nical point of view, it would be more advantageous to image the patient with thallium first, because of the lower-energy emission of thallium (80-keV mercury x-rays) and because of the small amount of thallium uptake by thyroid. Once a thallium image is obtained, then the patient can be given the [Tc-99m]pertechnetate and imaged on the technetium window. If the technetium is given first, significant Compton scatter will occur at about 80 keV, and may thus obscure small adenomas that are thallium-avid.

GARY G. WINZELBERG
JERROLD D. HYDOVITZ
Shadyside Hospital
Pittsburgh, Pennsylvania

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Reply

We were interested to read Winzelberg's letter, and while we agree about the Tc-99m Compton interference, it must be remembered that Tl-201 likewise invades the technetium window with its gamma emission at 167 keV, although to a lesser extent than Tc does in the thallium window. We prefer to inject the Tc-99m first for purely practical reasons: in order to avoid prolonging the time that the patient is required to remain immobile with the neck extended, under the gamma camera, waiting for optimum Tc-99m uptake in the thyroid. Immobility is essential for the correct carrying out of the image-subtraction technique.

It is for this very reason that, at the end of the examination, while both radionuclides are present, we register an image on the Tc-99m peak, which is used for subtraction from the thallium in those patients whose movement during the examination could falsify the subtraction result. We must also point out that in our patients (over 60 cases now tested), all the thallium-positive parathyroid adenomas lying in a retrothyroid position appeared as photopenic technetium areas, thus reducing interference from the latter. In our opinion, the only limitation of this technique lies in the resolution of the equipment.

With regard to the use of other imaging techniques, we refer you to the account of our comparison with ecography (*1*). Since ecography equipment with higher resolution has become available only recently and, although we have no precise data, we feel that use of both these techniques improves diagnostic accuracy and that they complement each other.

G. FERLIN
N. BORSATO
M. CAMERANI
B. SAITTA
Hospital Castelfranco
Veneto, Italy

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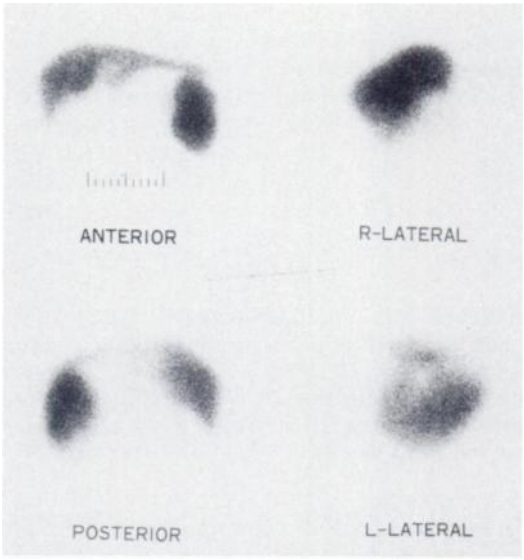

FIG. 1. Tc-99m phytate study shows splenomegaly and abnormal distribution of colloid. In portal area, radioactivity is markedly decreased.

Detection of an Extrahepatic Portal Shunt by Per-rectal Portal Scintigraphy with Tc-99m RBC

A 55-yr-old man was admitted to our hospital because of general fatigue. A dilated vein in the umbilical region and liver dysfunction had been pointed out to the patient 4 yr before at another hospital.

Examination of the skin revealed a vascular spider on the anterior chest wall and a large superficial vein in the umbilical area.

The results of blood chemistry were: platelets 82,000, bilirubin 1.8 mg/dl, alkaline phosphatase 132 milliunits/ml, gamma globulin 35.4%, and ICG (15 min) 38.7% (N <10%).

A Tc-99m phytate liver image performed 1 wk after admission showed a contracted liver with decreased uptake presumably in the portal area and enlarged spleen (Fig. 1). To investigate the portal circulation and liver blood flow, we performed per-rectal portal scintigraphy with red blood cells labeled in vivo with [Tc-99m]pertechnetate. After an enema, a catheter was introduced into the upper portion of the rectum. Ten milligrams of pyrophosphate (2 mg $SnCl\text{-}2H_2O$) was then injected intravenously. The pertechnetate, 15 mCi (555 MBq) in 3 ml, was infused through the catheter along with 25 cc of air, after which scintiphotos were obtained every 20 sec with a gamma camera. In the early phase (within 100 sec after infusion of pertechnetate), the portal vein was observed as a dark focus in the liver area, after which the radionuclide moved down into the lower abdomen (Fig. 2). Subsequently, contrast angiography of the inferior mesenteric artery was performed, and it revealed an enlarged and tortuous portal vein in the venous and portal phases; the contrast medium then flowed abnormally into the lower abdomen (Fig. 3).

Noninvasive per-rectal portal scintigraphy is a clinically useful method for analyzing the portal circulation in liver disease. Newman and Cohen (*1*) reported on the measurement of portal circulation time using the per-rectal method with ether. Recently, several authors (*2-6*), using radionuclides, have measured portal circulation time and portal shunt index in liver disease.

We have analyzed portal shunt and the detection of varices using per-rectal portal scintigraphy with Tc-99m RBCs. This method provides better visualization of the portal vein system, because in vivo labeling of RBCs with pertechnetate keeps a high percentage