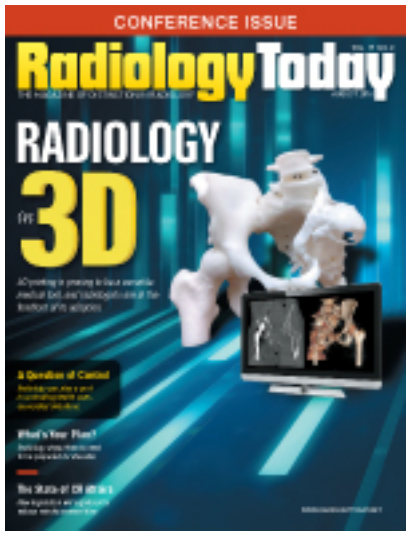
Ultrasound News: Shear Wave Elastography — Moving Toward a New Clinical Standard in Radiology? - Radiology Today Magazine

August 2016



Ultrasound News: Shear Wave Elastography — Moving Toward a New Clinical Standard in Radiology?

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Radiology Today
Vol. 17 No. 8 P. 5

Shear wave elastography (SWE), an ultrasound imaging technique that can produce 2D and 3D images and quantified measurements of tissue stiffness noninvasively, is not yet the clinical standard for assessing liver fibrosis. Two factors, one from within the medical-scientific community and one from without, are poised to change that.

A New "Global Epidemic"

One incentive for clinicians to adopt SWE is that the need for diagnostic information about the liver is sharply on the rise. Nonalcoholic fatty liver disease (NAFLD), especially in Western nations, has been termed a "global epidemic," and is "set to become the predominant cause of chronic liver disease in many parts of the world."1 NAFLD already affects up to one-quarter of all Americans.2 SWE is equipped to evaluate NAFLD's resultant fibrosis more quickly and with less discomfort than traditional options.

To correctly classify NAFLD among affected individuals, as well as to stage and monitor more serious liver diseases, biopsies are traditionally performed. Biopsies, however, are subject to distinct limitations—samples

are limited solely to the tiny region that is removed—and serious risks, such as pain, potentially lengthy hospital stays and, in rare instances, excessive bleeding and major complications, none of which are present in ultrasound scans. The United Kingdom's National Health Service Technology Adoption Centre (NTAC) has estimated that replacing liver biopsies with ultrasound scans using SWE for the evaluation of patients suffering from liver disease would save the National Health Service in England and Wales roughly £14 million (USD $20 million).3

While the cost savings estimated by the NTAC should indeed influence clinical decision-making, SWE's noninvasive approach and time savings for the patients should be seen as equally important. With SWE in particular, the scan can be performed quickly and is comfortable for the patient. Some ultrasound systems, such as the Aixplorer from SuperSonic Imagine, Toshiba's Aplio and i-series, and some GE and Siemens ultrasound systems, among others, are equipped with SWE technology and can produce a color-coded map of tissue stiffness, which can also be overlaid on B-mode images for reference.

Such rapid scans have not only been shown to be accurate but they can also overcome the sampling limitations of biopsy and optimize its indications. If clinicians can rapidly survey and quantify an entire region of interest, they can zero in on the stiffest area of the region, reducing the need for obtaining second or third biopsies and eliminating follow-ups necessitated by sampling variability.

New Guidelines Available

The World Federation for Ultrasound in Medicine and Biology recently published Guidelines and Recommendations for Clinical Use of Ultrasound Elastography, Part 3, which focuses on the use of elastography to assess and manage liver diseases.4 These guidelines offer practical advice to clinicians, incorporating the authors' personal experience with the technologies discussed, as well as an overview of the reproducibility and study results. The document has a clinical perspective and it is hoped that it will give concrete, actionable advice to clinicians

grappling with a growing number of liver disease patients.

In addition, the Society of Radiologists in Ultrasound convened a panel of specialists to arrive at a consensus regarding the use of elastography in assessment of liver fibrosis in chronic liver disease. The panel analyzed current literature and common practice strategies and developed a suggested approach to the noninvasive assessment of diffuse liver fibrosis.

With respect to clinical practice, the panel concluded that the literature indicates that elastography techniques can differentiate patients with no or minimal (F0 and F1) fibrosis from those with severe fibrosis or cirrhosis (F3 and F4) with no need for biopsy unless there are other factors that need to be considered. In addition, they noted that all of the biological confounders, such as acute inflammation and the effect of a meal, tend to increase liver stiffness so the low values can be relied on. A middle group between these cut-off values requires additional data to determine follow-up.5

Evaluating Liver Stiffness

Over the past decade, several studies have demonstrated the benefits of real-time SWE for evaluating liver stiffness quantitatively, noninvasively, and accurately.6

SWE has been shown to yield accurate diagnostic measurement of liver fibrosis in a range of patients, from hepatitis C patients to those with ascites.7

One study found that the moving images obtained with this method accurately measured incidentally discovered liver lesions in patients with no history of liver disease.8

Another study found that SWE aided the detection of portal hypertension, a dangerous complication of cirrhosis.9

SWE is unaffected by the presence of ascites, which is a common complication of diffuse liver diseases.

Obstacles to Adoption

In the case of SWE, physicians may not have yet embraced the technique because they aren't aware of clinical scenarios where the technology indisputably increases diagnostic confidence. Facing a formidable rise in liver disease globally, but armed with new guidelines steering them towards faster, safer, less costly techniques that are also less painful for the patient, clinicians are likely to adopt SWE more widely.

After evaluation of liver stiffness with SWE becomes standard, those same clinicians are likely to investigate what researchers have already been finding: that the real-time, noninvasive imaging of other pathologies, such as in the kidney, prostate, and breast, will soon become indispensable as well.

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