Transcript Details
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Exploring AI-Powered ATTR-CM Detection

Announcer:
This is *Heart Matters* on ReachMD. On this episode, Dr. Bruno Batinica, a Postdoctoral Associate at the Yale School of Medicine, will discuss how artificial intelligence could help with early identification of transthyretin amyloid cardiomyopathy, or ATTR-CM Let's hear from him now.

Dr. Batinica:
I think what makes ATTR-CM so unique right now is that it's very new and very novel, and it mimics a lot of other conditions. And I think this is true of a lot of these cardiomyopathies, but it's not often at the top of the differential list, and it's not something that clinicians are going to be seeing day in and day out unless they're in a specialist center. And even at the specialist center, even if you have all of the tools at your disposal—if you have an echo, MRI, and ECGs—there's still a lot of other conditions which can look like ATTR-CM or just cardiac amyloidosis in general. So you have to really raise that clinical suspicion, and that's not always an obvious thing to do. You're relying on a lot of clinical ability to spot all of these disparate signs, to consider it on the differential.

And then to diagnose it, not only do you have to raise that clinical suspicion, but you have to be somewhere where you can go and undertake downstream specialist testing. And so luckily things have progressed in the last decade from requiring cardiac biopsy and going down this very invasive route. There's been great progress now moving to these radionuclide non-invasive imaging techniques, but that's still a specialist test. That still needs a nuclear cardiology or nuclear medicine department. You need a patient to come in, sit for up to three hours, and get something injected. So it's not as easy as ordering an ECG or even an echo.

All of those factors combine to make it a very elusive condition. But the tables have turned now where previously, it was important to make that diagnosis, but it was often a more academic exercise because the treatments at our disposal, for the vast majority of cases, didn't change that much. But now we have some really good medicines for ATTR-CM, and so now there's a real impetus for the clinicians to identify this disease because we can benefit patients by making this call earlier.

I think AI is very well positioned to help us screen for this condition, but it's an evolving field, and I think the crucial thing is going to be that it helps us identify patterns of this disease in more easily accessible tests. We really want to diagnose this condition as early as possible. The current treatments that we have—the TTR stabilizers and gene silencers—they're going to be most effective when they're initiated early. And so then, almost by definition, you want to try and catch people before they have overt symptoms that develop. So if you have a patient who doesn't have overt symptoms, then the only way that we're going to flag suspicion for this condition in order to send them to downstream testing is that we have to identify things on the tests that are already being done. So in cardiology, we have some tests which are done pretty widely and routinely—ECG most routinely, and pretty much everybody who comes through the door gets one of those, and then echo, which is a bit more specialist, but still very widespread.

And so there are, I think, really bountiful modalities where we can identify signs of ATTR. And we know that they exist and that there are electrical and mechanical consequences of ATTR. And you get taught these in med school, and they're like a little flashcard people will learn, and maybe they'll think about it when they see it. But it's not the top thing that you're going to be thinking about when you're looking at an ECG or an echo. And so I think that's where these sorts of AI models which are modality-specific, which are trained specifically to look at thousands of ECGs and recognize these patterns, are more performant than these traditional signs which you're taught.

So the traditional signs are nice, but one, it requires a clinician to even think about it, and two, even if you have the best clinician who's looking at it, the signs themselves, like a pseudo infarct pattern and low voltages, are things which you're told to look for, but they're just

very non-specific. They lack sensitivity and specificity. And so an AI model is going to be able to identify lots of patterns which a clinician maybe can't pick up on a read or isn't looking for and then flag it. And so there we can automatically raise that clinical suspicion, and then hopefully that'll work as a way to refer people to downstream testing and to get that in the minds of the clinicians so that we can think about sending people down to get properly tested and hopefully start treatment if they need it.

Announcer:
That was Dr. Bruno Batinica discussing the potential role of artificial intelligence in identifying ATTR-CM. To access this and other episodes in our series, visit *Heart Matters* on ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening!