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# Building a Structural Heart Disease Team

## How to Integrate People

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### Abstract

**Although the field of structural heart disease intervention is by no means a nascent one, it has undergone an unprecedented period of growth and organization over the past decade. The long-established stalwarts of aortic and mitral valvuloplasty have been joined by newer techniques including shunt (ASD/PFO) closure, transcatheter aortic valve replacement (TAVR), transcatheter pulmonary valve therapy, and mitral valve repair (MitraClip). As this field continues to unify, the expectation is that it will only grow. The prevalence of aortic and mitral valve disease is expected to increase as the population ages. This fact and the inevitable broadened commercial availability of these procedures will drive the number of structural procedures upwards. As an illustrative example, it is postulated that by 2015 the number of TAVR procedures will reach 25,000 per year.**



### Key Word

**Heart Team**

### Growth of Structural Heart Disease

Although the field of structural heart disease intervention is by no means a nascent one, it has undergone an unprecedented period of growth and organization over the past decade. The long-established stalwarts of aortic and mitral valvuloplasty have been joined by newer techniques including shunt Atrial Septal Defect (ASD) and Patent Foramen Ovale (PFO) closure, transcatheter aortic valve replacement (TAVR), transcatheter pulmonary valve therapy, and mitral valve repair (MitraClip). As this field continues to unite, the expectation is that it will only grow. The prevalence of aortic and mitral valve disease is expected to increase as the population ages [1]. This fact and the inevitably broadened commercial availability of these procedures will drive the number of structural procedures upwards. As an illustrative example, it is postulated that by 2015 the number of TAVR procedures will reach 25,000 per year [2].

### Building a Multidisciplinary Team Approach

*The Importance of Multidisciplinary Team*

As our field moves forward, it does so riding the edge of technological innovation but without prior organizational doctrine to guide the construction of a structural heart disease program. The concept of multidisciplinary care has long been utilized in other medical fields, the most conspicuous example being oncology. Trials evaluating forms of revascularization for coronary artery disease (SYNTAX and BARI) [3,4] introduced the concept of multidisciplinary care into cardiovascular medicine in the form of the "heart team." While there are indications from Neily et al. [5] that a cohesive team approach may improve mortality outcomes, the advantage of a multidisciplinary team (MDT) extends beyond procedural success. When dealing with the complexity of structural heart disease, the MDT is fundamental in the evaluation,

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decision-making, and post-procedural care. A cohesive team minimizes fragmentation in decision-making and improves coordination and delivery of care. It is crucial for patient safety, which is vital given that a substantial portion of this population may be frail and/or have multiple co-morbidities.

*Structure and Challenges of a MDT*

At the core of a multidisciplinary team lay a partnership between interventional cardiologists and cardiothoracic surgeons. However, as outlined by the 2012 ACC/STS consensus statement on TAVR, a complete heart team should also include others: a non-invasive cardiologist, imaging specialists (echocardiography, CT, MRI), cardiothoracic anesthesiologist, nurse practitioner, and cardiac rehabilitation specialists [6]. It must be noted that when dealing with congenital or acquired structural disease, for example, ASD/VSD, a strong relationship with pediatric interventional cardiologist is advantageous. The heart team must also extend beyond the individual physicians who form it and reflect a broader cooperation between cardiology and surgery divisions. Incorporating several members from each division strengthens the MDT by expanding the clinical input available for the decision-making process, as well as improving the flow and availability of care to the patients. Importantly, the opinion of a second surgeon regarding the operability of a candidate is often required for enrollment in several existing TAVR protocols.

Specifically for MitraClip, the heart team must include a cardiologist and cardiothoracic surgeon both experienced in mitral valve disease and treatment. The surgeon can lend expertise as to suitable mitral valve anatomy but also importantly assess patient frailty, an important criterion for patient selection. The use of 3D echocardiography in addition to standard 2D and Doppler imaging is vital in assessing mitral valve anatomy and pathology and thus suitability for MitraClip. This highlights the importance of having an experienced echocardiographer not only as a member of the MDT but also present during procedure to help guide deployment.

The primary challenge to a MDT is having effective communication and coordination between the different providers each with a busy clinical schedule. Fundamental to overcoming this hurdle and vital to the success of the MDT is a network of support staff including clinical and research coordinators. The clinical coordinator is a key member of the MDT who can serve as a pivot point through which the evaluation of a patient can be planned and executed. They can compile diagnostic results and facilitate the flow of information between the different members of the heart team. Because many patients are outside referrals, the coordinator can spearhead the gathering results from any previous diagnostic evaluation. Finally, as many devices and procedures are still in the investigational phase, the research coordinators are necessary to the enrollment of patients in ongoing studies or registries.

## An MDT Model

While the ACC/STS consensus statement outlines the composition of a MDT, there exists no blueprint for organizing a team that will be cohesive and effective. Individual structural heart programs must adapt their model within the unique environments of their academic center. Below is a summary of our experience in applying the MDT approach to valvular heart disease (TAVR, MitraClip).

*Outpatient Evaluation*

Patients referred with complex valvular heart disease are seen in a weekly comprehensive valve clinic that brings together elements from cardiology and cardiothoracic surgery. Prior to being scheduled for consultation, the patient's available information is reviewed and any additional required diagnostic testing (e.g., transthoracic echocardiography, pulmonary function testing, CT) is scheduled for the day of their appointment day if possible. Additionally, the patient meets with any pertinent research coordinators and undergoes any needed ancillary studies (blood draw, frailty testing, etc.). This maximizes the amount of pertinent information available to the clinical team allowing a more precise evaluation and fruitful discussion with the patient. Once the patient has been seen, the history and physical as well as all available objective data (echocardiography, coronary angiogram, CT, etc.) are reviewed as a team. Therapeutic options are discussed and any additionally needed

**Table 1.** Adopted from Holmes et al. [6]

| Components of TAVR Screening |
|---|
| Demographics<br>• Age<br>• Gender |
| Comorbidities (*many used for STS Score*)<br>• CAD<br>• PVD<br>• CHF (NYHA Class)<br>• COPD (FEV1)<br>• Renal Function |
| Imaging to Confirm<br>• Presence and severity of AS (echo)<br>• CAD burden (angiography)<br>• Presence of cerebral vascular disease (carotid doppler)<br>• LV Function (echo)<br>• Associated valvular lesion (echo) |
| Imaging for Procedural Planning<br>• Annular size (2D and 3D echo, CT)<br>• Aortoiliac anatomy |

**Table 2.** TAVR Follow-Up

| Post-Procedure Follow Up |
|---|
| Initial 2-Week Visit with CT Surgery<br>• Chest X-ray<br>• Laboratory studies (BMP, etc.)<br>• ECG |
| 1-Month Visit in Valve Clinic<br>• ECG<br>• Transthoracic echo |
| 6-Month Visit<br>• Laboratory studies only |
| 1-Year Visit then Yearly Visits<br>• Transthoracic echo |

diagnostic testing is planned. The session culminates with a cardiologist and cardiothoracic surgeon meeting the patient and presenting all medical, interventional, and surgical options.

*Inpatient Evaluation*

A substantial number of patients evaluated by the valve team are transferred from referring institutions and have developed advanced valvular heart disease and secondary heart failure. It is even more challenging to apply the MDT approach to this subset of patients as there is no longer the advantage provided by the structured setting of the valve clinic. Communication between various members of the team is crucial. Again, a well-organized central core of support staff can facilitate this task and help meet the goal of patient evaluation by both a CT surgeon and cardiologist within 24 hours.

*Weekly Meeting*

Complementary to the valve clinic, weekly MDT meetings are held at our institution. This weekly valve meeting is the nucleus for the valve service and brings together the entire valve team as well as additional faculty including several cardiothoracic surgeons, interventional cardiology operators, and echocardiographers. Bringing such a comprehensive group of providers together offers many advantages. There is a broader contribution into the discussion regarding patient candidacy and ongoing management. This is a facilitated forum for clinical input including opinions from cardiothoracic surgeons regarding patient operability and frailty. Both inpatient and outpatient referrals who have completed the extensive screening for TAVR or MitraClip (Table 1) are presented. Importantly, this is also an opportunity to prioritize and schedule patients for procedure allowing timely delivery of care to those most in need of treatment.

*Follow Up*

Post procedure patients are seen initially at 2 weeks by cardiothoracic surgery at which time they undergo evaluation with chest X-ray, electrocardiogram, and laboratory studies (Table 2). Subsequently, patients are seen in valve clinic at 1 month, 6 months, 12 months, and then yearly thereafter. Echocardiographic studies are obtained prior to discharge, 1 month and then yearly. Again, having the MDT available at valve clinic provides the ability to address a wide range of post-procedural issues.

## Conclusion

As the field of structural heart disease matures there will be many lessons learned regarding the construction and organization of a viable program. The concept of a multidisciplinary heart team is a solid foundation on which to build. The primary challenge is to bring together providers from different specialties in a cohesive and effective manner. In order to accomplish this there must be forums that allow joint patient assessment, this role can be filled by establishing a joint valve clinic and supplementing this with weekly meetings with other members of the heart team. Finally, the importance of strong support staff cannot be over-emphasized, as they can facilitate the flow of information between members of the heart team.

## Conflict of Interest

The authors have no conflict of interest relevant to this publication.

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