- My name is DJ Lakkireddy. I'm the Executive Medical Director for the Kansas City Heart Rhythm Institute.

Please summarise the aim, study design and endpoints?

The SUSRUTA-IST study is an observation registry, which essentially looked at sinus node sparing hybrid endo/epicardial ablation approach compared to that of an endocardial radiofrequency ablation done in a percutaneous fat. As you know, the inappropriate sinus tachycardia is a very common cardiac dysautonomic condition that is mostly seen in young women of very productive adult years. This group of individuals range anywhere from 13, 14 years all the way up to 35, 40 years of age. It's most commonly seen in this group of people. Manifested by dramatic symptoms of palpitations, shortness of breath, which really impedes the quality of life, really compromising their entire life. And oftentimes, there are no easy solutions in treating these people. There's a lot of work that has been done in this space using beta blockers and the more recent antiarrythmic drugs like Corlanor. However, radiofrequency ablation has been attempted in a lot of these patients over the last 20 years of experience, including very early work that was done by the Michigan Group, and then subsequently by the Cleveland Clinic Group. And what you realise repeatedly in this particular approach is the endocardial ablation of sinus node modification oftentimes does not work. And there is a very high failure rate where patients require more than two or three procedures, and at the end of it, you're left with a sinus node that's completely destroyed with patients requiring permanent pacemakers. And then you have the collateral damage of the phrenic nerve injury because the sinus node sits in close proximity to the phrenic nerves. So when you're delivering radiofrequency energy in that particular location, you have a very high risk of phrenic paralysis. And this oftentimes, often requires epicardial access and then mapping of the sinus node in the epicardial space and ablation of the same, really resulting in suboptimal results, very high complication rates. And this is kind of what we learned over the years and for a lack of a better answer, depending on the intensity of the symptoms, patients are willing to put themselves through something as intense as that. So somewhere along, we realised that sparing the phrenic nerve or the diaphragmatic nerve is important. And since the sinus node is essentially an epicardial structure, and then you have these entire network of sympathetic nerve inputs into the right atrium epicardially, we felt that if there was a way for us to really do a regional sympathetic denervation around the superior vena cava, sparing the sinus node, and around inferior vena cava, and potentially, all across the crista terminalis, this could potentially result in what we call a regional sympathetic denervation of the sinus node while you remove the pathological inputs into the sinus node and preserve intensive sinus node activity. This technique was initially described by Carlos De Asmundis and Mark LaMeier from Belgium. And so, we all got together, and we learned, and embraced this particular technique, and started trying to execute it in patients who have very symptomatic inappropriate sinus tachycardia that are not responding to medical therapy who have dramatic limitations of their lifestyle. What we found was incredibly reassuring. By doing this endo/epicardial hybrid approach and sparing the sinus node, the number of procedures that you require to really get the sinus node rates under control is significantly lower. I mean, with almost with one procedure, you can get more than 90% of these people's sinus rates heart rate syndrome under better control, while you preserve the phrenic nerve and avoid the phrenic nerve damage. And what we also noticed is the sinus node is well-preserved, and so, the risk of needing a permanent pacemaker is also dramatically lowered. So we find that with the hybrid IST procedure, you could help a lot of these patients who have inappropriate sinus tachycardia that are currently faced with a very limited choice of treatments and a dramatic reduction in their quality of life. And oftentimes, they become so debilitated that their life is completely turned upside down.

What were your key findings?

Our key findings were the hybrid endo/epicardial sinus node sparing surgery is safe. It's not only feasible, it's safe, has significantly lower risk of complications and is dramatically more efficacious in controlling the heart rate, improving the overall quality of life, anxiety and depression scores, and exercise capacity.

How should your findings impact practice and influence further research?

I think the take-home message from this study is that inappropriate sinus tachycardia is a very debilitating disease with very limited treatment options. The sinus node sparing hybrid endo/epicardial ablation procedure could be a very important tool in the therapeutic armamentarium against the inappropriate sinus tachycardia, which as a disease, is very poorly understood. And it has very limited treatment options at this juncture. You have to realise that this is not a randomised controlled trial, and obviously, being a clinical registry, it has its all the limitations that are very much innate to a clinical registry like this. We really need a large randomised controlled trial to prove the clinical effectiveness and reproducibility of our findings, so that this could be applied to a wider group of people and be offered to more patients across the world. We also need further understanding of how exactly this procedure works. I mean, based on our limited experience and our exploration, we believe that this creates sort of a regional sympathetic denervation, sort of minimising the abnormal autonomic sympathetic inputs into the sinus node, which makes the sinus node react and put out increased electrical impulses. But what else is in play needs to be further explored. So I think, we have hope, and we are moving in the positive direction, but we need more definitive answers, and in order to be able to understand this in a better way.