# Building a Tricuspid Program: Multidisciplinary Approaches and Skill Development

Physicians explore the practical aspects of establishing a tricuspid intervention program, including team building, procedural training, reimbursement challenges, and other lessons learned from early adoption of tricuspid technologies.

**With Mackram F. Eleid, MD; James McCabe, MD; Firas Zahr, MD; Sameer Gafoor, MD; and Molly Szerlip, MD, FACC, FSCAI**


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### What steps did you take to assemble a multidisciplinary team for your tricuspid program, and what roles are most critical?

**Dr. Eleid:** When establishing a tricuspid program, the multidisciplinary team is essential for identifying appropriate candidates for medical therapy and intervention; determining the mechanism of tricuspid regurgitation (TR) with multimodality imaging; determining the best therapy for the TR, including clinically available options and investigational options; and coordinating procedures, periprocedural care, and outpatient longitudinal follow-up. The team includes valve clinic staff (including schedulers and nurses), the structural heart coordinator, advanced practice providers, structural imaging physicians, cardiovascular surgeons, and structural interventional cardiologists. Close collaboration with heart failure (HF) and transplant cardiologists as well as electrophysiologists is needed for certain patients. The key to efficiency involves triaging referrals and records to determine optimal candidates and arranging appropriate testing. Cardiologist evaluation of TR patients requires not only a broad understanding of valvular heart disease and its management but also the ability to recognize and evaluate noncardiac comorbidities. Determining patients who require HF optimization is essential, and admission for HF optimization is sometimes needed. Also needed is admission prior to transcatheter procedures to optimize volume status, which contributes to procedural success. Patients with device lead–related TR require particular attention to their pacemaker anatomy and function, with contingency planning needed for patients who may require revision of their pacing system before or after tricuspid intervention.

Training of echocardiography and CT imaging physicians on the data required to screen for tricuspid transcatheter procedures is highly important to ensure that appropriate techniques, images, and measurements are available to determine the mechanism of TR and guide best therapies. Structural interventionalist experience with tricuspid procedures and familiarity with imaging—including intracardiac echocardiography (ICE)—is an important aspect, as is close collaboration with device manufacturers for procedural execution. Intraprocedural communication between the interventionalist, imager, and entire procedural care team is also very important.

Postprocedural care is essential. This includes HF medication management in the hospital and monitoring for arrhythmias. Determining an optimal anticoagulation strategy that is individualized to the patient both before and after procedures is important. Longitudinal follow-up including arrangement of appropriate appointments with required testing is also necessary to track patient response to treatment and for ongoing surveillance and management of cardiac function.

### How do you train your team on tricuspid interventions, and what role does industry and/or simulation play in skill development?

**Dr. McCabe:** Thus far, training on tricuspid intervention has been very therapy specific. Our introduction to the therapy has been via trials, which comes with very prescribed onboarding and trial-based training. Obviously, as each therapy matures and is scaled, the same form of training won't always be offered or required, and that is when things will get more interesting.

Personally, my closest facsimile to this was tricuspid clipping. We started clipping the tricuspid valve using the MitraClip system (Abbott) in 2017, well before there was dedicated equipment or training offered. It's amazing to look back and realize how little we understood at the time. One thing is clear: With each successive therapy for the tricuspid valve, the rollout gets easier because the imaging requirements are largely therapy agnostic. Whether you are offering a new repair or replacement, the imager is still using the same echo machine and, largely, the same views; each clip experience ultimately helps each replacement experience, and vice versa. Thus, all interventions build toward the next, and that is a huge plus for onboarding new therapies and new operators within an existing system.

In this regard, the biggest hurdle is likely starting a first tricuspid therapy at a center that hasn't offered tricuspid intervention previously. In my opinion, beginning with a smaller group of dedicated operators and imagers is paramount, and investing primarily in imager training is the real key to success. I am not familiar with any simulator systems in development that would help our imaging partners train, but that would certainly be a great idea if available.

### What's one unexpected hurdle you faced when starting your tricuspid program, and how did you overcome it?

**Dr. McCabe:** Our primary hurdle was working through how to obtain consistent functional imaging. This may seem outdated now, but when we started tricuspid clipping in 2017 using the MitraClip system, no one was

thinking about transgastric short-axis views or multiplanar reconstruction (MPR), which have become standard working views. We also didn't have three-dimensional (3D) ICE at that time. Changes to the software and hardware of the ICE systems have been a huge leap forward when it comes to implementing 3D ICE for tricuspid interventions. I certainly don't use ICE in every tricuspid intervention, but it can be a real game-changer, particularly in patients with a lot of preexisting hardware in their hearts.

Although echo techniques and technology have advanced tremendously in the last few years, there are still plenty of opportunities to continue to grow. Fluoroscopy integration systems with echo and CT remain more hopeful than functional at this time. MPR via ICE has gotten a lot better but is not yet where it needs to be, and, importantly, our imaging colleagues need to be able to bill for their time and expertise in a rational way.

The other important challenge that everyone has faced, and has yet to be resolved, is matching the correct solution to the correct patient. Tricuspid solutions are proliferating, but when we only had a hammer, everything was a nail. Plenty of patients thus received well-intentioned but inappropriate therapies. This speaks to a need for a more nuanced understanding of which technology works best in which patient, as well as for a full complement of solutions to offer. I certainly can't wait for a functional annuloplasty system, as that is probably the best solution for the widest range of patients.

## ? What strategies have worked for building referral networks to identify tricuspid patients early?

**Dr. Zahr:** Transcatheter tricuspid intervention is now available in the United States with one approved repair device (TriClip, Abbott) and one replacement device (Evoque, Edwards Lifesciences). These approvals took the tricuspid valve from being the forgotten valve to the most discussed valve in scientific conferences and multidisciplinary heart team meetings. Importantly, this shift also included electrophysiologists in the heart team, given the prevalence of leads in TR patients and the risk of heart block after tricuspid replacement. TR is also dynamic and varies in severity, and symptoms are often vague. This, combined with the challenges in imaging the tricuspid valve, results in underrecognition and subsequent undertreatment of tricuspid valve disease.

Building a referral network starts with education about the disease, prevalence, and treatment options. This should start in the echo lab, through emphasizing the importance of complete scanning to recognize tricuspid disease. However, tricuspid disease is also present in cardiology clinics, HF clinics, electrophysiology clinics, and even primary care clinics. Therefore, it is important to educate all of these entities about the available data, echo tips and tricks, diagnosing criteria, outcomes, and symptoms.

It is very helpful to target transcatheter aortic valve replacement programs and other structural programs because TR is often part of multivalvular disease syndromes, and treating the aortic and/or mitral disease does not always resolve the TR. It is equally important to prepare your own program to take care of these patients, including the needed skills for interventional transesophageal echocardiography, cardiac CT, procedures, pacing strategy, and HF management.

## ? How do you address reimbursement challenges for tricuspid therapies, especially given their emerging status?

**Dr. Gafoor:** Reimbursement challenges affect every aspect of what we do. Particularly in new areas, such as transcatheter tricuspid valve repair and transcatheter edge-to-edge repair for the tricuspid valve, it is important to understand the pathway for approval. A recent article by Vanchiere et al on reimbursement for renal denervation was quite descriptive and enlightening, with many parallels to reimbursement for tricuspid therapies.[1]

When a therapy obtains FDA approval after a rigorous trial, there is often a significant rush for patients to be treated. It is important to focus on the therapy in detail. We still want good outcomes and safety, and it is key to stick to the inclusion and exclusion criteria for the trial. The significant impact of a complication to an emerging therapy cannot be understated. Although complications can happen, it is important to have the appropriate indications when treating patients. We need to be up front with patients about the therapy and its benefits and risks; so having that thoughtful discussion is key. It also sets appropriate expectations for time frame and learning curve. For tricuspid therapies, having the operator and imager be on the same page with procedural plan, expectations, and outcomes is key to success.

We have a close partnership with our administrative and finance departments on any new technology. New therapies are brought to a quaternary care center, sometimes as a trial period to evaluate the outcomes, length of stay, and reimbursement. It can be better to wait for the new technology add-on payment code to better understand the financials before full commercialization. From an administrative standpoint, not all therapies are necessary or appropriate in all settings. For larger markets with multiple

sites, it is better from a quality and financial sense to focus on higher-volume quaternary centers. Throughout this pathway, systems may work with vendors for optimized contracts to decrease costs and maximize value.

On a physician level, it is important to realize that therapies do not exist in a vacuum, and we have to work toward a sustainable model that allows the best care of the community. A therapy that has to start and stop and restart, whether for safety or financial issues, is detrimental to that vision.

## How has collaboration with HF specialists influenced the success of your tricuspid program?

**Dr. Szerlip:** We have a very close collaboration with our HF colleagues, and this is essential to any structural programs. We actually call it our heart recovery team and heart recovery clinic, as HF clinic sounds negative. This team is crucial as they make sure patients are on the correct guideline-directed medical therapy; importantly, for tricuspid patients, this can involve more than just diuretics. HF specialists help us get these patients on the correct medicines, and they can often see the patients a lot sooner than we can, and in shorter intervals of time. This is important for ensuring the patient remains diuresed, before and after treatment.

Interventional cardiologists and HF specialists also work closely together with inpatients, particularly to maintain volume status. Our HF specialists see and refer a lot of tricuspid patients from their clinics, and these patients might not otherwise be sent to us right way.

Our program is built on collaboration, not just with the HF specialists but with all subspecialties. We all see our patients clinic together, and all of our meetings are together. It really is a built-in collaboration that The Heart Hospital was founded on to begin with.

When it comes to a tricuspid program, collaboration is the key. The only way to be successful is via collaboration with all cardiology subspecialties. ■

1. Vanchiere C, Shah T, Cohen DL, et al. The state of reimbursement for renal denervation in the United States. Cardiac Interv Today. 2025;19:26-29.

*Disclosures*
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