

Chapter 5: The role of the heart team

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The purpose/rationale of the TAVR Heart Team

The multidisciplinary Heart Team approach is a key principle in the contemporary management of cardiovascular disease, particularly with respect to valvular heart disease(1, 2). In the landmark PARTNER-1 and United States (US) CoreValve clinical trials(3–6), patients considered for transcatheter aortic valve replacement (TAVR) were – by defined inclusion criteria – at extreme (i.e. prohibitive) or high surgical risk. These patients were complex by virtue of their advanced age and coexisting medical illnesses such as chronic renal disease, lung disease, diabetes mellitus, or peripheral vascular disease. Given the high stakes involved in this vulnerable population, the consideration for surgical or percutaneous valve replacement in these patients called for an aligned partnership across medical and surgical disciplines, consequently demanding collaboration among a diverse array of healthcare providers.

In the early TAVR experience, a principle function of the multidisciplinary Heart Team was to select patients who would be optimal candidates for transcatheter intervention and appropriate for clinical trial enrollment. Since then, as TAVR has proven to be a viable, effective option for high surgical risk and now intermediate risk patient populations, the functionality of the Heart Team has also evolved. Not only is it essential for assessing surgical risk and TAVR candidacy, but it also offers a comprehensive, team-based approach to the diagnostic imaging assessment, preoperative planning, procedural execution, in-hospital care, and post-discharge follow-up for each patient undergoing this advanced procedure(2). For example, the imaging specialist may help identify unique hemodynamic valve properties seen on echocardiography (e.g. low-flow, low-gradient aortic stenosis), or he may assist in determining the appropriate valve prosthesis based on aortic annular and sinotubular dimensions on computed tomography. Cardiac anesthesiologists have always had an important place on the TAVR Heart Team in planning for and managing the anesthesia, intubation and mechanical ventilation, and patient hemodynamics during TAVR, as well as the post-anesthesia recovery. As the use of moderate conscious sedation has expanded, the role of the cardiac anesthesiologist has become even more critical for selecting the appropriate anesthetic strategy for patients undergoing TAVR and managing these patients during the procedure.

The construct of the TAVR Heart Team

While the individual personnel of a structural Heart Team vary from one institution to another, the fundamental elements of the team include the following: referring cardiologist, cardiothoracic surgeon, interventional cardiologist, imaging specialist, cardiac anesthesiologist, outpatient clinic coordinator, and hybrid catheterization laboratory or operating room administrator (7). Expert staff – for instance, cardiac nursing, social work, or case management – are routinely involved as well, depending on the specific

needs and circumstances of each patient. Furthermore, specialists from other medical disciplines, such as heart failure, pulmonary/critical care, hematology, or nephrology, can be integrated into the team on a case-by-case basis.

As delineated by the Centers for Medicare and Medicaid Services (CMS) national coverage determination for TAVR, the cardiac surgeon and interventional cardiologist on the Heart Team should possess adequate individual procedural experience with surgical aortic valve replacement and structural heart catheterizations, respectively. These members should also maintain the prerequisite combined experience in performing TAVR (≥ 20 TAVRs in prior year or ≥ 40 TAVRs in prior two years). Notably, there are specific regulatory mandates by CMS that provide directives on the Heart Team construct, hospital infrastructure to perform TAVR, device training, and data registry enrollment for short and long-term tracking of clinical outcomes. Accreditation and reimbursement for TAVR are predicated on fulfillment of these conditions, and there are explicit parameters that emphasize the institutional presence and components of the prototypical Heart Team (7). As policy and payment models evolve (e.g. bundled care reimbursement), the TAVR Heart Team may serve as an archetypical example of optimizing healthcare delivery processes while also promoting high-value care.

Workflow of a TAVR referral to Heart Team Consultation

To illustrate the natural workflow of a TAVR evaluation (Figure 1), the process begins with a subspecialty referral to the structural heart (or valve) disease clinic, usually from a general cardiology practitioner. The valve clinic coordinator plays a fundamental role in scheduling index appointments with the cardiac surgeons and interventionalists for independent risk assessments. This coordinator also facilitates the collection of any available echocardiographic imaging, angiographic and hemodynamic catheterization data, laboratory results, or other relevant clinical records that will aid the practitioners in their initial TAVR evaluations. Valve programs may also employ nurse practitioners or physician assistants who have received dedicated training in the field of valvular heart disease, and thus, will be primed to assess and care for patients with severe aortic stenosis. These team members should also be equipped to understand the nuances of surgical versus transcatheter aortic valve replacement, and as such, actively participate in multidisciplinary team meetings.

Once a patient has been independently evaluated in the valve clinic, and all additional testing has been obtained as deemed appropriate, his or her case will be presented to the entire Heart Team, which convenes on at least a weekly basis. At this point in time, the patient's non-invasive imaging, surgical risk assessments, medical history, and all pertinent risk factors (e.g. frailty, functional status, etc.) will be rigorously vetted by the group. A conclusion regarding an individual's TAVR candidacy is formulated, and if approved, hybrid catheterization laboratory scheduling and pre-procedural planning may then commence. In subsequent Heart Team meetings, more technical aspects of each case may then be explored, such as consideration of prosthetic valve type and sizing, route of vascular access, deep versus conscious sedation, and utilization of adjunct intra-procedural imaging.

Ultimately, the goal of the structural Heart Team is to efficiently streamline and individualize medical care from the initial time of referral to successful valve deployment and clinical follow-up thereafter. This team-based approach for the treatment of valvular heart disease has been endorsed in published

guidelines by preeminent cardiovascular societies both in the US and Europe (8, 9). As TAVR expands to intermediate surgical risk populations(10) and for other disease states such as high-risk bicuspid aortic valve stenosis or surgical valve deterioration (i.e. valve-in-valve TAVR)(11), the indispensable value and function of the Heart Team philosophy will correspondingly grow. Based on the success of this multidisciplinary strategy for the treatment of aortic valve disease, similar models of care have been emulated for the treatment of other prevalent medical conditions – such as complex coronary artery disease and pulmonary embolism – and have also demonstrated success (1, 12).

In conclusion, patients with senile calcific aortic valve disease are inherently complex individuals, typified by advanced age and the presence of comorbid diseases. Therefore, the appropriate selection of ideal candidates for TAVR can be a challenging process that necessitates the input and collaboration of cardiac specialists within an interdisciplinary construct – the structural Heart Team. Unequivocally, the cardiothoracic surgeon and interventional cardiologist performing TAVR will exercise a critical role and voice within the group. Of equal importance, however, are those team specialists who can inform the proceduralists on how to tailor intra- and peri-procedural care based on relevant areas of expertise. This team-based strategy provides each TAVR patient the benefit of a holistic evaluation and ensuing plan of care that, when executed properly, may optimize clinical outcomes. Finally, forward-minded Heart Teams should continuously strive to improve by: 1) critically assessing patient outcomes, 2) conducting journal clubs to update team members on recently published literature in the field, 3) innovating new approaches to procedural management and recovery processes, 3) participating in clinical trials that will integrate innovative technologies into the program experience, and 4) periodically appraising financial viability of the program to ensure its longstanding viability.

References:

1. Holmes DR, Rich JB, Zoghbi WA, Mack MJ. The heart team of cardiovascular care. *J Am Coll Cardiol.* 2013;61:903–907.
2. Passeri JJ, Melnitchouk S, Palacios IF, Sundt TM. Continued expansion of the Heart Team concept. *Future Cardiol.* 2015;11:219–228.
3. Kapadia SR, Leon MB, Makkar RR, et al. 5-year outcomes of transcatheter aortic valve replacement compared with standard treatment for patients with inoperable aortic stenosis (PARTNER 1): A randomised controlled trial. *Lancet.* 2015;385:2485–2491.
4. Mack MJ, Leon MB, Smith CR, et al. 5-year outcomes of transcatheter aortic valve replacement or surgical aortic valve replacement for high surgical risk patients with aortic stenosis (PARTNER 1): A randomised controlled trial. *Lancet.* 2015;385:2477–2484.
5. Yakubov SJ, Adams DH, Watson DR, et al. 2-Year Outcomes after Iliofemoral Self-Expanding Transcatheter Aortic Valve Replacement in Patients with Severe Aortic Stenosis Deemed Extreme Risk for Surgery. *J Am Coll Cardiol.* 2015;66:1327–1334.
6. Deeb GM, Reardon MJ, Chetcuti S, et al. 3-Year Outcomes in High-Risk Patients Who Underwent Surgical or Transcatheter Aortic Valve Replacement. *J Am Coll Cardiol.* 2016;67:2565–2574.
7. National Coverage Determination (NCD) for Transcatheter Aortic Valve Replacement (TAVR) (20.32). 2012. Available at: <https://www.cms.gov/medicare-coverage-database>. Accessed

4/30/17.

8. Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: Executive summary: A report of the American college of cardiology/American heart association task force on practice guidelines. *J Am Coll Cardiol.* 2014;63:2438–2488.
9. Authors/Task Force Members, Vahanian A, Alfieri O, et al. Guidelines on the management of valvular heart disease (version 2012): The Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). *Eur Heart J.* 2012;33:2451–2496.
10. Martin B, Leon M, D. CR et cols. Transcatheter or Surgical Aortic-Valve Replacement in Intermediate-Risk Patients. *N Engl J Med.* 2016;374:1609–20.
11. Praz F, Windecker S, Huber C, Carrel T, Wenaweser P. Expanding Indications of Transcatheter Heart Valve Interventions. *JACC Cardiovasc. Interv.* 2015;8:1777–1796.
12. Kabrhel C, Rosovsky R, Channick R, et al. A Multidisciplinary Pulmonary Embolism Response Team: Initial 30-Month Experience With a Novel Approach to Delivery of Care to Patients With Submassive and Massive Pulmonary Embolism. *Chest.* 2016;150:384–393.