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Discussion

DR. J. SHELTON HORSLEY, III (Richmond, Virginia): It is a pleasure to have had the opportunity to review this manuscript.

At the Medical College of Virginia in the Division of Surgical Oncology, we have been using ultrasound of the liver as a routine part of our intraoperative evaluation of patients with primary hepatomas and metastatic lesions from the colon and rectum that are confined to an area of the liver that is resectable. It adds about 20–30 minutes to the operative procedure. Our radiologist comes into the operating room. The surgeon performs the ultrasound technique. We have been able to do this with the usual upper abdominal bilateral subcostal incision with an extension up to the xiphoid process. We have felt good about our ability to accurately ultrasound the entire liver.

We have found lesions that were not clinically evident, that led us to decide that the patient was not resectable. In addition, early in our experience we had a patient with a very extensive metastatic colon cancer involving both the medial and lateral segments of the left lobe with some extension into the anterior segment of the right lobe with questionable involvement of the right hepatic vein. With the ultrasound, we could clearly delineate the right hepatic vein to be free from the tumor. We proceeded with a left hepatic trisegmentectomy and, fortunately, the patient is doing well clinically free of disease 18 months later. The delineation of the proximity of the hepatic veins to these tumor masses is another additional benefit of intraoperative ultrasound.

Sitting here in the audience listening to this presentation, Scott Jones turned to me and said, "We should be using ultrasound to scan the liver when we do our primary resections." That is a good suggestion!

I believe it is a helpful technique and I appreciate Dr. Rosato bringing it to the attention of the membership. I would like to ask Dr. Rosato if he has been able to delineate the situation that was alluded to in the previous paper, the so-called benign lesion from the malignant lesion by intraoperative ultrasound?

DR. SHUIN-LIN (Closing discussion): In regard to Dr. Horsley, I appreciate your comments. We always do have radiologists present in the operating room to help us interpret the ultrasound images, which are not as easy for surgeons as the CT scan or other x-ray images to interpret.

Secondly, the anatomic structures are very well outlined by the intraoperative ultrasound, including the hepatic veins. As a matter of fact, last week we had a patient who was suspected to have a lesion involving the hepatic vein. By the intraoperative ultrasound we were able to define the clearance of the hepatic vein, and subsequently, to avoid injury to the hepatic vein and other major vessels and reduce the blood loss.

Third, right now some colorectal surgeons in our institution are using the technique to screen the liver routinely during colon resection to detect if any small lesions are present.

And, finally, to answer Dr. Horsley's question: "Is the intraoperative ultrasound able to define the lesion as malignant or benign?" The answer is no. The intraoperative ultrasound is unable to differentiate the malignant from the benign lesion. If we have a questionable lesion, we will routinely do frozen section biopsy of the lesion to define the pathology.