

Early experience with the new Vivid™ Pioneer ultrasound system

Assessing image quality, workflow efficiency, and usability

As cardiovascular imaging continues to evolve, today's clinicians are seeking tools that keep pace with rising clinical complexity and relentless workflow demands. With more patients and more pressure every day, true innovation must pair precise imaging with greater simplicity, consistency, and speed across all areas of echo.





Dr. Akhil Narang is the Director of the Echo Lab and a vital member of the structural heart imaging team at one of the largest Echo Labs in the US. His institution treats more than 75,000 patients annually across cardiac surgery, heart failure, interventional procedures, and cardiac rehab, performing over 2,700 cardiac surgeries per year. The echo lab is equally robust, conducting more than 2,700 echoes monthly — including TTE, TEE, and stress echoes — totaling an estimated 35,000 echoes annually.

Dr. Narang has an extensive background with Vivid E95 ultrasound systems and recently experienced the next-generation Vivid Pioneer platform. We sat down with Dr. Narang to get his perspective on the new Vivid Pioneer and what it might mean for cardiovascular care.

As a leader of a high-capacity echo lab, how does a heavy caseload impact your workflow and technology needs?

Dr. Narang: *We are the biggest and busiest echo lab in the Chicagoland area and one of the largest in the country with a robust team of dedicated cardiac imagers. We also have one of the busiest structural heart programs in the country in both surgical volumes and transcatheter volumes.*

High volume necessitates operational efficiency. From the echo lab standpoint, that means we are pretty regimented in terms of the amount of

time we schedule for an echocardiogram, the sonographer to complete the exam, and do the report. We are specific in terms of the metrics we want sonographers to achieve so we don't fall too far behind.

We also face staffing limitations. We are well staffed when it comes to physicians, but sonographer staffing has been a bigger challenge. We rely on different agencies to help fill the gaps, with many sonographers coming in on several-month assignments and some contracts extended for a year. That's why it's critical for us to have an ultrasound system that reduces variability and improves reproducibility across users to effectively scale across all areas of echo.

You are among the first to experience the new Vivid Pioneer. How would you describe the overall image quality?

Dr. Narang: *I think the new Vivid Pioneer platform has made significant strides in improving image quality compared to the Vivid E95 — particularly in 2D, Color Doppler, and 4D imaging. There have also been notable improvements in respect to tissue and blood pool differentiation, and contrast resolution. I found the grayscale to be crisper with sharper borders and less noise. The color imaging was improved as well, with less bleed and speckling noted. I think the advances allow for greater accuracy when evaluating valve disease, especially in a complex setting.*

What is your impression of Vivid Pioneer's 2D image quality in the context of structural and valvular assessment?

Dr. Narang: *The 2D image quality was very impressive, with finer delineation of structures — particularly native valves and implanted devices. You could really see subtle features. When it comes to valvular anatomy, like the subvalvular apparatus and chordal structures, the leaflets appeared much cleaner. It was also easier to see the endocardial border definition, which improved assessment of LV and RV function. Overall, there was less bleeding of the grayscale. I thought it was all really outstanding and preserved across single plane and biplane imaging as well.*

How would you describe the probe technology: both the 4Vc-D probe and the new 6Sc-D probe?

Dr. Narang: *From my initial experience with the 4Vc-D probe, I thought the 2D imaging was great — there was no question about that. There was enhanced differentiation between blood pool and tissues, particularly with 2D imaging, and the Color Doppler was definitely superb. I thought the Color Flow was also very smooth with better spatial resolution — fewer blooming artifacts. This is really a step in the right direction in terms of image quality.*

With the 6Sc-D probe, the image quality was excellent with great near and far field resolution. I didn't perform any exams with the probe, but I held it and it felt very ergonomic. Overall, the Vivid Pioneer felt like a premium system, and I think it will also give you a lot of confidence in imaging.

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You mentioned some enhancements to the Color Flow technology — could you please share what improvements you've noticed?

Dr. Narang: *In the new Vivid Pioneer, the Color Flow is clean and you are able to focus on the localization of the jets. The rendering is completely different in how the imaging is displayed, and overall, it's quite good.*

I only observed a few demonstrations of the Radiantflow™ feature. It offers a sort of three-dimensional rendering of what the jet will look like in Color Flow. Theoretically it could be very helpful for jet localization.

Shifting to 4D imaging — how would you describe the quality and your experience with Vivid Pioneer?

Dr. Narang: *I think the 4D rendering — especially of valves — is improved compared to the prior Vivid E95 platform. It was outstanding for the aortic valve. Depth perception was noticeably better, and the surface detail of the valve leaflets was more nuanced. That's especially important for valve interventions — whether it's mitral, tricuspid, aortic, or left atrial appendage — because it really enhances how you visualize the tissue and understand the spatial relationships in four dimensions.*

High-quality imaging is the cornerstone for trustworthy AI-powered analysis. Do you think improvements in Vivid Pioneer's image quality can enhance confidence in its smart tools?

Dr. Narang: *There's no doubt that precise imaging and excellent image quality allow for the rest of the smart tools. Automation, measurement, multiplanar reconstruction — it all rests on good 2D image quality and builds on that foundation. Image quality and resolution are always the underpinnings of ultrasound accuracy.*

One of those smart tools is AI Cardiac Auto Doppler. How useful is the feature in everyday practice, particularly for regurgitant measurements?

Dr. Narang: *When you get a Doppler measurement, the sonographer or cardiologist typically has to measure*

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all the Doppler tracings, which can be very time consuming when done manually.

The AI Cardiac Auto Doppler tool is really good because it automatically measures, averages results, and you can select specific beats to interpret, so it really saves time and improves workflow.

By standardizing measurements, the AI Cardiac Auto Doppler in many ways takes the human variability out of the equation — which is really important. The nice thing about the system is that the person acquiring and interpreting the images can still decide whether or not to accept the auto tracings. But from my experience, Vivid Pioneer does an excellent job, and there's very little changes that need to be made.

The AI Cardiac Auto Doppler helps in valve disease because it can trace VTIs and trace the continuous Doppler signal. It aids in the assessment of diastolic function because it traces the deceleration time, measures the E, the A wave, the E primes — all the elements required for assessment of valve disease. If those measurements are inaccurate or there's variability in interpretation, your assessment of disease severity is going to be incorrect.



The structural heart space is rapidly evolving, and GE HealthCare is working to push the boundaries in this area — with Vivid Pioneer representing the next step forward. How do you think it delivers on image quality and workflow?

Dr. Narang: *The first thing that stood out was the assessment of valve lesions and color imaging. Previously, this area was lagging behind, but Vivid Pioneer shows clear improvement. I felt Vivid Pioneer offered a more precise evaluation of valve regurgitation, which in turn gives you greater confidence during procedural steps, post-procedure, assessing valve, residual valve disease or residual regurgitation.*

Additionally, some of the smart tools built into the system also make it a competitive product. It automates many steps, particularly measurements.

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Standard measurements typically performed by sonographers or echocardiographers can now be completed on the cart system with just the click of a button.

Improvements in features like FlexiSlice, 2-Click-Align, and the LAA Workflow Suite, along with updates to existing quantification tools and mitral valve visualization tools — make this a better system. It simplifies operations and leads to efficiency across the entire echocardiography workflow — from image acquisition to interpretation. The better the workflow, the easier it is to adopt and integrate into day-to-day practice. I think Vivid Pioneer does that, and it really helps improve imaging.

The bottom line: Improved image quality is the first step in feeling confident about using Vivid Pioneer in structural heart, and I think that's been accomplished here. Vivid Pioneer will be a game changer in structural heart — and the fact that GE HealthCare invests in workflow improvements makes a big impact.

Expanding on workflow — which new interventional tools made the biggest impression on you in this area?

Dr. Narang: *I was particularly impressed by the LAA workflow tools [AI FlexiViews LAA, LAA sizing, and device compression tools]. They are helpful for sizing, measurement, procedural planning, and guidance. It's really as simple as acquiring the image. As long as the left atrial appendage is in the field of view in 3D, you are good to go. I found it to be both practical and valuable for implanters and imagers during cases.*

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I also had a chance to observe the workflow of the LAA sizing and compression tools. The tools support a structured, repeatable workflow that can be standardized, which is especially valuable for newer users. The standardization can help with consistency and reduce variability.

Could leveraging AI in image acquisition benefit newer users who are trying to master multiplanar reconstruction (MPR)?

Dr. Narang: *MPR takes some time to learn. Part of the battle is just setting up the views and clicking through the right buttons before you can even start doing any useful measurements or guidance. So the fact that it can now be done automatically for the left atrial appendage is a big help, especially for those still learning the process. It removes one step they'd potentially have to master during a procedure or a screening case.*

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With images automatically generated with AI FlexiViews LAA, users can focus more on understanding the anatomy and morphology of the LAA. Then, as they gain experience, they can start thinking more about how to further optimize things manually. In a busy echo lab, this kind of automation can really help novice users feel more confident using tools like FlexiSlice.

Vivid Pioneer also introduces a new TSP Height Tool, designed to help identify the ideal transseptal puncture location in just two clicks. What were your impressions and thoughts on its potential impact?

Dr. Narang: *A critical step in transcatheter mitral valve intervention is ensuring you have adequate left atrial height or transseptal puncture height. There's definitely a science to this, but also an art. Helping users optimize their height for a transseptal puncture is critical. Without taking the time to get it right — which many tend to rush — you can end up with suboptimal height, making the transcatheter procedure significantly more challenging.*

Any quick tool that can provide a precise measurement is extremely helpful — especially when the interventional cardiologist is asking, 'What's the height at this particular location?' Having that readily available would definitely support the procedure. No question about it.

Did you observe any meaningful updates to tools you've used in the past?

Dr. Narang: *I think the FlexiSlice feature has improved. It really goes hand in hand with the 4D imaging — the better the 4D rendering, the better the visualization you get from the FlexiSlice tool.*

The important thing about the FlexiSlice tool is that it provides 2D reconstructions from a 4D image,

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and I found those 2D images to be quite good — noticeably improved from previous versions. They felt comparable to what we're seeing from standard 2D images, even without doing a 3D acquisition and post-processing. That can be especially helpful in valve interventions — enhancing confidence for transcatheter interventions.

The new Vivid Pioneer is lightweight, weighing just 104 to 110 kgs. What are your thoughts on the system's portability and role in day-to-day workflow?

Dr. Narang: *The footprint of the machine is smaller, feels more compact and streamlined than the Vivid E95, which improves portability. I actually moved it around myself, and that was great. The Vivid E95 is bigger and a bit more difficult to maneuver in a hospital setting. Sometimes you've got to squeeze into tight spaces — whether it's an OR, a cath lab, an emergency room, or an ICU filled with equipment. So having a system that's easy to move around is definitely important.*

New perspective: exploring Vivid Pioneer in the cath lab

Another important way to evaluate Vivid Pioneer's impact is by assessing its performance in real-world clinical settings. Dr. Narang gained deeper insight into the system's capabilities by reviewing a percutaneous tricuspid annuloplasty case study by Professor Marta Sitges. He also observed its use during a complex mitral edge-to-edge repair performed by Dr. Laura Sanchis at Hospital Clinic Barcelona, Spain.

Tricuspid valve case study

You reviewed a case report on a tricuspid annuloplasty procedure utilizing Vivid Pioneer. How would you describe the system's performance in terms of image quality?

Dr. Narang: *Tricuspid annuloplasty in Europe is done very well with a lot of high level expertise and I recall seeing one case completed in under an hour. This procedure is typically performed with 2D imaging, but in this case, 4D imaging was used as well, and the image quality was excellent.*

The clarity of the annular structure and adjacent valve tissue allowed for a better assessment of device and tissue interaction — which is the key step in this procedure. You want to make sure your anchors are inserted into the annulus and not the leaflet tissue. The 4D rendering that they used during the procedure was actually quite good as well. It gave a lot of confidence in the accuracy of device positioning and implantation, so it was very impressive.

Are there any specific capabilities that would enhance the procedure?

Dr. Narang: *I think it's really the 2D imaging that plays the most important role in tricuspid annuloplasty procedures. While 4D can be a helpful adjunct, the strength lies in high-quality 2D with biplane imaging, which allows you to clearly visualize the annular structure and differentiate tissue. I think that's what facilitates easier implantation.*



Mitral valve procedure

You observed a mitral valve edge-to-edge repair procedure with Vivid Pioneer. How would you evaluate the system's performance in terms of image quality?

Dr. Narang: *It was good and Dr. Laura Sanchis did a wonderful job imaging the valve throughout all the procedural steps — from the baseline assessment, the transeptal puncture, clip positioning, to leaflet grasping. Everything went smoothly, despite it being a challenging case and having to redo the transeptal puncture.*

She used FlexiSlice throughout the procedure, which helped in terms of streamlining the procedure by eliminating the need to go in and out of 2D and 4D imaging, and expedited decision making.

You mentioned that it was a challenging case. How so?

Dr. Narang: *The challenge was attributed to the patient's anatomy, not any limitations in image quality. With the enhanced resolution of the TEE — in my opinion, if I was doing the procedure — I can see how it may really help and improve my confidence with the transeptal puncture, assessing leaflet anatomy, and device orientation. If the image quality was challenging, this could have been a much more difficult case.*

Through this lens, how would you compare Vivid Pioneer to the prior system?

Dr. Narang: *The Vivid E95 platforms have obviously been a great workhorse for GE HealthCare, but there's noticeable improvement in the imaging quality with Vivid Pioneer for sure.*



Vivid Pioneer features a simplified user interface, digital TGCs, and customizable options. How would you describe the user experience?

Dr. Narang: *The interface is definitely cleaner and it feels more intuitive than previous iterations. It has a nice big screen, the button layout is nice, and the navigation feels easier and more customizable. Overall, it really gives the impression of a high-end product.*

For the TGCs — I know it's a little controversial, and I went back and forth on it myself. Initially, I didn't think

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I'd like it, but honestly, it wasn't a big deal. There are fewer physical buttons on the screen, and to me, that's fine. I know some users really value the tactile feedback because it's familiar and allows them to navigate using both hands more instinctively. But as we shift into a more digital, touchscreen-driven era, I was comfortable with the new setup. Plus, there were some nice presets — including customizable TGC contouring — which I think will help ease the transition for others as well.

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Vivid Pioneer includes a power interruption mode—in the event of accidental disconnection or power loss, the system continues scanning up to 5 minutes. What's the value of this feature in your clinical settings?

Dr. Narang: *It's a very helpful feature. In the cath lab or tight spaces, cords can easily get pulled or tripped over — it's happened to all of us, and it's very disruptive. It can take us 10 or more minutes to recover and get back to where we were, and can also create safety concerns. So having a power interruption mode is definitely valuable. And being able to unplug the system and still have 5 minutes of battery life is really helpful — especially for someone who needs to move quickly from one area to another.*

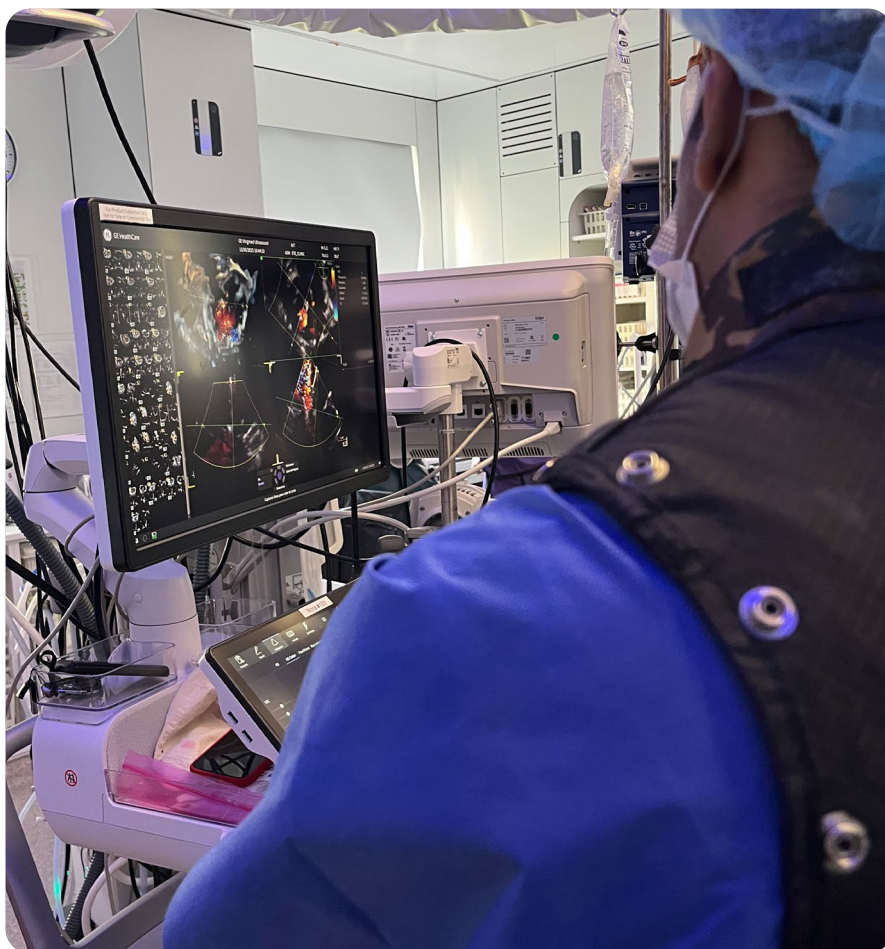
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Bringing everything into focus, how would you best describe Vivid Pioneer to your peers?

Dr. Narang: *I think Vivid Pioneer is a combination of comprehensive improvement in image quality and post-processing tools, coupled with enhanced workflow via automation and artificial intelligence.*

For sonographers, I would mention that it's a premium system with enhanced tools and advanced post-processing software that will allow for improved workflow, enhanced imaging quality, and an enjoyable scanning experience.

For physicians, Vivid Pioneer offers substantial improvements in image quality, particularly for TEE. The enhancements in valve assessment will allow for greater confidence in all aspects of transesophageal echocardiography, including structural heart evaluation. ■



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