

Announcer: Welcome back to Mayo Clinic's cardiovascular podcast series, interviews with the experts. I'm your host, Sharonne Hayes. I'm a non-invasive cardiologist and vice chair of faculty development and academic advancement for the Department of Cardiovascular Medicine here in Rochester, Minnesota. Today I am joined by my colleague, Dr. Sorin Pislaru, who's professor of medicine chair of our structural heart disease division here in Rochester. But as he says, he's an echocardiographer at heart. Our topic today is the TRIO score and choosing patients most likely to benefit from tricuspid valve intervention. Dr. Pislaru will share with us some contemporary management strategies for tricuspid regurgitation, the sometimes forgotten valve that has been coming back into the spotlight because of new ways to assess the impact of regurgitation, the risks, and new options for non-surgical intervention. So, Sorin, why should we reconsider what we've always thought about the tricuspid valve?

Dr. Sorin Pislaru: Oh gosh, Sharonne, that's a loaded question. You know, so, so first of all, this is, this has been very interesting to a lot of us, and, and it has been a passion of mine for, for a few years now. And, and I want to thank you the opportunity to, to share some of the things we learned. We know for 20 years already that tricuspid regurgitation is associated with excess mortality. But as soon as we learned that 20 years ago, people started questioning whether it's the disease of the valve that kills you or whether it's the other disease that leads to the valve regurgitation that will eventually take your patient's life. So, so for the longest time people were talking about you die with tricuspid regurgitation rather than you die after tricuspid regurgitation. And over the last two decades, we, we learned slowly that almost in every possible circumstance there is excess mortality associated with severe tricuspid valve regurgitation. Hence the, the interest to reconsider our, our approach to that.

Dr. Sharon Hayes: So we, we wanna hear about how we should revisit understanding our patients with this actual score. And, and I'm gonna let you get into detail, but why do we need a risk score?

Dr. Sorin Pislaru: Well, so, so it's extraordinarily valuable in terms of etiology and it's extraordinarily valuable in terms of outcomes. So, so we, we took the opportunity of having a large tertiary center and, and we look at our experience with about 20,000 or so patients who have a first ever diagnosis of moderate or more tricuspid valve regurgitation. And intuitively you would say if you are older, you'll survive less. If you are younger, you'll survive more. And to a certain extent that's true. But, but to my surprises, when when you take, say, an 80 some year old patient, they may live as long as 15 years, or they may die the very next day after you see them. And there's really no, no rhyme or reason why that should happen from a superficial view. So the *tr per se* will not, will not tell you what your patient will do. And then, then if you think about it, you have to have better tools engaging the risk of the one individual who sits right next to you when, when you have the clinic visit, it's not enough to tell them what 100 people will do. You will need to tell them what they will do. And that's the reason we, we, we felt it's really important to develop a risk score.

Dr. Sharon Hayes: So, so tell us more about how did you come up with it and, and can regular cardiologists like me actually use it?

Dr. Sorin Pislaru: So, so the, the, the very first thing we, we decided to do when, when looking at a risk score was to make it very, very simple. If you make things too complicated, no one will ever be able to, to apply them in a clinical setting because we are too busy. We, we have a lot of things to do. So it had to be simple. We on purpose wanted to make this something that can be embraced not only by cardiologists, but also primary care physicians. So on purpose, we did not put parameters of right ventricular function, you know, fancy, this is from Echo MRI, which we have, but we wanted to make something very, very easy. So, so we took with this 20,000 or so patients and, and see what's associated with mortality in terms of simple clinical parameters. And it turns out that eight of them, which are just age, the, the gender renal failure, history of heart failure, lung disease, some laboratory tests like a ST, and then a heart rate that's fast and present of severe tr where all the things we needed to have a really, a good model to, to predict who's going to survive longer or shorter. So, so instead of having this extraordinary variability in one year survival from zero to to 80%, now you can break it down in, in various levels. So, so we, we created this score that goes to a maximum theoretical maximum of 12, but, but practically anything more than nine, it's, it's already bad enough. And then, then, you know, a person who has a risk of zero, their one year survival, it's 95% and the person has a risk of nine or, or more probably mortality is going to be 80% in these patients. So, so that's a huge difference and it helps you understand how sick overall is the patient in front of you.

Dr. Sharon Hayes: So, and, and I just wanna allow you to say that this score is available to anyone and you're gonna share a QR code with the audience so they can access this and actually work with it.

Dr. Sorin Pislaru: Absolutely. So, so on the, on the website, we, when we post this interview, we will put some, some slides, there's going to be a QR code, there's going to be a link. But, but even before you do that, just just go Google or Bing or your, your search engine of choice. Just put Trio score calculator and it's going to pop right there. It's free of use. You don't need to remember how many points or what to do, don't remember which factor. It's very easy to calculate and it's going to give you the one year and five year mortality in prediction in your model. And the other thing I was going to say, you know, it's not a perfect score. Nothing is perfect in life, but, but the, the performance, it's probably as good as, if not slightly better than other scores like Chads VASc for instance, you know, so just about in that neighborhood. So, so we, we feel this is a fairly straightforward tool and easy to use.

Dr. Sharon Hayes: So once a clinician has looked at the score, they've maybe given a score to one of their patients, how do you recommend people practically use the score with that patient sitting in front of them?

Dr. Sorin Pislaru: So looking at all these large number of patients, you, you start to understand that there's, there's more to it than, than just the tricuspid valve regurgitation per se. And, and then, then, then when we look at our own population, so say you have patients who have lower scores or

intermediate scores or higher scores, does presence of tricuspid valve regurgitation influence them in the same way, or is that different effect depending on how sick you are? And, and we did not expect that, but this is what we've seen patients who have lower intermediate scores, the impact of tricuspid regurgitation severity on mortality is very notable. In other words, if you have a score of five and you have moderate tr you have a probability of death. If you have severe TR with the same score of five, you'll have a substantially higher probability of death. So, so that adds a lot to, to, to your mortality. If you have a patient who has a very high score, the impact of tricuspid regurgitation was nonexistent. So it doesn't make any difference there. So I think, I think in many ways this score helps you separate patients who die with TR or off tr. And that means that perhaps when, when you start thinking, okay, let's do an intervention, let's do a surgery, let's do any of the modern things that we try to do, you should consider that patient's more likely to benefit from your intervention are the ones with the lower scores. I think that's, that's an important concept when, when selecting what you're going to do with your patient.

Dr. Sharon Hayes: That's great. And because you've studied like thousands of patients, I know, and I know that you have learned many other things about tricuspid regurgitation as well as the, the how to, how to manage and how to predict. So what else has TRIO and your investigations told you?

Dr. Sorin Pislaru: So we, we have lots of talented young, young staff here. And, and because we, we do have them, they, they have great ideas and, and VI who's one of our young rising stars had had this, this thought, well, you know, don't fight the computer just, just, just work with the computer and see what the computer can tell you about large numbers. So, so she, she did what we, we call clustering analysis, which is fancy words for saying we will let the computer segregate the patients into, into phenotypes that the computer chooses. We have no say in that we just provide the input data. So you know, the age, the gender, a lot of other variables that we did not include originally in the score. And what, what came up was that the computer isolates five very distinct phenotypes of, of tricuspid regurgitation. And, and you know, the lower earlier disease, it's, and the more advanced disease are kind of two thirds or even even a little over two thirds of the population, but then three very, very distinct clusters. So there's the patients who have chronic kidney disease, the patients who have ischemic heart disease, and the patients who have chronic lung disease and much more surprised the, the, the patients with highest mortality were the ones with adrenal disease and followed right after that by the patient with lung disease, which is not all that expected if you think about that. So, so all sorts of things you can learn out of that, you know, it, it's amazing.

Dr. Sharon Hayes: And I'm hoping that as we look at this further, those additional refinements of the phenotype may help us guide even more because obviously somebody with renal or lung disease is gonna be at higher operative risk,

Dr. Sorin Pislaru: Right? Yeah, no, most definitely. The the other thing that, that we, we also learned in the process, you know, you have a large number of patients and now you, you start following them up in time. And, and the, the issue is, we all agree, no question about that. Most of the tricuspid regurgitation

is functional, so it's related to another disease that enlarges the right, ventricle right atrium, and therefore the first line of therapy is medical therapy. No question about that. But how much should you expect out of medical therapies? There are a limit to that. Everybody responds. Some people respond. So we learned about that. And, and the paper is not published yet. It's under review, but, but about half of the patients who have severe tr do respond. And about the six of the patients who have only moderate tr actually progress on medical therapy because their underlying disease gets worse. Very, very important. If you do not see regression of tricuspid regurgitation at one year, it's very unlikely to happen past that. It can, but, but that would be rather unusual. So, so if you are waiting for a medical therapy response, don't go past one year,

Dr. Sharon Hayes: Do you need to wait a full year? I mean, is there anything No, because I, I, I think that's the thing. Patients are impatient. We are impatient. We say, let's get you on a, on a good, you know, volume management program and control your blood pressure and all of that. How, you know, I guess that's sort of another question beyond trio. But, but I think, do you have some advice for, is it two months, is it six months? And then you say, Hey, we gotta refer this patient on for something else.

Dr. Sorin Pislaru: I think with the emergence of, of low risk procedures and with the understanding also that surgery, in fact, it's not such a terrible thing in these patients. If you refer them early, their mortality is actually quite low. You know, the bad bad mortality comes from referring the patient to late. To me, to me, you know, it's a philosophical question. What do you call a patient who has no edema because they're on 40 milligrams of Lasix? Do you call that patient symptomatic with tr or asymptomatic with tr? You know, it, it's, it's not that easy to answer. And when you move from 40 to 80 and from 80 to 10, or from 120 to 160, are you preventing the patient the risk of an intervention or are you shorten their lives, not by not giving them an intervention? So I think you are right, one year may be too long to me, maybe bring them back in three to six months if they have persistent severe tr despite your best effort to do medical therapy, and if they're symptomatic or they have right ventricular dysfunction, well then start thinking about doing something to the tricuspid valve.

Dr. Sharon Hayes: We've got the score, we've got a better way to assess and predict for these patients, what's in their future. Tell us what we can look forward to in terms of fixing this tricuspid valve.

Dr. Sorin Pislaru: Oh, this has been a fabulous year and it is just February, you know, so, so we have two devices approved, so that's fantastic news. So the evoke valve from Edwards and the tri clip from Abbo, they have been approved for treatment, percutaneous treatment of the tricuspid valve regurgitation. Not only that, but, but also the surgeons have a lot more appetite to go and intervene on the tricuspid valve with isolated surgery just because there's a better understanding of risk. And there's actually a preoperative risk score now from, from a French group, that tri score that that you know, can give you the, the risk of surgeon in this patient. So overall, I, I think it's all hands on deck, you know, so, so we want to treat these patients very aggressively with medical therapy, but if that fails and if they're

symptomatic, we should offer them the, you know, the intervention. They, they need the surgical or intervention on the behalf.

Dr. Sharon Hayes: I, I would ask another, because we have folks who are listening to us who might say, can every cardiac surgeon do this isolated? I, is it something that we should think about sending to a referral center? I know the, the, the recently the percutaneous advice devices likely need to come to a referral center, but what about the surgery? Is there something new or different?

Dr. Sorin Pislaru: So like everything is life, you know, with experience comes, comes mastery of one field. So, so I, I think the more the surgeon performs intervention, the better they get at it. If you look at the, the publications from the STS database, the, the consensus is this is really not the surgeon's fault that the mortality is so high. It's just the extraordinarily sick population who eventually makes it to, to the surgical intervention. That's, that's part of the problem for, for Mayo Clinic, just looking at Mayo Clinic data, the mortality for isolated tricuspid regurgitation is actually quite low. It's, it's a little less than 3%. So, so, and that is with the risk factors included, so, so with the advanced disease included, so, so it's not as high as, as we fear off, but, but you need to, to send your patient earlier and your surgeon will do. Okay.

Dr. Sharon Hayes: So any, any last thoughts before we wrap up Dr. Pislaru?

Dr. Sorin Pislaru: It's, it's a fantastic opportunity for all of us to, to, to help our patients, but I, I think really that this is not a disease that is forgiving. It's just takes a long time to punish you, but it'll eventually do so. And I, I think it's time for us to, to be more aggressive about it. And don't take me wrong, I don't think you should send everybody with tr straight to an intervention or surgery. I think do due diligence, but, but don't think that because they are apparently well that the disease will, will let them live forever because it won't.

Dr. Sharon Hayes: That's a really powerful ending. So this wraps up this week's episode of interviews with the experts and I'd like to thank Dr. Piru for joining us today and discussing this important topic.

Dr. Sorin Pislaru: Thank you so much, Sharonne for, for having us, having me. And, and thank you for all the listener to, to tune in and then I hope that TRIO score will be helpful to you.

Dr. Sharon Hayes: We look forward to you joining us again next week for another interview with the Expert. Be well.