

Narrator - Welcome to the Mayo Clinic cardiovascular Continuing Medical Education podcast. Join us each week to discuss the most pressing topics in cardiology and gain valuable insights that can be directly applied to your practice.

Dr. Hayes - Welcome back to the Mayo Clinic cardiovascular podcast series, interviews with the experts. I'm your host, Sharonne Hayes. I'm a noninvasive cardiologist and vice chair of faculty development and academic advancement for the Department of Cardiovascular Medicine here in Rochester, Minnesota. Today I'm joined by Dr. Regis Fernandes. He is division chair of Preventive and Comprehensive Cardiology in our practice in Arizona. He also directs the lipid clinic and does lipid research. Today our topic is the clinical utility of calcium score, coronary calcium score, A guide for practitioners. Welcome. And I'm gonna start by asking you, can you just, you know, kind of review real quickly what is a coronary calcification study and what is the information that's gonna be given to us as clinicians?

Dr. Fernandes - Sure, of course. And first of all, thank you for having me here. It's a pleasure to be here and talking about this topic. I'm very passionate about it and the more I learn about it, the more I get excited about it. So, to answer your question, the coronary calcium score is a simple CT of the chest trying to detect calcium in the coronary arteries. It requires very little radiation. It's not an expensive test, but it does prove the presence of atherosclerosis. And that's a very important finding comparing to traditional risk factors which give an estimate of risk. Well, this is a picture of the individual in front of you in the clinic, so it's very individual. So that's the, the big difference here. It is not an estimate, it's the presence of atherosclerosis. If it is a positive calcium score

Dr. Hayes - And you, and you get some numbers and you can talk about that later about, you know, the power of zero and and the big numbers. But who do we, who do you order? I mean, who is it currently guideline recommended to get coronary calcification? Who shouldn't we be doing it in? Who benefits the most?

Dr. Fernandes - Let's start with who should not be having this done. Okay. If you have clinical ASCVD, a coronary calcium score is not gonna add much. This is a tool to help better re-stratify the risk of your patients, A more individual analysis of the patient in front of you. So we compliment the ASVD calculator, but it is important to know that the ASCVD risk calculator has some, some issues with it. So we use the coronary calcium score to, to improve that on who we should not be doing that. Well probably besides patients with clinical ASCVD maybe who are people that are on a statin already. Because if you already are being treated for it, what's the point of getting a coronary calcium score? Those are the two ones that I can think probably not helpful to do it. Okay. Who can get a more help with this test in a nutshell would be people that are in an intermediate category on the ASCVD risk, and that'll be around the 7.5%. So a little bit below that, a little bit around that, maybe even a little bit forward there. Those are patients that may be helpful to have a calcium score if you're very, very low risk, less than 5%, 2%, probably not with some exceptions. And we can talk about that when you talk about the effect of age. On the other spectrum too, if your risk is over 20%, it's not gonna help you much

because the risk is so high that it doesn't matter if your calcium score doesn't show anything, the risk or the lifetime risk is already very high. But in that range where intermediate risk is definitely a tool that help physicians to have a better risk assessment of your patient.

Dr. Hayes - Much with decision making, right?

Dr. Fernandes - I mean... Yes, decision making, shared decision making.

Dr. Hayes - Yeah. And the other getting right at shared decision making. The other way I have used it is somebody who I feel maybe their risk score is such that, that I would prescribe a statin and the patient is resistant. And I have that shared, I said the risk scores are not perfect. Yeah. And if you have a zero, right, I would be okay with you continuing with lifestyle, but if you have coronary calcification, then I think that would sway it. And I think that can be really engaging patients sometimes. Because even with that 15 or 20%, not every single one has the disease.

Dr. Fernandes - Exactly. That's addictive. That's a, that's very correct Sharonne. You're right on one tip that I have for providers that I use, I don't know if you notice that, but there's a lot of power in imaging whenever you show a coronary angiogram to a patient that has coronary disease is very difficult for them to think that maybe I don't want to take a statin. Right? It's important for them to see how their body looks like. So when you show a coronary calcium score, although it's just a little speck of something white in the coronaries, you can tell them this is not supposed to be white depending on your age or how much do you have. And here how you compare with other people your age, that has a powerful effect on people. I found that very easy to convince people to have that shared decision making discussion when they see themselves in the screen. So the, the power imaging here, I think it's important

Dr. Hayes - We have a patient with a positive coronary calcium score. Does that automatically mean we start a statin?

Dr. Fernandes - Not necessarily though. So the guidelines in 2018 did have a mention about how to use coronary calcium. The new one in 2022. The expert consensus also had something more about coronary calcium. And although a lot of people do that, not necessarily, it's very individual, right? So if someone, for instance, have a little bit of like a very low, so we're talking about scores of zero to 99 because over a hundred is the cutoff that we should consider statins. But what do we do with a score of zero to 99? What is, why do you do a score of one two versus a score of 98? What's the difference? So in that range, one particular rule that I use that is helpful with age and that has been shown in studies too. So if you're older than 55, any calcium will likely put you in that 10 year risk of 7.5%. But if you're younger than than 55, it's gonna take longer. So if you're thinking about 10 years, it's not gonna get you to that seven point 55. But a young person in their forties with atherosclerosis is not good. Right. So that's where you have a

decision with the patient and you talk about it, but based on the guidelines and the recommendations, if you're older than 55, any calcium, probably consider a statin. If you're over a hundred calcium score, definitely consider a statin.

Dr. Hayes - Statins actually make the calcium go away.

Dr. Fernandes - No, and this is common question. I get this question all the time. The reason why we're calling this a guide for practitioner is because I just pick up the five more common questions here to talk about from patients and from providers. I get conscious all the time about that. Lemme explain a little bit about something that it's important for providers to understand. It's not difficult to explain to patients. The calcium score, the number you get is a combination of the measure of the volume of calcium versus the density, how dense that is. It turns out that density is inversely correlated with risk. The volume is positively correlated with risk. So the more volume, the more risk, the more dense, the less risk. But the number that you get in the score is one multiplied by the other. Right? So it's, it's the two in there. So it turns out that when you start taking statins, the plaques become more dense even though the volume is not increasing. So the number may go up, but it doesn't really mean that your risk is going up. Right. Another important thing is that your calcium score is not gonna change if you go on a statin, probably it's gonna increase because the, the plaques are gonna become more dense. But it's important to explain to patients not to get focused on that because, and we know that for intravascular studies share on that statins in patients with a, with a high calcium score, it removes the plaque, it decreases the plaque volume. So the overall volume of the plaque decrease is so less likely to rupture. That's why prevents events. But the calcium stays there, it's like a shell. That's how I explain to patients. It doesn't go away. It's part of the inflammatory reaction of the vessel wall. It's gonna stay there and the higher the density, the less the amount of events. So don't worry about what the numbers do after starting on a statin and we're gonna talk about that later. But we don't recommend repeating calcium scores if you are already taking a statin.

Dr. Hayes - Right, because I, I, I think that to me, based on what you just said, I I often describe this as a to patients to help them understand it's a scar. You know, scars don't

Dr. Fernandes - Exactly, exactly.

Dr. Hayes - But, but you know, I do see people doing serial coronary calcification and I, and I don't see the rationale for that. Is there ever a reason to do serial coronary calcification scans?

Dr. Fernandes - No. Potentially. Potentially. The National Lipid Association had a document that they released just a few years ago. It's a guideline for practitioners and they do have some, some data in there that came from some studies done in Germany, I believe, in which if your calcium score is over 300.

Okay. Or if it's over, especially over a thousand. Okay. The risk of the individual gets close to 20% of the SVD risk, which is similar to someone that just had an MI. So theoretically, if you have a calcium score that is that high, right, you may wanna switch your statin from modern intensity to a high intensity to match the risk. So theoretically, if you have someone with a calcium score of a hundred and you wanna repeat later to see if it's above 300 potentially. But this is how in theory we don't know yet. And it's something that can be discussed with patients. So it's not a recommendation, it's something for us to think about. If it is, it could be, but there is really not a reason to do it in, in general, in clinical practice, there's really not a reason to repeat. If your patient is properly taken care of and is within the guidelines for the parameters that you want for their lipids and other risk factors, you have them on the appropriate dose of statin. There is not really formal indication to be repeating a calcium score in someone who's already on a statin.

Dr. Hayes - Yeah. I think how I've seen it used probably from what you're saying is inappropriately is let's check another score and see what the, the statins did. And we should not be doing that.

Dr. Fernandes - Never. That's a very important question. Never do that. And the reason why I say never categorically here is because a calcium score is not a test to decide if you need more or less of this. And that calcium score is a test that helps to assess your risk. It is a risk assessment tool. It's not something to be followed and see if we need to change your therapy based on that.

Dr. Hayes - Yeah. Thank you for, for clarifying that. In general, in your use, and based on the guidelines, is this something that's more useful for our younger patients, those under 50 or older patients in terms of that decision making?

Dr. Fernandes - Yeah, exactly. So it's important to talk about age, right? So should we do, how, how young do you have to be to do a coronary calcium score? So it's important to know that coronary calcium is very prevalent. It's not normal, it's pathological, but it's very prevalent because coronary atherosclerosis is very prevalent, right? So it's important to, to start from that. So it's easy to know that it's very prevalent and increases with age. Another person is gonna have more likely chance of having a positive calcium score versus a young person. So it's important that when you use age to interpret the result or to decide to do a score to know a few things. For instance, in young individuals, the presence of atherosclerosis, even though if you do the risk calculator, even if you MESA the MESA score, which includes the calcium score is gonna be low because the person is young. But it's an important finding if you're in your thirties or forties and you have coronary atherosclerosis. For me this is a very important finding to discuss with the patient. On the other hand, if you're another person, you're in your seventies and you have a positive calcium score, okay? And you are the amount of calcium just average or even below the average for your age group, what does that mean for that person, right? So the way I see that that is easy to answer is like this, if you're very young and you have any calcium, I think is something important to know if you're in an older age is more important to know if you don't have any calcium. Because a lot of older folks would qualify for statins just based on their age and they don't have any

other risk factors. If you do a calcium score and zero, they don't. The problem is, Sharonne, that is hard. The, the chances of a 70 year old to have a zero calcium score is very small, but it's worth trying because some of them are taking statins and they don't need. So if you really think the patient doesn't need a statin, doesn't qualify, it's a shot. But you can do a calcium score. If it's zero, you're good to go. If it's not, then you continue with, you know, with the therapy because you're doing the appropriate thing. It's not just based on age. The patient has atherosclerosis for the younger person, any kind of calcium. I think it's a little bit concerning as far as the age. I get this question a lot. Okay, tell me the age doc. Is it 40, 30? What's the age? So the best I can tell you is the cardio study. The cardio study was a study that was done in coronary calcium, coronary calcium scores in young individuals. And here's the age range, Sharonne, was 32 to 46 year years of age, okay. And these people were followed up for a few years. The interesting thing on that study is that the prevalence was about 10%. So you can see that from that age group of 32 to 46, the prevalence of prevalence of coronary calcium score was 10%. So I don't know how young is too young to have it done. It is just that the chances of finding it are smaller but not zero. So hope, hopefully that study helps people to understand how young you, you don't have to be 50 or 60 to benefit from a calcium score.

Dr. Hayes - I agree. And particularly when you are in that intermediate risk. And I think what I find really helpful is particularly in my, the older patients is looking, you see the score, but also the percentile ranking based on age and gender. And sometimes they have a score that would be concerning, but they're actually in the 25th percentile, you know, so they've actually got less than average, and I think that is, we have to consider that as well.

Dr. Fernandes - yeah, definitely

Dr. Fernandes – So I'm going to move to kind of a, a, a question that we don't have an absolute answer to. But sometimes the radiologist is doing a CT for somebody who's short of breath or they are a lung cancer screening and they make the comment coronary calcification scene. What are you and I as cardiologists supposed to do with that? Do we put everybody on a statin? Do we do a, a formal coronary calcification score? What, what is the approach?

Dr. Fernandes - That's great. That's a great question, Sharonne, is into those things that are the most common things with coronary calcium score. Probably one of the most common consults that I get from other providers. Someone goes for a CAT scan cancer or, or something, a nodule or some smoking and they come back with the calcium score. So what do you do with that? Here's one helpful tip. Okay, if the radiologist says there is moderate amount of calcification, then the key word Sharonne, is moderate. Moderate means a score greater than a hundred already. So you may not have to do anything if someone comes to you as a cardiologist or as a primary care provider, you know, and they have a calcium score. So if your patient had a calcium scan done and is moderate amount of calcifications in the coronary arteries, you can already start the discussion as if the patient had a score greater than a hundred. Now severe calcification, things like that, maybe get a little bit higher. Okay, now less than

moderate. If it is a little bit or something like that, but it shows the presence of atherosclerosis, then yeah, maybe you want to get a calcium score because then you're gonna get a more objective analysis of how much calcium is in there. What is the, you just mentioned just now the percentile for age, which is very important. Is that an average amount for you? Are you in the 75th, 99 percentile, et cetera? So that's very helpful, right? Like we're talking about young folks, a 32 year old with a score of one is gonna be in a 99 percentile for age. So it's very important to, to do that. But moderate amount is usually a hundred and you know what to do. So that's what I use in clinical practice when I do a calcium score in patients that are found to have incidental, you know, atherosclerosis. But I have to say that if we look into the future, there are now some softwares that have been developed around the country to give you a calcium score based on any non-contrast CT of the chest in the institutions that will use, that will have the ability to give you a calcium score from that test. The problem is, as a primary care physician, as an endocrinologist or a pulmonologist around oncologists that order the test, what do we do with that information now? I got a score, it's 180, I'm a pulmonologist, what do I do with that? So it's important that once, once that happens that we have tools in place or institutions have tools in place to guide providers on what to do with that score instead of just perhaps just reaches, recommend, recommend cardiology consultation. So I think that's something that is gonna come up and it's gonna become more and more important. And finally, I would like to end saying that we don't have a lot of data on that. We don't know what to do with this incidental, we usually order, so think about this Sharonne. We order a calcium score because we want that result. We we decide that for this patient we wanna do that test. So I do the test and I have the score. An incidental finding is completely the opposite. I didn't wanna do that, it was just given to me. So why do I do with that? Does it have the same implication then the data that I have from the ones that I wanted to do? And that's what we're gonna get into this incidental coronary calcium that are gonna show up. And this is a great question. Fantastic.

Dr. Hayes - It's the future. I really wanna thank you 'cause this wraps up this week's episode of interviews with the experts and I'd like to thank Dr. Fernandes for joining me today and discussing this important topic. We look forward to you joining us again next week for another interview with the expert. Be well. Thank you so much, Regis.

Dr. Fernandes - Thank you Sharonne. Thank you for your excellent questions.

Dr. Hayes - As usual, Thank you for joining us today. Feel free to share your thoughts and suggestions about the podcast by emailing [cvsselfstudy@mayo.edu](mailto:cvsselfstudy@mayo.edu). Be sure to subscribe to the Mayo Clinic cardiovascular CME podcast on your favorite platform, and tune in each week to explore today's most pressing cardiology topics with your colleagues at Mayo Clinic.