelve hours before the performance of the liver scan, the patient had an acute onset of sepsis and shock. A liver scan was requested to rule out the presence of a liver abscess. The patient's liver was not enlarged. Liver function studies were normal. Although the liver scan tracer dose is routinely administered directly into a peripheral vein at our institution, a satisfactory vein could not be identi-

fied in this acutely and chronically ill patient. It was decided to administer 2 mCi of ^{99m}Tc -sulfur colloid through the patient's central venous catheter which had been inserted 12 hr previously. The patient was receiving an isoprel drip through this catheter. The resulting scan image, obtained on a conventional 5-in. dual rectilinear scanner, revealed a 6-cm area of markedly increased tracer concentration in the central portion of the right lobe of the liver (Fig. 1). The remainder of the scan was normal. An artifact was suspected because of the density of tracer concentration. External contamination of the patient by tracer spillage was excluded. The central venous catheter was then injected with 15 ml of iodinated contrast media and serial radiographs were obtained.

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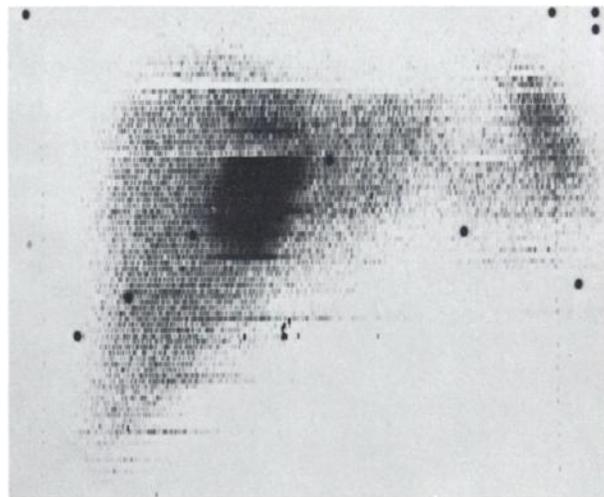


FIG. 1. Anterior projection, rectilinear liver scan revealing area of dense tracer concentration in central portion of right lobe of liver.

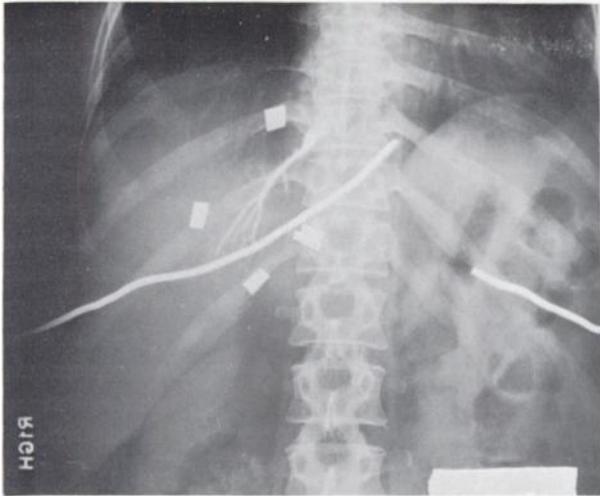


FIG. 2. Roentgenogram obtained after injection of iodinated contrast media through patient's central venous catheter. Branches of right hepatic vein are opacified and catheter is faintly visualized passing through vena cava. Rectangular lead markers are placed around area of markedly increased activity. Linear markers are placed along costal margins.

It was found that the catheter passed through the right basilic vein and the superior and inferior vena cava and terminated in one of the branches of the hepatic vein in the right lobe of the liver (Fig. 2). It was felt that the dense localized area of tracer concentration was the result of the injection of the tracer dose directly into a branch of the hepatic vein. A followup scan performed five months later revealed completely normal hepatic tracer uptake.

DISCUSSION

The mechanism of production of the area of increased tracer concentration within the liver is not established. The reflux of a high concentration of radiocolloid into hepatic sinusoids might cause increased uptake by the reticuloendothelial (Kupfer) cells in this area. However, it is also possible that the radiocolloid adhered to clot or to walls of hepatic

veins possibly inflamed by the presence of the catheter. Uptake of some particulate tracers, particularly radionuclide-labeled MAA, both by clot and by damaged or inflamed venous endothelium, has been well established (6-8). It is felt this latter explanation is more likely.

Most central venous catheters are introduced at bedside without fluoroscopic control and are frequently malpositioned. Of the 300 patients with central venous catheters reviewed by Langston (9) at Massachusetts General Hospital, 32% were incorrectly positioned, usually either in the right atrium or ventricle or in the internal jugular vein. Interestingly, none were found to be in the hepatic veins.

This case illustrates the importance of the use of peripheral veins and the avoidance of the central venous catheter as a route of administration of a scan tracer dose.

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