

REPLY: We wish to thank Drs. Grünwald and Biersack for their interest in our work. We certainly agree with the necessity of rigorous quality control in the preparation of ^{99m}Tc -HMPAO. Due to the characteristics of the radiopharmaceutical, paper chromatography prior to injection is not practical. Their suggestion of simultaneous injections in two patients provides an elegant and definite proof of radiopharmaceutical quality. However, we do not believe that their technique would be applicable to the patients studied by our group. Our studies are usually performed as an urgent or semi-urgent procedure in the intensive care unit and it is doubtful that patients with neurologic disorders who would serve as controls would be available at the exact same time. We prefer to rely on the radionuclide angiogram of the head performed at the time of injection to quality assure technique. This part of the study is not affected by radiopharmaceutical impurities. When there is no ^{99m}Tc -HMPAO in the brain, one should always review the radionuclide angiogram before confirming the diagnosis of brain death. Chromatography is used to verify the quality of the product.

Our experience with ^{99m}Tc -HMPAO in all applications includes quality assurance of about 2,000 vials. We find the preparation of the product to be reliable and reproducible, provided that there is adherence to protocols. We have never had to repeat a study for reasons of radiopharmaceutical quality deficiency.

N.R. Laurin
A.A. Driedger
Victoria Hospital
London, Ontario, Canada

REPLY: We read with interest the letter presented by Grünwald and Biersack. In fact, their procedure seems to be an elegant in vivo quality control method for the radiochemical purity of ^{99m}Tc -HMPAO. Nevertheless, there are some misunderstandings.

From an ethical point of view, the diagnosis of brain death should be independent from any other clinical requirement, such as patients with Alzheimer's disease. Furthermore, the in vivo quality control procedures recommended by us can only be regarded as additional controls. In our opinion, the in vitro methods, which can be easily performed within a few minutes, should be the basis of ^{99m}Tc -HMPAO quality control, but not the subject of any discussions.

W. Brandau
O. Schober
Westfälische Wilhelms-Universität
Münster, Germany

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SELF-STUDY TEST

Gastrointestinal Nuclear Medicine

ANSWERS

leak, since images obtained within the first hour may appear completely normal. In patients with biliary-enteric anastomotic bypasses, cholescintigraphy is not only useful in determining the presence of a bile leak, but is superior to other methods (upper gastrointestinal series, T-tube cholangiograms) in determining the preferential route of biliary drainage.

References

1. Rosenthal L, Fonseca C, Arzoumanian A, Hernandez M, Greenberg D. ^{99m}Tc -IDA hepatobiliary imaging following upper abdominal surgery. *Radiology* 1979;130:735-739.
2. Weissmann HS, Chun KJ, Frank J, Koenigsberg M, Milstein DM, Freeman LM. Demonstration of traumatic bile leakage with cholescintigraphy and ultrasonography. *AJR* 1979;133:843-847.
3. Zeman RK, Lee CH, Stahl R, et al. Strategy for the use of biliary scintigraphy in non-traumatic biliary trauma. *Radiology* 1984;151:771-777.

ITEM 3: Sphincter of Oddi Dyskinesia

ANSWER: D

This patient's images (Figs. 3 and 4) demonstrate the typical cholescintigraphic changes of sphincter of Oddi dyskinesia. There is a delay in biliary-to-bowel transit, a normal maximal gallbladder ejection fraction response to cholecystokinin (CCK), and a paradoxical response (dilated common duct sign) of the sphincter of Oddi, itself, to CCK. In addition, administration of CCK induced the patient's typical pain. The patient does not have duodeno-gastric reflux demonstrated so the syndrome of alkaline reflux gastritis is unlikely to explain her symptoms. Since both her serum and urinary amylase are normal, she is not likely to have pancreatitis. Chronic acalculous cholecystitis and biliary infundibular cervicocystic dyskinesia (a synonym for cystic duct syndrome) are not likely diagnoses, because her maximal gallbladder ejection fraction

response to CCK is normal (i.e., > 35%).

[Test Figures 3 and 4 reprinted with permission from DeRidder P, Fink-Bennett DM. Dilated common duct sign. *Clin Nucl Med* 1984;9:263.]

Reference

1. DeRidder P, Fink-Bennett D. Dilated common duct sign. A potential indicator of sphincter of Oddi dyskinesia. *Clin Nucl Med* 1984;9:262-263.

ITEM 4: CCK Cholescintigraphy in Chronic Acalculous Cholecystitis

ANSWER: B

In Figure 5A, there is activity seen in the left upper quadrant, but this is clearly in loops of small bowel and at no time before or after CCK administration does activity appear to fill the stomach. No significant emptying of the gallbladder is seen following CCK injection. The peak gallbladder ejection fraction at 20 minutes is 8% (Fig. 5B).

The finding in this study of a subnormal peak gallbladder ejection fraction response to CCK in a patient with recurrent right upper quadrant pain and a normal biliary sonogram makes chronic acalculous cholecystitis the most likely diagnosis. Acute cholecystitis is not likely since the gallbladder is well visualized by 60 minutes. Sphincter of Oddi dyskinesia is not a likely diagnosis because the CCK-cholescintigram demonstrates neither a delay in biliary-to-bowel transit nor a paradoxical response of the sphincter of Oddi to CCK.

Reference

1. Fink-Bennett D, DeRidder P, Kolozsi W, Gordon R, Rapp J. Cholecystokinin cholescintigraphic findings in the cystic duct syndrome. *J Nucl Med* 1985;26:1123-1128.

Note: For further in-depth information, please refer to the syllabus pages included at the beginning of *Nuclear Medicine Self-Study Program I: Part I*.