

Catheterization Laboratory

Structural Heart Disease, Devices, and Transcatheter Aortic Valve Replacement



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KEYWORDS

- TVAR • Left atrial occlusion device • Cardiac catheterization laboratory
- Endovascular edge to edge mitral valve repair

KEY POINTS

- Transcatheter aortic valve replacement is approved for those patients considered intermediate risk for open heart surgery and is performed under monitored anesthesia care or sedation.
- TAVR is a high-risk procedure, and the team must be prepared for immediate cardiopulmonary bypass and resuscitation.
- Endovascular edge-to-edge mitral valve repair is approved for patients who are high risk for open mitral valve repair. It is like an open Alfieri stitch repair, increasing coaptation between the anterior and posterior leaflets.
- A left atrial occlusion device is an alternative to chronic anticoagulation therapy. Deployment is done under general anesthesia with transesophageal echocardiography guidance.

INTRODUCTION

Medicine is rapidly evolving. The advent of newer technologies allow for the same outcome with less invasive surgery, shorter duration of hospital stay, and faster recovery times. The cardiac catheterization laboratory (CCL) is at the forefront of

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implementing minimally invasive procedures, such as catheter-based therapies. The CCL advanced coronary artery disease treatment, with the ability to correct ischemia-causing disease without requiring open heart surgery. Many procedures performed in the CCL are done so without the assistance of an anesthesiologist. These procedures include diagnostic catheterizations, percutaneous coronary interventions, and balloon mitral valvuloplasty. These patients receive a generous amount of local anesthetic and intravenous sedation for their procedures. The sedation is routinely administered by certified nurses under the direction of the interventionalist. Although most patients in the CCL are managed without an anesthesiologist, some procedures do require general anesthesia or more complicated sedation for the procedure. The anesthetic approach to procedures such as transcatheter aortic valve replacement (TAVR), left atrial appendage closure and mitral clip repair varies from center to center.

Because most cases done in the CCL are performed without an anesthesiologist, these laboratories are not typically part of the main operating area, but rather on a separate cardiology floor. When requested, anesthesiologists must be prepared to handle potentially critically ill patients in an unfamiliar non-operating room setting. Non-operating room suites may lack readily available resources traditionally found in the operating theater, such as additional anesthesia support and familiar operating room equipment.

AORTIC STENOSIS

One of the biggest advances in the CCL is in the treatment of aortic stenosis. Patients typically present with aortic stenosis in their sixth decade of life, and if severe enough will warrant surgical replacement or a surgical aortic valve replacement (SAVR). Aortic valve replacement is the most common valvular surgery performed. Unfortunately, not every patient is eligible for a SAVR procedure owing to increased risk because of multiple comorbidities. Patients not eligible for SAVR are managed medically.

INTRODUCTION TO TRANSCATHETER AORTIC VALVE REPLACEMENT

TAVR was first approved by the US Food and Drug Administration (FDA) in November of 2011. In that time, TAVR has emerged as an effective treatment alternative to traditional SAVR in patients with severe aortic stenosis who are at intermediate risk or high risk for morbidity and mortality with traditional surgery.^{1,2} The benefit of TAVR in patients who are deemed inoperable for surgery has also been established.³ Currently, the American Heart Association/American College of Cardiology 2017 valvular guidelines focused update recommends TAVR for patients who are at prohibitive risk for SAVR (class 1, level of evidence A).⁴ In addition, TAVR is considered equivalent to SAVR in patients with aortic stenosis who have high surgical risk for SAVR (class 1, level of evidence A).⁴ Last, TAVR is considered a reasonable alternative to SAVR in patients with aortic stenosis who have an intermediate surgical risk for SAVR (class IIA, level of evidence B).⁴ As indications for TAVR have expanded, the number of TAVR procedures performed has steadily increased. From 2012 to 2015, the volume of TAVR in the United States has increased from 4627 procedures in 2012 to 24,808 procedures in 2015.⁵ Over that same period, in-hospital mortality from TAVR decreased from 5.9% to 2.9%.⁵ Overall, TAVR has become much more prevalent, and the procedural outcomes have continued to improve.

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