Larger Study in Design

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Rheumatologists Learning US; Studies Show Diagnostic Usefulness

By M. Alexander Otto

US is useful to look at superficial structures, including muscles, tendons, ligaments, nerves, and blood vessels, said Dr. Mihaela Taylor of the division of rheumatology at UCLA, who collaborated with Dr. Motamedi on the presentation and workshop. It has higher soft-tissue resolution than does CT, Dr. Motamedi noted, although CT remains the standard for visualizing bone. US also can visualize superficial joint structures, and pick up bone erosions, Baker's cysts, fluid behind the patella, and even meniscal tears, if they are in the periphery of the meniscus, according to Dr. Motamedi.

Joints can also be seen in motion, meaning that US can help guide joint injections. "Ultrasound can't replace all that MRI [or CT] does, but it helps diagnose a lot of pathologies," Dr. Motamedi said.

Painless, noninvasive, relatively inexpensive, and free of radiation, it's also readily accepted by patients, Dr. Taylor said. Although magnetic resonance imaging remains the standard for visualizing deep anatomical structures, such as those of the knee, US is a valid alternative, especially for claustrophobic patients and those with pacemakers or other MRI contraindications. The general concept of US is easy to grasp. Sound waves emitted from a probe are bounced off body structures. Their reflections back to the probe indicate the structure's density. Bone reflects as white. Less-dense structures—those that contain more water—reflect as darker shades.

What's closest to the probe (usually skin) appears at the top of the screen. What's farther away appears lower down.

Anything below bone cortex is artifact. Ultrasound does not penetrate bone, Dr. Taylor said. Further sound-wave frequencies mean better resolution but less penetration; lower frequencies penetrate more deeply but give less resolution.

It's helpful to keep the probe in motion and tilt it from side to side to help differentiate structures, Dr. Taylor said.

Information about the American College of Rheumatology's US course is at www.rheumatology.org/education/clinical-sympo/ usa.asp.

Disclosures: Dr. Motamedi and Dr. Taylor each reported having no relevant financial conflicts.

Ultrasound's Usefulness Depends on Confirming Pattern of Early Changes

The study provides an indication that systematic evaluation of joints by ultrasound in patients presenting with very early undifferentiated arthritis may be a useful predictor of future diagnosis of rheumatoid arthritis. Ultrasound may detect involvement in more joints than are detected on clinical examination, and it may detect early erosions with greater sensitivity than conventional radiography. Especially in patients who do not have anti-citrullinated peptide antibodies, the presence of polyclonal and erosions on ultrasound appears to herald an eventual diagnosis of RA even when patients who do not appear to have polyarthritis on clinical examination.

This approach has promise, but examination of 50 joints is not likely to be efficiently done on reimbursable routine clinical practice. Further work may yield a profile of specific target joints that may have highest sensitivity and predictability for eventual development of RA when examined by ultrasound, or whether all joints would need to be evaluated. Studies of conventional radiography have failed to show consistent pattern or joints that could be consistently excluded. Magnetic resonance imaging studies of the hands have suggested that involvement of specific joints in the wrists, for example, might best discriminate the eventual diagnosis of RA early in the disease course. Such studies are needed to better define the role of ultrasound in assessment of patients with early undifferentiated inflammatory arthritis and the role of diagnostic ultrasonography in routine clinical practice.

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CT Makers Unveil New Safety Feature Proposal

Manufacurers of computed tomography machines have agreed to a standardized set of features that will help ensure that patients receive the appropriate radiation dose when being scanned.

In a conference call with reporters, Dave Fisher, executive director of the Medical Imaging & Technology Alliance (MITA), said that the industry had been working for years to make CT machines safer and that the timing of the announcement was not related to either the Food and Drug Administration's recent heightened interest in radiation or a recent House Energy & Commerce Health Subcommittee hearing. The five CT manufacturers—General Electric, Siemens, Philips, Toshiba, and Hitachi—all agreed to participate in the MTA "dose check" initiative, said Mr. Fisher.

There are three new main safety features. First, machine operators will receive an on-screen alert—possibly in the form of a pop-up window—when they exceed recommended dose levels. The alert is akin to a yellow caution flag, said Mr. Fisher. The recommended dose—the reference dose—will be determined by clinicians at hospitals and imaging centers, not manufacturers, he said.

The second safeguard will also likely come as a pop-up window: a warning if the dose reaches hazardous levels that could result in burns, hair loss, or other injuries. This "red flag" can be configured to prevent the scan, Mr. Fisher said.

Clinicians, not manufacturers, will have the power to determine whether they want to block a scan or have some other series of instructions or steps to prevent harm, he said.

Manufacturers have agreed to a standardized method of image storage so that they can be incorporated into a registry—if such a registry is developed, as the Obama admin-