accuracy for excluding or demonstrating the presence and location of an abdominal or pelvic abscess by ultrasound is 96%. Unlike the gallium examination, the results of ultrasound examination are immediately available to the surgeon, and an abscess cavity can frequently be drained before the diagnosis could have been made with gallium. Nevertheless, in our experience, the combination of gallium and ultrasound examination provides the highest accuracy.

In conclusion, it appears that our experience with the grey-scale ultrasound technique and the hepatobiliary system has led us to conclusions rather different from those of Dr. Sanders' about its clinical use in the diagnosis and management of patients at this institution. We believe that our experience is more characteristic of the potential of the method than that indicated by Dr. Sanders.

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Reply

We are glad that Drs. Taylor and Rosenfeld have commented on our recent article in the *Journal of Nuclear Medicine* because it gives us an opportunity to emphasize the importance of technique.

Performance of a diagnostic ultrasound examination requires considerably greater technical skill—and possibly more interpretive skill—than a comparable nuclear medicine examination. Although the two techniques give results of roughly comparable diagnostic accuracy, the radioactive approach, requiring less skill, is therefore preferred.

Standards of technical skill and interpretation for diagnostic ultrasound vary throughout the country, and in our article we attempted to give a consensus of the feelings at the better centers in the U.S.A. of the value of diagnostic ultrasound in abdominal disease. In several areas, the claims made by the Yale ultrasound group differ from those reported from other major centers. Although the grosser examples of diffuse liver disease can be diagnosed by a high-quality sonographer, in our view a difficult and subjective judgment on the internal sonographic texture of the liver is required. Borderline cases are hard to call, and time-gain compensation and output power variations may make a dense echo pattern invalid. Since in a scintigram the spleen shows increased uptake in early diffuse liver disease, we believe early detection is simpler by radionuclide techniques.

With regard to focal liver disease, it is inevitable that some peripheral liver lesions will be missed by sonography. In those patients in whom the liver is high in the abdomen or surrounded by ribs, some parts of the liver are inaccessible to current ultrasonic scanning techniques. We therefore persist in our belief that the liver scan is a more accurate method of detecting peripheral liver lesions.

However, several centers now report slightly greater accuracy for ultrasound in the overall detection of focal liver lesions. We now feel that all individuals suspected of having focal liver disease should have both a scintigram and an ultrasound examination, since each can detect lesions missed by the other. The scintigram should precede the ultrasonic examination so that defects found on the liver image can be characterized by the ultrasound examination. In our experience, liver abscesses may be surrounded by a zone of increased or decreased echoes.

It is over a year since we completed our manuscript for the *Journal of Nuclear Medicine*, and since this is a rapidly moving field, some of our conclusions have become outdated. We now agree with Drs. Taylor and Rosenfeld that ultrasound is highly accurate in the detection of obstruction of the common bile duct, and have ourselves achieved similar results: a 95% accuracy rate. It remains true, however, that a decision as to whether the bile ducts are obstructed is dependent on actual distention of the ducts. Therefore, obstruction that is recent in origin and has not yet caused duct dilatation may be difficult or impossible to detect by ultrasound.

When an abscess is intravisceral, i.e., within the spleen, liver, etc., it is easily detected by ultrasound. More difficulty is encountered with abscesses in the mesentery, where gas, barium, bandages, incisions, and ribs may all render ultrasound useless, and loops of fluid-filled bowel may be confused with an abscess (*1*). In our view, gallium is the preferred first screening technique in fever of unknown origin if there are no localizing signs and the patient's condition is such that a decision can be deferred for 48 to 72 hr. The sonogram is used to look at areas of suspicion found with gallium. An additional value of the gallium scan is that it will detect extra-abdominal inflammatory foci.

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Unbinding of Tc-99m by Iodinated Antiseptics

All of the radiopharmaceutical kits used in our institution are prepared "in house" by our nuclear pharmacist, using the same formulation as two neighboring hospitals. These two others have never had any problems of poor labeling with our common procedure. We have had numerous sporadic occurrences of excessive free technetium activity with our Tc-99m-labeled sulfur colloid.