

Tricuspid Valve Disease

Announcer: 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. Bell: Well, welcome again to another in our series of Interviews with the Experts here at Mayo Clinic Rochester. I'm Malcolm Bell, the vice chair for the department and I'm delighted to have, again, back in the studio with Dr. Juan Crestanello, who is the Chief of Cardiovascular Surgery and a Professor of Surgery here in Rochester. Welcome again, Juan.

Dr. Crestanello: Thank you, Malcolm, glad to be here.

Dr. Bell: Yeah, so today we're gonna talk about tricuspid valve regurgitation and a surgical approach to this. And, you know, it's often said, you know this is the forgotten valve. I suspect we won't be forgetting about this in the future. And maybe it was forgotten in the past. Maybe for good reason perhaps. But, you know, surgical techniques have changed. Our whole approach to tricuspid regurgitation seems to have taken on, you know, a new energy, a new approach so. Maybe I'll just start off asking you, in your practice what do you see as the most common etiologies of tricuspid valve regurgitation?

Dr. Crestanello: Well, the most common etiologies of tricuspid regurgitation in our practice are related to left-sided valve disease, pulmonary hypertension and left ventricular dysfunction. We are starting to see an increased number of patients with isolated TR related to defibrillation and then organic TR is not very prevalent in the overall population but we see it very commonly in our practice.

Dr. Bell: So we'll get back to, you know the heart pulmonary hypertension LV dysfunction a little later but, you know, one of the things which I think we have all appreciated over you know, the last few decades is that by the time many of these patients present with your clear cut, your tricuspid regurgitation, they've already got signs of advanced right heart failure, some end organ damage. So maybe just sort of tell us what you think the optimal timing is for surgical intervention on the tricuspid valve and in a patient who does present late, you know, is there a point where it's too late?

Dr. Crestanello: Yeah, sure, well, that's. You stated that very well. Patients with tricuspid regurgitation are usually referred late for surgery when they have evidence of ventricular dysfunction or in organ dysfunction such as liver dysfunction or renal failure. And at that time, the risk of the surgery is significantly increased and the benefits of the surgery decreases. Therefore, patients with tricuspid valve disease should be referred early for surgery before the development of an organ dysfunction such as liver failure or liver dysfunction or kidney dysfunction, I'm sorry. And before the development of ventricular dysfunction. So it is important to detect those patients early on and refer them for surgical treatment early.

Dr. Bell: And how many of those patients that you're just talking about detecting early would have isolated tricuspid valve regurgitation separate to, you know, left-sided disease?

Dr. Crestanello: The isolated tricuspid valve regurgitation in the setting of absence of left side heart disease or pulmonary hypertension is relatively rare but it's an increasingly recognized form of tricuspid valve regurgitation and it's mostly related to chronic atrial fibrillation that leads to massive dilatation of the left atrium as well as the annulus of tricuspid valve. And that leads to tricuspid regurgitation. Those patients, in general we treat them by doing an ablation procedure, restoring sinus rhythm, and if the tricuspid regurgitation persists, with a repair on the tricuspid valve with a concomitant ablation, a surgical ablation.

Dr. Bell: Okay, so you've touched on surgical risk. Maybe you could share with us what you consider to be the main determinants of surgical risk and what would be the operative mortality in patients such just described. The patient with atrial fibrillation that has associated tricuspid regurgitation. And then what would be the surgical risk in the patient who presents with more advanced, you know right heart failure with symptoms and clinical signs.

Dr. Crestanello: The major determinants of surgical risk are the severity of the tricuspid regurgitation, the age of the patient, the presence of comorbidities, the severity of the symptoms of congestive heart failure and the severity of the right ventricular dysfunction, as well as the presence of any organ dysfunctions, renal and liver dysfunction. So the operative mortality across the country for patients who had isolated tricuspid valve surgeries is high. It's 8% and that's not because of the surgery. It is because of the late referral and the presence of comorbidities and physiological impairment that these patients have.

Dr. Bell: What degree of right heart failure and end organ dysfunction then leads you to make a determination that the risk of surgery is prohibitive. And I might also ask, is there a level of pulmonary hypertension which you take into account when making those decisions?

Dr. Crestanello: Well, it's hard to have a specific limits in which you say one patient is not a surgical candidate, but those patients who had extensive RV remodeling, that has a very poor right ventricular function, who are elderly, who has a renal failure, they have liver failure with thrombocytopenia, significant anxieties, portal hypertension. All those type of patients with advanced end organ dysfunction associated with the TR is very difficult to pull them through a surgery safely.

Dr. Bell: You know, it's interesting from a non-surgeon standpoint, you know, we often think of you know, LV dysfunction as, you know such a determinant of survival and a risk for surgery and often you'll forget about the right ventricle. And my understanding, at least in the past, has been that the right ventricle has also been very difficult to protect during surgery. Are there better techniques now to protect the right ventricle during open heart surgery and is that important to you today?

Dr. Crestanello: Well, certainly preserving ventricular function in patients who already have some degree of an impairment of a right ventricular function is essential. So if we're doing a isolated tricuspid valve surgery normally we do not cross clamp the heart. So we don't subject the heart to ischemia during the tricuspid valve repair or replacement. And that tends to preserve the right ventricular function. However, all patients once the tricuspid valve is made competent have some degree of deterioration of right ventricular dysfunction that adds to the underlying

dysfunction that the patient already has. So we have to have some reserve of the right ventricle in such a way that once we make the tricuspid valve competent we don't generate enough, after load means much with the right ventricle that we go into a situation of a right ventricular dysfunction and cardiogenic shock.

Dr. Bell: Okay, so you're in the operating room now. So as you approach this valve, are you repairing it or replacing it? What is more favored today?

Dr. Crestanello: Well, repair versus replacement for any type of a tricuspid valve disease, the outcomes of repair are better than replacement in terms of survival, the rate of reoperations as well as the impact on the right ventricular function. So in general, if we can repair the valve we favor repairing the valve and the predictors of a repair are related to the degree of annular dilation, the degree of right ventricular dysfunction, as well as the degree of tethering of the leaflets as well as the presence of leaflet pathology. But the first three, the annular dilation, the degree of right ventricular dilatation and the degree of tethering talks about how advanced the tricuspid valve disease and the right ventricular dysfunction is. So we believe that as operating on patients early with less degree of annular dilation, with less degree of RV dilatation and less degree of tethering allows for a higher percentage of valves to be repaired. And as a consequence also that leads to an improved outcome.

Dr. Bell: And in those patients that you do have to replace the valve, what type of valve would you be recommending?

Dr. Crestanello: Well, we normally recommend tissue valves. We very rarely use mechanical valves although mechanical valves are associated with a similar rate of reoperations and lower rate of tricuspid regurgitation recurrence than a bioprosthesis. They are associated with sometimes some challenges with the need for anticoagulation and risk of valve thrombosis and bleeding. In our practice, we only use mechanical valves in young patients who have need for anti-coagulation for other reasons or who have mechanical valves in other positions, for example in the mitral, in the aortic position. But we use them very rarely in general. If we have to replace the valve we replace them with a bioprosthesis.

Dr. Bell: Okay, so we just get back to, you know, we talked about left-sided disease and obviously for the most part we talk about significant mitral valve disease, you know whether it's but usually mitral regurgitation. In this patient just tell us, just walk us through how you then decide to treat the tricuspid regurgitation, which is, you know often a accompanies, you know, severe mitral valve disease but obviously there's various, you know varying levels of severity of the tricuspid regurgitation. So again, maybe just walk us through how what you decide. Well, when you decide to do tricuspid valve repair at the time of left-sided valve surgery.

Dr. Crestanello: So, as you say, tricuspid regurgitation is secondary to mitral valve disease is the most common type of TR. More than half of the patients who has some mitral valve disease has some degree of moderate or severe tricuspid regurgitation. And as the severity of the tricuspid regurgitation increases the outcomes are the survival decreases. So what to do with the tricuspid valve disease at the time of mitral valve surgery. So we recommend for patients with moderate or severe TR to do concomitant tricuspid valve repair at the time of mitral valve surgery. For

patients with trivial or mild to do nothing. And there's still significant controversy in those patients who are trivial or mild or mild TR but they have a tricuspid annulus that is dilated and dilation means an annulus greater than 40 millimeters, what to do. The guidelines recommend to do concomitant tricuspid annuloplasty in those patients. However, in our practice we have shown that there's really no concomitant, that there's no progression of TR on those patients either when the annulus sizes analyzes a continuous variable in or psycho categorical variable in terms of annular diameters greater or smaller than 40 millimeters. So in general, therefore we don't recommend to perform a concomitant annuloplasty on patients with annular dilation on less than moderate tricuspid regurgitation at the time of mitral valve surgery.

Dr. Bell: Okay, well unfortunately we are running outta time here but you know, if I interpret what you've been sharing with us here is that you really highlighting that we should be intervening earlier in these patients in general, those with tricuspid regurgitation. And to really avoid waiting until they've really manifested you know, signs of your advanced right heart failure just because of the risk, you know, even if they're not operated upon. I mean obviously you know that's a high mortality associated with those patients and then poor quality of life but the surgical risks become higher. And so maybe what message would you like to send to, you know, the cardiology community in terms of, you know detection of disease and working them up for earlier in surgical intervention?

Dr. Crestanello: Well, just to summarize that tricuspid regurgitation has significant impacts on the outcomes. It is undertreated and when it's treated, it's usually treated late. And we believe that early treatment is associated with a lower operative mortality, a higher rate of repair, and should lead to better long-term survivals as well as quality of life. And overall the whole field of tricuspid valve disease is a great opportunity for cardiologists and surgeons to work together to really define the timing, the type of treatment and the outcomes of patients with tricuspid valve regurgitation.

Dr. Bell: Well Juan, thank you so much. It is been a really wonderful summary of an important disease here from the surgical perspective and thanks so much for joining us today.

Dr. Crestanello: Thank you, Malcolm.

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