



JOHN D. CARTER, M.D.

ASK THE EXPERT

Advanced Imaging in Gout

Medical imaging is a very important tool in the diagnosis and management of gout.

Together with the documented evidence of monosodium urate crystals in synovial fluid, the presence of “typical” radiographic features helps establish the diagnosis and gauge disease progression. These features include soft-tissue swelling during acute attacks, and bony changes, including tophi, punched-out lesions, and overgrowth of the periosteum in chronic gout.

Radiographic evidence of gouty tophi and bony erosions are also accepted indications for prophylactic urate-lowering drugs in gout and hyperuricemia patients.

Although there is substantial literature describing the plain radiographic changes that are seen in patients with chronic gout, “far less is known about the changes seen on other

imaging modalities, such as MRI, CT, or ultrasound,” according to Dr. John D. Carter of the University of South Florida in Tampa.

“Such advanced imaging modalities potentially offer the advantage of earlier detection of erosive changes, and they might better detect both intraosseous and soft-tissue gouty tophi.

Additionally, advanced imaging might also detect other important features of gout, for example synovial pannus, bone marrow edema, or soft-tissue edema, which could be signs of acute attacks or, more importantly, smoldering disease activity in patients without clinically apparent gout that could lead to radiographic progression in the absence of acute attacks.”

In this month’s column, Dr. Carter, lead investigator in a recently completed pilot study comparing MRI and ultrasound with standard radiography in gout patients, discusses the pros and cons of the various imaging technologies available and how their use might improve gout management.

RHEUMATOLOGY NEWS: How do ultrasound, CT, and MRI compare with standard radiography in terms of diagnosis and treatment management in gout?

Dr. Carter: Surprisingly, there is a paucity of data in the literature regarding the bony changes of gout on MRI, CT, or ultrasound. Regarding MRI specifically, the appearance of gouty tophi has been described in a limited number of patients. These tophi typically have low to intermediate signal intensity on T1 and variable intensity on T2-weighted images with a variable enhancement pattern depending on the amount of calcification. Gadolinium enhancement aids in the detection of erosions and tophi.

As is the case with MRI, there are scarce data in the literature regarding the ultrasound findings in gout. The available data

primarily assess the ultrasound appearance of soft-tissue tophi. CT appears to be a useful modality for detecting bony erosions and tophi, although there are scarce controlled data assessing it in the setting of gout.

In our recent study assessing MRI and ultrasound in patients with early gout, many of the patients had erosive changes that were not apparent on their plain radiographs.

Additionally, many subjects also had evidence of synovial pannus on these advanced imaging techniques, which was surprising.

It is important to point out that all of these patients had their imaging studies performed while asymptomatic. We also observed a fair amount of bone marrow edema, soft-tissue edema, and soft-tissue tophi. I would expect these findings to be more frequent in patients with longer-standing gout.

RN: What are the advantages and disadvantages of the various imaging modalities for the evaluation of gout?

Dr. Carter: The obvious benefit of advanced imaging is the superior quality of the images obtained. The large amount of detail available to the reader with MRI, CT, or ultrasound is tremendous compared with plain radiography. Such detail allows for better detection of erosions and

tophi. It also makes it possible, as noted, to detect synovial pannus and bone marrow edema—two findings that cannot be discovered with plain radiography.

The obvious detriment is the cost. Advanced imaging is far more expensive than plain radiography. Another disadvantage is the length of time needed to perform the procedure. While some advanced imaging techniques take longer than others, they all are more time consuming than are plain x-rays. If the study includes contrast enhancement, this adds to the time necessary to perform the test.

Additionally, contrast must be administered with caution in patients with renal insufficiency.

Of the advanced imaging options, ultrasound is the least expensive, but it has the most interreader variability. For this reason, musculoskeletal ultrasound interpretation is best performed by an experienced reader. Because utilization of musculoskeletal ultrasound is still in its infancy, particularly in the United States, it might take several years before it is common practice.

Additionally, our study findings suggest that MRI is superior to ultrasound at detecting the musculoskeletal pathological sequelae of gout.

RN: So why haven’t these advanced imaging techniques become standard care in the evaluation and management of gout?

Dr. Carter: The main reason is that we still do not have enough data to know how to properly interpret these findings. For example, should erosions detected on advanced imaging that are not yet apparent on plain radiographs mandate initiation of therapy to lower urate? Perhaps the answer is yes, but prospective studies have not been performed to answer this question.



A T1-weighted MRI view of the left foot shows erosion on the medial aspect of the first metatarsophalangeal joint.

COURTESY DR. JOHN D. CARTER

What about other potential findings on advanced imaging, such as synovial pannus or bone marrow edema? The potential effect of these findings on the management of gout is even less apparent. Studies are needed to answer these important questions before these techniques can become the standard of care.

RN: How might the increased use of these alternative imaging techniques improve treatment and minimize the likelihood of disease undertreatment in gout, which has been identified as a contributing factor in the rising prevalence of clinically significant chronic gout?

Dr. Carter: It is very clear that erosive changes on plain radiographs mandate urate-lowering therapy if the patient is not already treated. By discovering these erosive changes even earlier with advanced imaging, we can start patients with gout on therapy even sooner to abrogate the long-term sequelae of their disease.

Signs of potential ongoing inflammation might also mandate more aggressive therapy, thereby potentially improving outcomes.

RN: Which gout patients stand to gain the most from the use of advanced imaging technologies?

Dr. Carter: I believe there are two groups of gout patients who might ultimately benefit from advanced imaging.

The first group includes patients with known gout, early in the disease course, who have no apparent damage on plain radiography and are not currently on urate-lowering therapy. Advanced imaging might detect occult damage, thereby indicating the need for treatment.

The second group includes patients with gout who are already on urate-lowering therapy who have signs of active, ongoing inflammation, such as synovial pannus or bone marrow edema.

Such findings might indicate the need for more aggressive disease-modifying therapy in gout patients, although this still needs to be confirmed in clinical studies. ■

DR. CARTER is assistant professor of medicine in the division of rheumatology at the University of South Florida in Tampa.

By Diana Mahoney, New England Bureau

European RAID Score Gives Novel Patient-Derived Outcome Measure

PARIS — Pain is paramount to rheumatoid arthritis patients, according to a European League Against Rheumatism survey of 505 RA patients in 10 European countries. The survey was reported by Dr. Tore K. Kvien at the annual European Congress of Rheumatology.

The finding came from a new measure, the Rheumatoid Arthritis Impact of Disease (RAID)

score, created by a EULAR task force to make up for the deficiencies in the current widely used indices of disease activity—for example, the Disease Activity Score—which don’t include all of the outcomes patients deem important, such as fatigue, added Dr. Kvien, professor of rheumatology at the University of Oslo and editor of the *Annals of Rheumatic Diseases*.

The RAID score began with a group of 10 patients who developed a list of 17 domains important to patients with RA. This list was trimmed to 7 through a subsequent survey in which 10 patients from each of 10 European countries ranked the 17 domains.

Next, 505 RA patients in 10 countries were asked to rank the relative importance of the seven domains. Pain got 23 points; func-

tion, 16; fatigue, 16; emotional well-being, 11; sleep, 11; coping, 11; and physical well-being, 11. The weighted values were unaffected by disease duration or severity level, meaning the weighting system has a desirably high generalizability.

Dr. Kvien then relied upon an extensive review of the psychometric literature and expert opinion to create the RAID question-

naire, which includes rating scales and other assessments addressing each of the seven weighted domains.

The RAID score is currently undergoing a 12-country validation study that will refine the final wording choices. After that, physicians are likely to increasingly encounter RAID as a prespecified end point in clinical trials.

—Bruce Jancin