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Differentiating Peripheral Spondyloarthritis from Osteoarthritis Using Ultrasound

Announcer:

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This episode of *Living Rheum*, titled "Differentiating Peripheral Spondyloarthritis From Osteoarthritis Using Ultrasound," is sponsored by Novartis Innovative Medicines US Medical Affairs. The host and speaker have been compensated for their time. This program is intended for health care professionals.

Here's your host, Dr Ethan Craig.

Dr Craig:

Peripheral spondyloarthritis, or pSpA for short, is a heterogeneous disease characterized by peripheral arthritis, enthesitis, and dactylitis. And it includes entities like psoriatic arthritis, reactive arthritis and other spondylarthritides. Now, diagnosing pSpA can often be really a challenging endeavor, especially when we're identifying patients with predominant enthesitis manifestations, and when we're trying to differentiate from other causes of inflammatory and noninflammatory arthritis. So, in this episode of *Living Rheum*, we'll review the role of ultrasound and diagnosing this often-difficult entity.

This is ReachMD, and I'm Dr Ethan Craig. There's no one I'd rather have join me to discuss this topic than our guest, Dr Catherine Bakewell. Dr Bakewell is a rheumatologist at Intermountain Healthcare in Salt Lake City, Utah. She's an active member of multiple spondyloarthritis research groups, including SPARTAN and GRAPPA, and continues to actively mentor and teach rheumatology ultrasound trainees through various CME efforts and the Ultrasound School for North American Rheumatologists, or USSONAR, program. Dr Bakewell, thanks for being with me today.

Dr Bakewell:

Thank you for having me.

Dr Craig:

So we really wanted to focus this conversation on how we can use ultrasound to aid in the diagnosis of peripheral SpA. So, what do you see as the role of ultrasound in this setting? And is it a modality you're frequently reaching for in diagnosing these patients?

Dr Bakewell:

Absolutely. So, I am a big fan of musculoskeletal ultrasound in my day-to-day practice for both diagnosing and monitoring treatment for these conditions. I see it as a kind of extension of the physical examination of the patient. So, you could almost conceptualize it as a type of stethoscope, if you will. I always have the machine on and running in the room with me. And I'm not necessarily doing a full separate radiology report, but I'm using it in real-time as I examine the patient if there is an area of equivocal findings on physical exam, for example. And I do find it particularly helpful in distinguishing inflammation from other sources of pain, such as central sensitization or neuropathic pain where the patient will have a very high tender joint count but a low swollen joint count, or in patients with chronic inflammatory disease, they may have chronically fibrotic or thickened synovium that does not necessarily represent active disease.

I also think it can help distinguish inflammatory arthropathies from osteoarthritis, for example, where if you just look at enthesitis, this is a hallmark of the spondyloarthropathies but not thought to be so in OA or the other inflammatory conditions.

Dr Craig:

Great, I kind of figured asking you if ultrasound was something you used a lot was a loaded question. But so, to hone in just a little bit then on enthesitis, can you speak a bit about how we define this entity on ultrasound?

Dr Bakewell:

Absolutely. So, there's a group that has been diligent in defining our ultrasonographic features of different inflammatory conditions, and that's OMERACT, or the Outcomes Measures in Rheumatology group. And they went through a number of different iterations starting as far back as 2014. But the final definition of ultrasonographic enthesitis was published in 2018. And they divided it into inflammatory or reversible/treatable components, which is comprised of Doppler signal, hypoechogenicity, and thickening of the entheseal insertion. And if individual ultrasonographer is curious, is this particular enthesis thickened or hypoechogenic, it's always helpful to do a contralateral comparison in the same patient. Again, hopefully they don't have bilateral Achilles enthesitis, so that you may get one normal, one abnormal.

And there are cutoffs as well in general shapes of the enthesis that are helpful. And that can be distinguished from the structural components that will be representative of chronic damage, such as calcification, or enthesophytes and erosions. And of course, you would not expect those necessarily to reverse with treatment, and so those shouldn't be scored in your enthesitis scoring system if you are looking for something that is reversible with a particular agent, for example.

Dr Craig:

And if we're going by that particular definition, how specific is the finding of enthesitis on ultrasound? So, like, if somebody, for example, has PsA and elbow pain at the lateral epicondyle, how helpful is ultrasound in distinguishing between, you know, your typical tennis elbow from enthesitis related to PsA?

Dr Bakewell:

That's a great question, and there may not be 100% assurance on the specifics of ultrasound but the OMERACT guidelines could serve as a guide. So, if I were to read out their definition of enthesitis, I had kind of broken it down into components before, but here it is in sentence structure: They define enthesitis as a hypoechoic and/or thickened insertion of the tendon close to the bone, and they're looking for these signals to be found within 2 millimeters from the bony cortex, which exhibits Doppler signal if active, and then may show erosions, enthesophytes, or calcifications as a sign of structural damage.

So, the 2 millimeter part is what is key. They are really trying to hone in on the specific findings of enthesitis as opposed to enthesopathy or tendinitis. Now, as you gain specificity, of course, you will lose some sensitivity. And you can see enthesitis with Doppler signal more distal to the insertion than within that initial 2 millimeter mark.

And so with that, I want to not only say, of course, we have to interpret every ultrasonographic finding within the context of the whole clinical picture. But I really want to highlight the work that is being done by GRAPPA, so, that's the Group for Research for Psoriasis and Psoriatic Arthritis, in the DUET trial; so, that is an international effort to come up with a Diagnostic Ultrasonographic Enthesitis Tool. And at the end of that, we should have hard data about what percentage of patients have enthesitis with Doppler and other findings within the 2 millimeters from the bony cortex versus beyond, and we use that then as a diagnostic tool rather than just a treatment-monitoring tool.

Dr Craig:

Great. That’s very helpful, thank you. So then, if we're looking aside from enthesitis, are there any other ultrasound features that are helpful in differentiating, say, peripheral SpA from other inflammatory arthritides, like rheumatoid arthritis as an example?

Dr Bakewell:

Yes. So, several papers have shown that early rheumatoid arthritis will show the majority of inflammation occurring in the MCP joint itself, intracapsular with perhaps some flexor tenosynovitis, whereas early psoriatic arthritis patients, most of the inflammation may be extracapsular. So there, the distribution of inflammation is key and can be helpful in differentiating.

When you look at the crystalline arthropathies, let's take, for example, gout, you're going to get the quote “starry night” appearance or the double contour appearance, which is due to that presence of monosodium urate crystals layering on top of the cartilage, in the case of the double contour, or sort of floating around within the synovial effusion, in the case of the starry night appearance.

Dr Craig:

And then to what extent is ultrasound useful in distinguishing between peripheral SpA and the noninflammatory causes of joint pain, like

mechanical disease or osteoarthritis? I mean, we often end up looking at, say, a report of a small-joint ultrasound that suggests maybe some synovial hypertrophy without Doppler or patients with erosive or inflammatory OA that may even have some Doppler changes. So how do you interpret the likelihood of these cases representing inflammatory arthritis, as opposed to atypical findings in osteoarthritis?

Dr Bakewell:

That's a great question. And you have to remember, again, the need to compare with the clinical picture. Don't forget that rheumatology is not only an ambiguous field, but that any one specific ultrasonographic feature shouldn't be considered 100% diagnostic; it needs to be interpreted in the clinical context.

That being said, we have some really good proof-of-concept papers that demonstrate that the Doppler that we pick up within the synovium is representative on histology of neovascularization and dilation of existing vasculature, and that this correlates very well with inflammation levels. But you touched on something, which is to say that OA can be erosive and also inflammatory. And so when you look at it in that context, don't forget, at least one paper found that about 10% of patients with hand osteoarthritis had synovitis detected ultrasonographically within the finger joints, and that those patients of the 10% with even grayscale synovitis, those patients who had positive power Doppler signal were those with more severe radiological features, so for example, central erosion and reduced cartilage thickness. So, nothing in medicine or life where ultrasonography is 100%. We cannot exclusively say that power Doppler belongs to conditions like rheumatoid arthritis or psoriatic arthritis, but we can say that it correlates with inflammation levels.

And as far as the discriminatory capacity for ultrasound to distinguish from osteoarthritis from PsA or OA, I'll point you to something that is coming. So, hopefully within the next 12 months, we should see an ACR guidance paper that really hones in on an international expert consensus on the discriminatory ability of musculoskeletal ultrasound to help us differentiate between inflammation from RA and PsA in patients with comorbidities, such as osteoarthritis or fibromyalgia.

Dr Craig:

Great. So, great way to end with a watch-this-space. I want to thank my guest for helping us think in depth about ultrasound in peripheral SpA. Dr Bakewell, it was great speaking with you today.

Dr Bakewell:

Thank you again for having me. This has been a lot of fun.

Announcer:

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