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Fluid Biomarkers: Revolutionizing MS Diagnosis

Announcer:
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Dr. Obeidat:
Hello, this is CME on ReachMD, and I am Dr. Ahmed Obeidat. Joining me today is Dr. Mark Freedman.

Mark, can you tell us about fluid biomarkers in MS? That's an area of expertise for you that you've published and talked about a lot. So I really want to learn more about it from you today.

Dr. Freedman:
Well, thanks, Ahmed. It's a growing field because technology has allowed us to do things that we haven't been able to do before. Plus, the diagnostic criteria for MS are further recognizing the role of biomarkers in not only diagnosing the disease, but prognosticating. So for instance, the spinal fluid has been a source of biomarker for years, and the presence of oligoclonal bands, which is a bit of a tedious exam to cover and not all labs are able to do it, we now recognize that there's a much faster and easier test to do, and that's the measurement of kappa free light chains, and especially the kappa free light chain index, which is how much it's elevated in the CSF compared to serum, will give you a very clear indication of somebody who has MS, maybe, than compared to other diseases.

But CSF is something you're only going to get at diagnosis. Most people I know are not going to lie down for a lumbar puncture repeatedly over time, and so we needed something better. Unfortunately, with so much protein running around the serum, it was very hard to pick out small amounts of another substance. The newer technology that has come to us is something called Simoa, single molecular arrays, where we're able to measure down to picogram levels, in a very accurate way, various molecules. And one of them that has really, I think, abounded and very useful for MS as well as a number of other neurological diseases, is the measurement of neurofilament light chain.

Neurofilaments, as you know, are proteins that are only present in nervous system structure. It's part of the scaffolding of the neuron and the axon. And so if you have neurofilaments running around your blood, there's only one source of it and it's a broken axon. Now in somebody who has multiple sclerosis, theoretically they don't have any other reason for breaking axons, and it's a good measure of the activity of the disease. And in fact, it can tell you how much in the way of broken axons you have. So somebody who's just ripe with the diagnosis and the levels of those neurofilaments are high, that's somebody who's brought a lot of broken axons to the table, similar to a very high burden of disease on MRI. And not surprising, the prognosis for those individuals is much poorer than somebody who has a low level of neurofilament light chain.

Similarly, if you monitor patients, usually MRIs are a bit more tedious to do if you're going to them more than once a year. You could do a blood test. You can do them every 3 or 4 months, and if you're measuring the neurofilament light chain, it should be low.

Any of the efficacious medicines we have actually drives the neurofilament level down. So here's a biomarker that actually gives you

something positive to look at. And you're treating a patient, because otherwise, Ahmed, how do you tell somebody it's working? Right? Oh, well, you didn't have an attack, or it's a negative sort of thing. But here's a positive: the NfL went down. You've got something to measure.

Dr. Obeidat:
That's right. And it's one of the things. As you mentioned, it's a blood test and we're able to do it and then we can give patients information from it. But also, maybe it can help us kind of move MRIs away from each other because with the cost involved, but also the inconvenience that sometimes comes with an MRI. If we can kind of decrease the frequency of them because we have that test, it's going to be important. But also, if we stop therapy or if we are kind of considering an extended-interval dosing of some therapy or using an immune reconstitution therapy, this could be another marker that we could follow to see if there is a return of disease activity to guide our decisions in the practice.

Dr. Freedman:
The words that I use for people, if you measure and you look at an MRI and you see lesions, it's after the fact. Right? But if you saw a raised neurofilament, patient's asymptomatic, you could be proactive rather than reactive. You could say, okay, yeah, this is anticipating something that's going to happen, and maybe this person needs a change in therapy.

Dr. Obeidat:
Yeah. Thank you so much. This has been a great bite-sized discussion. Hopefully you can put some of these tips into your own practice in the clinic. Thank you for listening.

Dr. Freedman:
Thank you, Ahmed.

Announcer:
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