Transcript Details
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Current Updates in Brain Imaging and Neurodegenerative Diseases

Host Intro:
Welcome to *Project Oncology* on ReachMD. On this episode, we'll hear about a presentation from the Society of Nuclear Medicine and Molecular Imaging, or SNMMI, 2024 on new technologies and imaging agents. Dr. Phillip Kuo is a Professor of Medical Imaging, Medicine, and Biomedical Engineering at the University of Arizona. Here's Dr. Kuo now.

Dr.Kuo:
Thank you for the opportunity to speak today. So I spoke in the Emerging Technologies, New Technologies session, I should say. It was a really great session that covered a wide variety of topics, and I was to talk about brain imaging and neurodegenerative diseases, what's new there. And in my talk, actually, a lot of things that have changed very recently have to do with what's changing around us, and I think that's when the important things to find out when you come to a meeting is not what's just new in your field, but what's new around us because that's going to affect us. And one of the major changes that's occurred very recently in the field of neurodegenerative disease and Alzheimer's disease, specifically, is that there are recently approved antibody therapies that remove amyloid from the brain, which is one of the culprit proteins in Alzheimer's disease. And that got full approval from the FDA because it actually slowed down the progression of Alzheimer's disease. So it's a big breakthrough that we finally have a disease-modifying therapy. It certainly doesn't cure Alzheimer's disease, but it slows down the progression.

And what we did in nuclear medicine to help with that was to do amyloid PET imaging. So we have our radioactive tracers that when you inject intravenously, go up to the brain and light up the amyloid in the brain. And so that was initially used to qualify patients for these trials because we proved that there was amyloid in the brain, and hence that they had Alzheimer's disease. But importantly, that's also the paradigm of Theranostics. So use a diagnostic test, in our case, an amyloid PET scan, to confirm that there's a target there for your drug, which is amyloid.

And so these patients, once we've confirmed that they have amyloid in their brain and they have clinical suspicion of Alzheimer's disease, they get the antibody, the antibody crosses into the brain, attaches to the amyloid, and removes it from the brain. And how did we know that it removed it from the brain? We did subsequent amyloid PET scans on these patients in the trials and showed by amyloid PET that the amyloid levels in the brain did decrease. So it's a very exciting result in the trial. Also exciting, the role that we played in nuclear medicine in making that happen.

So there is a trial with another anti-amyloid antibody that has not been approved, but it's under evaluation by the FDA right now for approval. And one of the neat things about that clinical trial protocol, and the name of the anti-amyloid antibody is donanemab, is that they actually took advantage of nuclear medicine in two new ways. We have an FDA-approved tracer for Tau, as well. So Alzheimer's disease is actually a neurodegenerative disease that has two pathologic protein being accumulated, amyloid, and we've had amyloid PET agents approved since 2012, but it is also a proteinopathy involving Tau protein. And more recently, we've had an FDA-approved Tao PET agent, and in that trial, they actually imaged patients before randomization, not only with amyloid PET, which was standard to

confirm the presence of the target, but also with Tao PET, which helped to stratify the patients further. And that trial actually did something also interesting, which is they used the serum amyloid PET scans not to just confirm that they were removing amyloid from the brain, but if patients became negative on subsequent amyloid PET scans, they actually stopped the drug, since, if you have no more amyloid in your brain, why would you keep giving someone the antibody to remove it when it's all gone?

And so it's a real potential in nuclear medicine that we can not only help now determine patients for eligibility for targeted Theranostic treatments, but also help in the management of patients and knowing when to continue and stop their drug regimens. One of the very cool things about this field that brought me to it was nuclear medicine really combines biology, physics, and chemistry like no other field in medicine. And at this meeting, those people all come together, scientists and clinicians, and all those different disciplines that make our field, and advance our field, in this very exciting time. Meeting them all in here in person, hearing from all of them, is very exciting, and it's great to be here.

Host Outro:
That was Dr. Phillip Kuo giving us a review of his presentation on new technologies in nuclear medicine from SNMMI 2024. To hear this and more episodes in this series, visit Project Oncology on ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening.