rick (*1*). Since then 61 new cases have been reported and we have in preparation another case.

All the cases reported have been in females (*2*) with no familial tendency. Symptoms first appear at any time during reproductive years and the disease is marked by breathlessness of increasing severity, usually ending in death from respiratory failure. Pneumothorax and chylous effusion are common, and there is a hemorrhagic tendency that is confined to the lung.

The primary pathologic change is shown to be in the lymph vessels of the abdomen, mediastinum, and lung, and in lymph nodes that are infiltrated by smooth-muscle cells, with blockage of the channels, dilatation of the draining lymph vessels, and leakage, giving rise to the chylothorax, chlyous ascites (*3*), and chyluria (*4*). The pathologic abnormalities present in the lung, which is the major organ involved, were proliferation of the smooth muscle associated with lymphatic vessels surrounding the acini of the lungs, causing a valve-like narrowing at the junction of the respiratory bronchioles with the alveolar ducts. This results in the development of emphysema-like dilatation of the acini and marked air-trapping. No significant pulmonary fibrosis was noted.

The main problems still to be clarified in this condition are the exact abnormalities in pulmonary function—especially compliance, possible endocrine abnormalities, and also the possible relationship to tuberous sclerosis (*5*), raised by some authors because of the high incidence of renal angiomyolipomas in these cases.

If my impression that this case is one of lymphangioleiomyomatosis is correct, the diagnosis can be established by means of a lung biopsy. I suggest that investigation of this woman's pulmonary function and compliance, using the body plethysmograph to assess lung volumes, would further clarify this condition, as would endocrine and chromosomal studies.

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Reply

The patient described in the Case Report, "Diagnosis of Chylothorax with ^{131}I-Triolein," began to have slowly progressive dyspnea after we had prepared the Case Report. Chylothorax did not recur. Increasing pulmonary insufficiency terminated in death due to respiratory failure. At postmortem examination, the normal pulmonary parenchymal architecture was completely replaced by diffuse honeycombing with many fibrous strands producing a sponge-like appearance. Normal pulmonary elasticity was absent. There was no evidence of chylothorax or chylous ascites.

Microscopic examination of the lymphatic system showed lymphangioleiomyomatosis involving peribronchial and mediastinal periaortic lymph nodes, as well as abdominal periaortic and pelvic lymph nodes.

We thank Dr. Demajo for his comments.

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Nuclear Medicine vs Ultrasound

Although appreciating the value of the Sanders and Sanders article (*1*) as an attempt to produce an overview of the relative merits of ultrasound and nuclear medicine, we wish to point out that some of their statements and conclusions reached about the value of ultrasound differ significantly from our experience and the use of ultrasound as practiced at the Yale–New Haven Hospital. For comparison, I would like to summarize our experience in grey-scale techniques of the liver since 1973.

We disagree that only the more florid examples of diffuse liver disease can be diagnosed and that the modality is less sensitive than the Tc-99m sulfur colloid scan. Moreover, we have not found that "nuclear medicine techniques are more sensitive for detecting lesions close to the surface." In a series of articles published over the past 4 yr (*2–6*), we have shown that grey-scale ultrasonic techniques are more specific and sensitive in the demonstration of both diffuse and focal disease. We do agree, however, that radionuclide scans of the liver provide a valuable screening procedure and that ultrasound is a complementary modality (*6*). The statement that "the major role of ultrasound should be that of determining whether a lesion found by radionuclide imaging is solid or cystic," pertains to the bistable techniques and denies the improvements in differential diagnosis due to the improved grey-scale instrumentation. For example, in purely cystic lesions, we are able to differentiate between simple cysts, abscesses, and necrotic metastases in liver with an accuracy approaching 90%.

In our experience with liver abscesses, we most commonly see the surrounding liver tissue showing an inflammatory reaction as indicated by a zone of high-level echoes. The long-standing abscesses show a thick rim of such echoes, which is consistent with a thick fibrous capusle. This is contrary to Dr. Sanders' statement that abscesses may be surrounded by "a zone of decreased echoes, compared with the rest of the liver."

Dr. Sanders' experience with ultrasound in the biliary system is again markedly different from our own. He states that "large intrahepatic biliary radicles can be seen if the ducts are sufficiently dilated; and in practice, this implies a bilirubin value of 6–8 mg per 100 ml." We have now followed up 220 patients with jaundice, many of whom had a serum bilirubin of 1.5 mg per 100 ml, and yet dilated ducts were clearly visible. In personal communications we have found a number of other groups with similar results.

Finally, our recent experience with gallium-67 and ultrasound for the detection of abdominal and pelvic abscesses is leading us to a conclusion different from Dr. Sanders' statement that "generally ultrasonic examination is not as good a screening technique as the gallium study." Our overall

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.