American Heart Association
Ischemic Stroke Etiology Update
December 5, 2016

- [Will] It is now my pleasure to turn today's program over to Mary Paulsen, Senior Consultant for the American Heart Association. The floor is yours.

- [Mary] Thank you, Will, and welcome, everyone, to today's webinar. We are pleased to have Dr. Lee Schwamm present. He is Professor of Neurology at Harvard Medical School, Vice Chairman and the C. Miller Fisher Endowed Chair and Director of Neurology at Massachusetts General Hospital. He's also Director of Acute Stroke Services. He acts as the Director of the Partners in TeleStroke Center. Dr. Schwamm is a recognized leader in the field of acute stroke treatment, stroke advocacy, and in the use of telemedicine and other technology strategies to improve the quality of stroke care. He's played a pivotal role in the development and leadership of the Get With the Guidelines-Stroke program, and is curl3pr201 (nt14.9 (s929 Td (m) 31.p36(t)14.9 (r)9.5 (h)47.9 (de18 (t)39.8 (s)5.66 (t)34.9 (he5im) h929 Tdt14.9.2 (N)64 (m)1 (W)ia5

comfortable with it. "We also know there are known unknowns, "that is to say we know there are some things "that we don't know." And they are, for example, I would say is cryptogenic stroke. We know there's a stroke. We're not sure what the cause is. And we know that we, at a certain point in our workup, are unable to determine the etiology at that point in time. "But there are also the unknown unknowns, "the ones we don't know that we don't know. "And if one looks throughout the history of our country "and other free countries, it is the latter category "that tend to be the difficult ones." And here I would say is an example of, we think it's a lacune, but it's actually not, it's cardioembolic. But we have dismissed the possibility that it could be anything other than a lacunar stroke because of our certainty, and those are the unknown unknowns. And that's an example of a patient who, if they really did have cardioembolism from atrial fibrillation and we thought it was a lacune, we have not provided

can be undetermined because it's truly cryptogenic, because it's unknown-other cryptogenic but not embolism, not cryptogenic embolism, unclassified, or incomplete evaluation. So you can have a cryptogenic stroke, which is a small-vessel stroke, and not be sure where it came from because the person has no hypertension, diabetes, or atherosclerosis. So it's not just embolism that can be

99% sensitivity and 10% specificity. And if the disease exists in the population, at a 1% rate, when a test is positive, it will only indicate the true presence of disease 17% of the time. Meaning if the disease is rare, a positive test is more likely to be a false positive than a true positive. If the disease is present at a 10% rate, it's likely to be accurate 69% of the time. And if a disease is present 20% of the population, then a positive test predicts the

embolism. This is a way of saying, "Well what if we just go with the CHADS score "and assume that subclinical arrhythmias are happening?" So geez, that might increase the risk even further. So maybe the CHADS score is what we ought to be paying attention to. So the burden does appear to matter. So if you look at the risk of events by duration and CHADS score, the two are additive. And if you have really low CHADS scores, then it seems like your chances of embolism are pretty low. So you can have Afib of even 24 hours duration, but if your CHADS score is zero, 0.8% of those patients had a stroke of these 568 patients. Whereas, if you have no Afib but a CHADS score of greater than or equal to three, you have a risk of stroke that's approximately 5%. So I think this is a really useful way of thinking, both of these matter. The duration of Afib matters, but your associated comorbid risk matters. So CRYSTAL AF, this is my picture of the crystal ball. CRYSTAL AF was a randomized controlled study of about 400 patients to see whether long-term monitoring with a small insertable cardiac monitor that was made by Medtronic was more effective than conventi (s m)11.5 (o7o)39.2 (f)5.7 ()-4 (M8.9 .o)39.2 (f)5.7 ctir%i Td[(8.4 (e)10004 7l pi ()0.982%i Tdyi ce

fibrillation. There are reciprocal innervation from the heart and the brain. The right side of the hear in the peri-insular area simulates sympathetic fibers and can cause tachycardias when stimulated in the form of seizures and bradycardias when lesions in the form of stroke. And the opposite is true on the left side. You can also think about mechanical factors, you know, you have fibrillation, you don't have the blood moving around as much, you get a clot in the left atrial appendage, that's sort of the classic teaching. But newer thinking has been going on about atrial tachycardias and atrial cardopathies and whether or not there might be changes in gene expression or coagulation environment inside the left atrium that are independent of the actual mechanical effects. We just don't know, we need a lot more research on that. So can you have just a little AF? And if so, what do you do about it? So is it real? Is it signal or is it noise? Is it the cause of the stroke or an effect of the stroke and does it matter? So if you find someone with a stroke, who then has a few minutes of atrial fibrillation in the background a month later, is that an indication for anticoagulation? We don't know. How much AF is enough to justify lifelong anticoagulation? Again, we don't know. And is ablation sufficient? If I see that and if I ablate the focus and the Afib goes away, have I actually reduced the risk or does that risk still endure? I think these are all really interesting and important questions and we're gonna have to study these carefully because as

- [Dr. Schwamm] Great, so do I take questions now only in the Q&A portal or are people also gonna have a chance to unmute and ask their questions verbally?

- [Mary] Our only option is through the portal.

- [Dr. Schwamm] Okay. So if you want to ask a question, you've gotta actually, you can't just be on the

questions for a moment and I'm going to shift back to the slides, and then I think, because many of these look like they're gonna be potentially answered by the slides. So the first new element is, was the stroke etiology documented in the patient medical record? So, you select Yes in patients with evidence that the etiology was investigated even if no cause or multiple causes were identified. So that includes patients with cryptogenic stroke. So it doesn't have to be that the stroke etiology was documented and definitively identified as one of these potential causes. If they look for a cause and they found more than one or they couldn't find any, then there was documentation would be present. And it does have to be by a physician, nurse practitioner, or a physician's assistant indicating that a potential underlying cause was identified. This option should be selected when there is evidence in the medical record that stroke etiology was investigated, even if no cause was identified despite the investigation or multiple causes. If they didn't do an investigation and therefore they don't know what caused it, then that wouldn't count as that the stroke etiology was documented. And you can see here now that under the choice of stroke-related etiology, it only becomes active if it's ischemic stroke. And now, rather than multi-select, which was causing a lot of confusion for people, it's single-select radio buttons. However, if you select number four, Stroke of other determined etiology, you're able to identify dissection or a clotting disorder with

of the intracranial vessels, so more than just the ultrasound of the carotids. And then there's short-term cardiac rhythm monitoring, so basically less than or equal to seven days of monitoring, which in many instances is like a Holter moni

- [Christine] Found it. So, it does look like for the short-term monitoring includes continued monitoring lasting less than seven days, includes 24 to 72 hour Holter monitors or equivalent, does not include heart rate monitoring without rhythm detection. So I would say that that means to me that telemetry monitoring would count. Correct, Dr. Schwamm?

- [Dr. Schwamm] Yup, yup, I think so. Because remember there are a lot of hospitals also that don't admit stroke patients to a monitor telemetry bed. So they might have an oxygen probe on them or they might have heart rate monitoring, but not actual rhythm detection so that you can see the heart rate blinking up at the central station, but you don't get any arrhythmia detection or alerts. So if you don't happen to be looking at the monitor when the patient goes into fibrillation, you won't see it. What was the last thing, Mary, that you were gonna say?

- [Mary] The last theme looks like if there are multiple etiologies documented, is there a hierarchy of which note should be considered, i.e. the neurologist is the highest note considered?

- [Dr. Schwamm] I think that the best approach there is the final note, either the discharge summary or the final note from the neurologist which summarizes the information. So sometimes I think someone might write a note where they think they saw fibrillation but after careful review, people decide that it's actually PACs or some other form of maybe it's an SVT but not Afib. So I think just being a single note that identifies a possible cause, you really want to looK for a note that synthesizes the information. And some of those examples I read you out before, those snippets I felt were very helpful, where at the end of the day it's like, carotid stenosis but also question fibrillation, embolism of uncert8 (3).4t8 (0)(1)TJ2 .8 (0)i(n)4.9 (ce)D