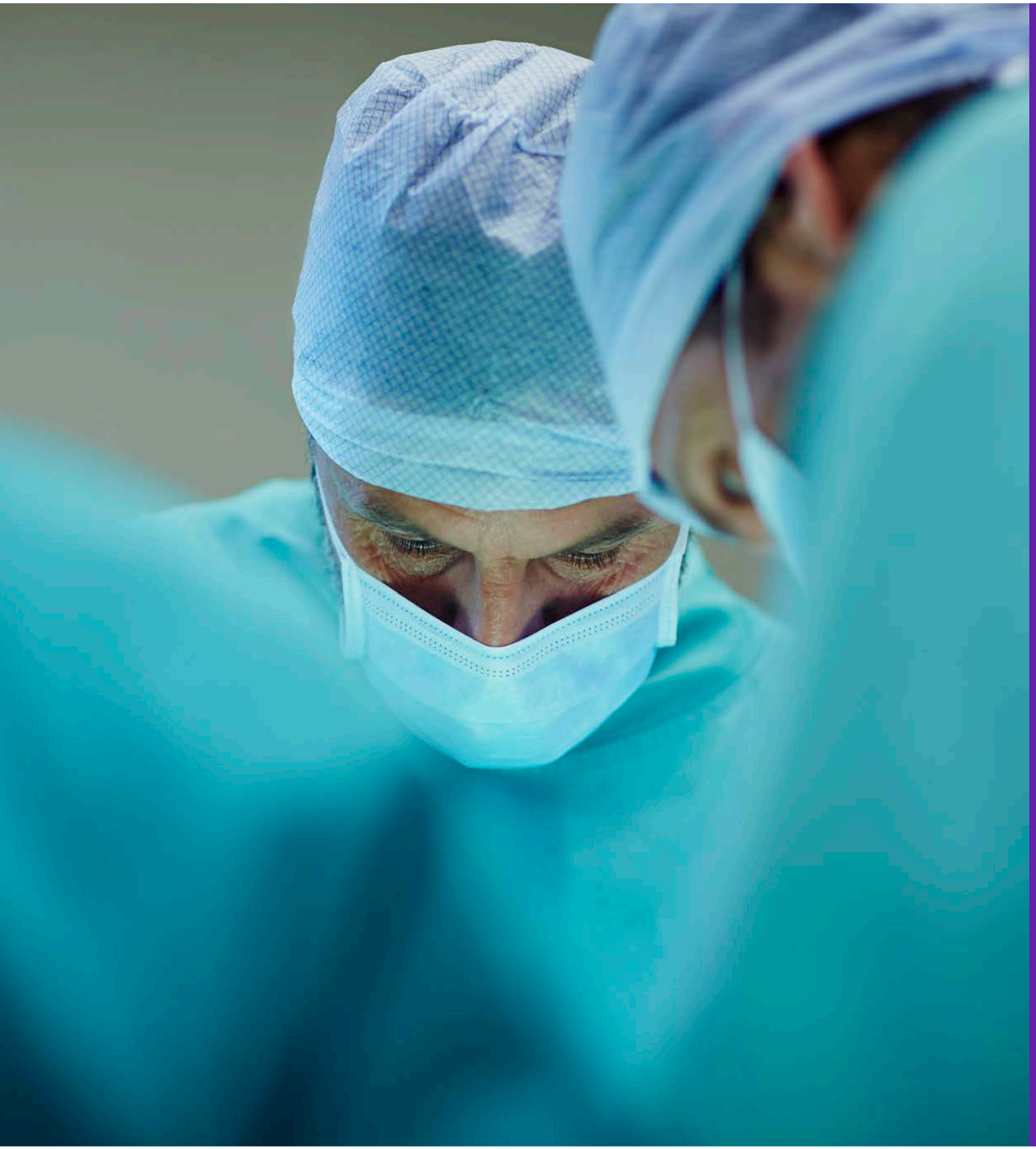


# A new vision for LAAO

## See more opportunities to simplify and streamline procedures with the 4D ICE NUVISION™ ultrasound catheter

Imaging advancements are driving significant progress in structural heart interventions. Through pioneering efforts and continuing research, the Texas Cardiac Arrhythmia Institute at St. David's Medical Center is helping set the pace. Executive Medical Director Andrea Natale, M.D., F.H.R.S., F.A.C.C., F.E.S.C., leads the team in exploring cutting-edge options that make it possible to treat more cardiac patients with less invasive techniques.

One of those emerging technologies is the 4D ICE NUVISION™ ultrasound catheter by Biosense Webster.[1] Physicians at St. David's Medical Center were among the first in the world to evaluate the intracardiac echocardiography catheter as an alternative to TEE, with early in-human trials in 2021. Now the 4D ICE NUVISION ultrasound catheter is the preferred tool in LAAO procedures, addressing the Institute's growing need for advanced imaging that goes beyond 3D capabilities.

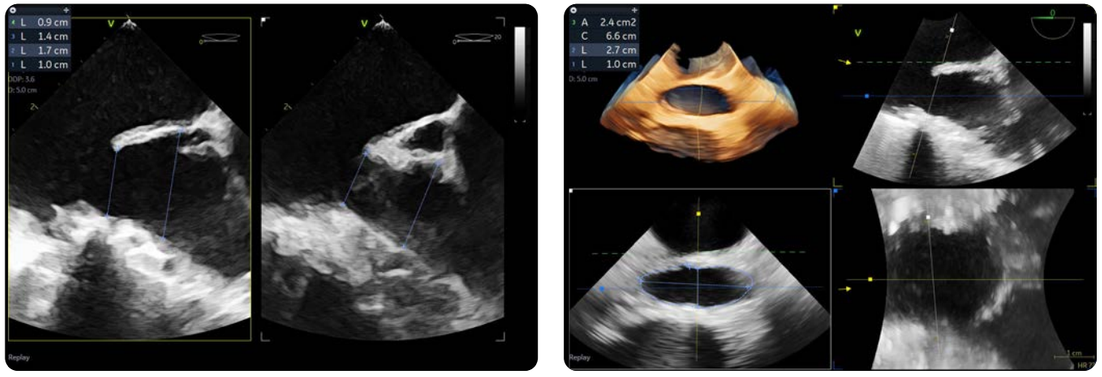
With real-time, volumetric imaging, a 90° x 90° field of view, 2D and 4D color Doppler flow ability and an independent rotating tip, the catheter was designed to allow multiplanar visualization of target cardiac structures with minimal manipulation.[1,2] The sophisticated imaging also enables physicians to perform procedures under conscious sedation, which can benefit patients and improve workflow efficiencies. It operates using GE HealthCare's Vivid™ ultrasound system.

We recently asked Dr. Natale to share his experiences with the 4D ICE NUVISION ultrasound catheter and the impact it has on structural heart interventions.

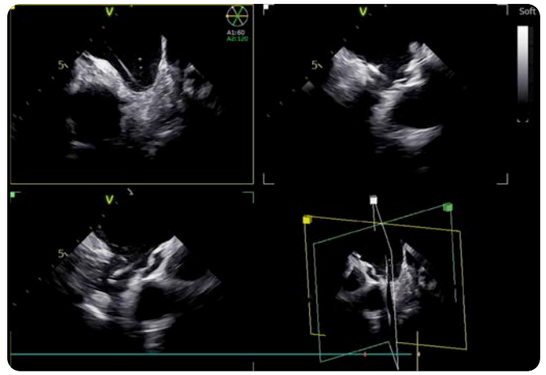
**Can you tell us about the electrophysiology program at the Texas Cardiac Arrhythmia Institute and what types of procedures are performed at your facility?**

**Dr. Natale:** *The EP program started in 1996 and expanded to the Texas Cardiac Arrhythmia Institute in 2008 with several expansions and remodeling projects over the years. We most recently opened a state-of-the-art Electrophysiology Center at St. David's Medical Center that has 6 dedicated EP labs that are all hybrid capable (with a seventh on the way), a 24 bed EP telemetry unit, training facility with integrated live broadcast capabilities, and a conference center. This recent expansion, which includes four VIP patient suites, will help accommodate the growing number of international patients traveling here to seek treatment. We perform complex ablations including atrial fibrillation (AF), ventricular tachycardia (ischemic and idiopathic), ventricular fibrillation, atrial tachycardia (AT), supraventricular tachycardia, and inappropriate sinus tachycardia (IST). We also perform implantation of biventricular devices, ICDs, pacemakers and loop recorders, laser lead extractions, and left atrial appendage occlusion devices. We currently perform well over 3,000 procedures a year.*

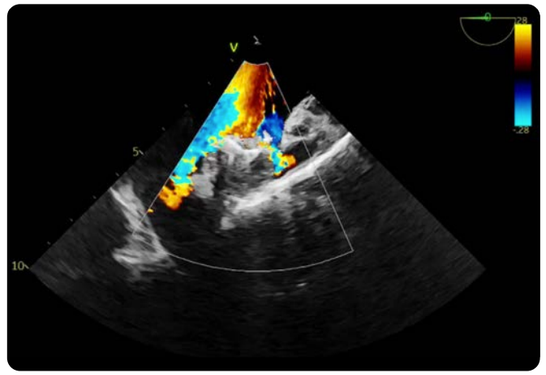
> *Now the 4D ICE NUVISION ultrasound catheter is the preferred tool in LAAO procedures, addressing the Institute's growing need for advanced imaging that goes beyond 3D capabilities.*




Using biplane and FlexiSlice 4D ICE allows better anatomy characterization helpful in complex anatomy.



4D ICE NUVISION ultrasound catheter with triplane imaging looking at 0, 60 and 120 degree view of left atrial appendage.



Using 4D Color Flow with the 4D ICE NUVISION ultrasound catheter is helpful while integrating intraprocedural leak detection and to guide leak closure procedure.

**You were one of the first physicians to use the 4D ICE NUVISION ultrasound catheter. What intrigued you about 4D ICE and volume imaging that made you want to pioneer this technology?**

**Dr. Natale:** *We have been using 2D ICE for procedures since early 2000s, mostly for ablation. But clearly when moving into more structural work, such as left atrial appendage closure and for some of our VT ablation, 3D imaging is certainly helpful.*

*There wasn't an issue until recently when we did not have a good platform for 3D or 4D that interested us. So, when the 4D ICE NUVISION ultrasound catheter came along, we got involved in the early human testing in Europe. It was really the excitement we had when we were involved in that testing that raised our interest in the technology.*

**What were your initial thoughts using the real-time imaging tool in LAAO procedures?**

**Dr. Natale:** *The quality of the picture was amazing, and we felt that we were getting adequate imaging to make sure the device was properly deployed without leaks. We also found the catheter was very nice in terms of 'ease of use.'*

**How has the 4D ICE NUVISION ultrasound catheter's unique design been beneficial in these procedures?**

**Dr. Natale:** *It's the rotating tip that makes the big difference. We can get the picture we want without spending too much time on manipulation. We can get multiple views of the same structure without too much manipulation, which really helps with left atrial appendage closure devices.*

**How would you compare the 4D ICE NUVISION ultrasound catheter to 2D ICE in terms of imaging capabilities and functionality?**

**Dr. Natale:** *It's really about the quality of the picture. With 2D ICE, you need more manipulation and it's sometimes difficult to get the view you want, so you always feel that you are relying more on geography.*

*Whereas with the 4D ICE, I feel we get the picture that is equivalent to TEE in terms of the view we get, maybe better quality. We are right there. Usually, we advance the catheter in the left atrium, so I feel more comfortable with the 4D ICE NUVISION ultrasound catheter that we have a good deployment.*

**Why is using biplane or triplane imaging in left atrial appendage closure procedures so important?**

**Dr. Natale:** *Those pictures are closer to what we are used to seeing with TEE, so we can make sure there is a good seal and no evidence of leaks. The 3D function is critical, and it's probably underutilized with the transesophageal echo. It's certainly valuable to maximize the fact that you've done a good job. The more information you get at the time of implant, the better it is for the future risk of leaks.*

> *"The workflow is better for us because we don't need anyone else in the room to help with the procedure. We can schedule whenever we want, rather than relying on others.*

**What influences your decision to use transesophageal echo in left atrial appendage closure procedures versus 4D ICE?**

**Dr. Natale:** *We've transitioned pretty much to ICE-guided procedures because it allows us to do the procedures without general anesthesia, so there's no intubation. It's less invasive and easier on the patient. In our hands, ICE has not caused any problem in terms of complications. Whereas with TEE, although the rate is low, there is more risk of esophageal perforation. With ICE, people don't complain the day after that they have a sore throat because of the intubation. I feel it's better for the patient.*

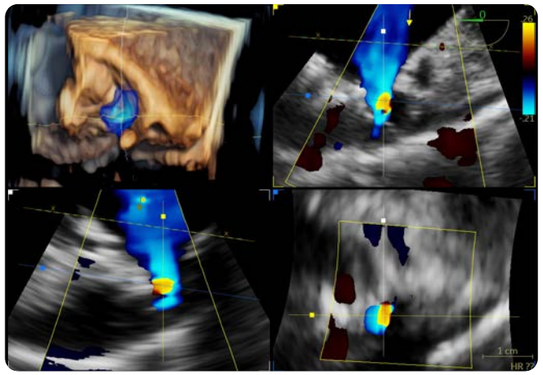
*And most importantly, the workflow is better for us because we don't need anyone else in the room to help with the procedure. We can schedule whenever we want, rather than relying on others.*

**How is your team utilizing the 4D ICE NUVISION ultrasound catheter now and what is the potential for the future?**

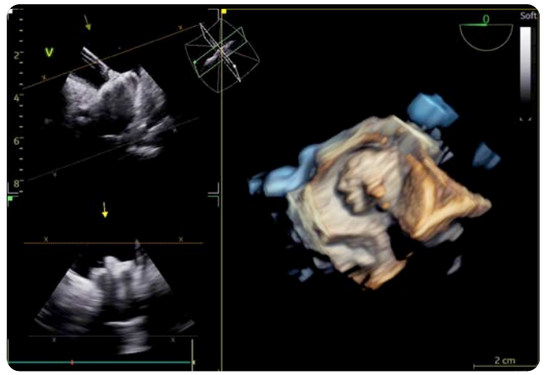
**Dr. Natale:** *For us, we are mostly using it for left atrial appendage closure, but the 4D is also very helpful for VT ablation procedures because it gives us a better-quality picture of the area we are trying to target. Our goal is to have all our LAAO procedures being done using the 4D NUVISION catheter for imaging.*

**The price of the 4D ICE NUVISION ultrasound catheter is higher than 2D ICE. How have you addressed this concern in your facility?**

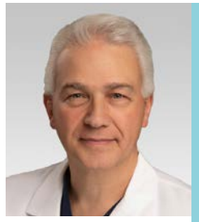
**Dr. Natale:** *I think the benefit of the catheter is significant. It really benefits our patients and our workflow. I think those benefits make it worth it.* ■



Using 4D Color Flow with FlexiSlice on the 4D ICE NUVISION ultrasound catheter is helpful to locate and visualize the leak in orthogonal planes.



4D Image using 4D ICE NUVISION ultrasound catheter of the closure device seated in the proper position.



**Andrea Natale, M.D., F.A.C.C., F.H.R.S., F.E.S.C.,** is Executive Medical Director of the Texas Cardiac Arrhythmia Institute at St. David's Medical Center in Austin, Texas. Dr. Natale is an internationally renowned leader in the field of electrophysiology, who specializes in the use of percutaneous catheter ablation to treat complex atrial fibrillation. He pioneered a circumferential ultrasound vein-ablation system to correct AF, developed some of the current catheter-based cures for atrial fibrillation, and was the first electrophysiologist in the nation to perform percutaneous epicardial radiofrequency ablation. Dr. Natale has authored or co-authored hundreds of published articles and is editor-in-chief of the *Journal of Atrial Fibrillation*.

1 4D ICE NUVISION ultrasound catheter is only available in the US and distributed by Biosense Webster. The combination of Vivid™ E95 with 4D ICE NUVISION is not CE-marked.

2 Evaluating the role of transesophageal echocardiography (TEE) or intracardial echocardiography (ICE) in left atrial appendage occlusion: a meta-analysis – Akela et al. – 2020 – Journal of Interventional Cardiac Electrophysiology