Trans catheter aortic valve replacement: A revolutionary approach to aortic valve disease.

Chayakrit Krittanawong*

Department of Cardiology, School of Medicine, USA

Introduction

Aortic stenosis (AS), a condition where the aortic valve narrows and obstructs blood flow from the heart to the rest of the body, is one of the most common valvular heart diseases, particularly in the elderly population. In severe cases, it leads to symptoms like shortness of breath, chest pain, and even heart failure. Traditionally, surgical aortic valve replacement (SAVR) was the standard treatment for patients with symptomatic severe aortic stenosis. However, for patients deemed high-risk for open-heart surgery, TAVR has emerged as a revolutionary alternative, offering a minimally invasive solution with promising outcomes. TAVR, also known as Transcatheter Aortic Valve Implantation (TAVI), is a minimally invasive procedure that involves implanting a new valve into the heart without the need for open-heart surgery. The procedure is performed through a catheter, usually inserted via the femoral artery, although other access points like the subclavian artery or directly through the chest may also be used, depending on the patient's anatomy and condition [1,2].

During TAVR, a replacement valve, typically made of biological tissue, is crimped onto a catheter and guided into position in the heart. Once in place, the valve is expanded—usually using a balloon or self-expanding mechanism—to replace the damaged aortic valve. The new valve restores normal blood flow, alleviating the symptoms of aortic stenosis and improving the patient's quality of life. TAVR was first introduced in the early 2000s and has rapidly evolved, becoming a standard treatment option for patients with severe, symptomatic aortic stenosis who are either high-risk for or ineligible for traditional open-heart surgery. The initial procedures were mainly limited to high-risk patients, but over the years, clinical trials have demonstrated its safety and efficacy even in intermediate-risk and low-risk populations. With the rising prevalence of aortic stenosis, particularly among the aging population, TAVR will likely become even more integral to the management of aortic valve disease. As the procedure becomes more refined and accessible, it holds the potential to revolutionize cardiovascular care and provide a life-saving option for millions of patients. [3,4].

Food and Drug Administration (FDA) approved TAVR for high-risk patients, and since then, its use has expanded globally. Newer generation valves, improved procedural techniques, and better patient selectio criteria have all contributed to TAVR's growing success. As of recent data, the procedure has proven to have comparable or even superior outcomes in certain cases when compared to traditional surgery.

TAVR is primarily indicated for patients with severe symptomatic aortic stenosis who are considered high or prohibitive surgical risk due to factors such as advanced age, comorbidities (such as chronic kidney disease or lung disease), frailty, or poor heart function. It has also been shown to be effective for intermediate-risk patients, expanding its potential to a broader group of individuals. Additionally, TAVR is increasingly being used in low-risk patients, as recent studies suggest it can lead to similar or better long-term outcomes compared to surgical replacement. Ongoing clinical trials are investigating its use in younger, healthier individuals, with some positive preliminary results. [5,6].

The major advantage of TAVR over traditional open-heart surgery is its minimally invasive nature. Because it does not require a large incision or cardiopulmonary bypass, recovery times are significantly shorter, and the procedure typically carries fewer complications. Patients undergoing TAVR often experience less bleeding, lower rates of infection, and a reduced risk of stroke compared to those undergoing surgery. Hospital stays are also typically shorter, with many patients returning home within 1-3 days after the procedure. Furthermore, TAVR has a lower mortality rate in high-risk and inoperable patients compared to medical management alone, offering a viable solution for individuals who might otherwise face limited options for treatment [7,8].

Despite its many advantages, TAVR is not without risks. Potential complications include vascular injury, bleeding, stroke, valve malfunction, and paravalvular leaks (a condition where blood leaks around the valve). Additionally, the long-term durability of TAVR valves remains an area of ongoing research, as these valves may not last as long as surgically implanted ones. To address these challenges, advancements in valve design, improved procedural techniques, and patient selection criteria are continually being developed. Research is also focused on identifying optimal management strategies for patients undergoing TAVR to reduce complications and improve long-term outcomes. The future of TAVR looks promising, with ongoing innovations and clinical studies aimed at refining the procedure. Researchers are exploring ways to enhance valve durability, reduce the risk of complications,

***Correspondence to:** Chayakrit Krittanawong*, Department of Cardiology, School of Medicine, USA. Email: Chayakrit.krittawong@va.gov

***Received:** 02-Nov-2024, Manuscript No. AACC-24-150745; **Editor assigned:** 04-Nov-2024, Pre QC No. AACC-24-150745(PQ); **Reviewed:**18-Nov-2024, QC No. AACC-24-150745; **Revised:** 25-Nov-2024, Manuscript No. AACC-24-150745(R), **Published:** 30-Nov-2024,DOI:10.35841/aacc-8.11.339*

***Citation:** Krittanawong C. Trans catheter aortic valve replacement: A revolutionary approach to aortic valve disease. Curr Trend Cardiol. 2024;8(11):339*

and expand the indications for TAVR to younger, low-risk patients. Furthermore, the advent of robotic-assisted TAVR and the use of advanced imaging techniques will likely improve the precision of the procedure, further reducing risks and improving patient outcomes. [9,10].

Conclusion

Trans catheter Aortic Valve Replacement (TAVR) has proven to be a transformative advancement in the treatment of severe aortic stenosis, offering a less invasive alternative to traditional surgery with excellent outcomes. With continued innovations in technique and technology, TAVR is poised to expand its role in treating patients with aortic valve disease and improve the quality of life for countless individuals. As the procedure continues to evolve, it will undoubtedly remain a cornerstone of cardiovascular.

References

1. Narciso J, Silva AJ, Rodrigues V, et al. Behavioral, contextual and biological factors associated with obesity during adolescence: A systematic review. PloS one. 2019;14(4):e0214941.
2. Sohler N, Lubetkin E, Levy J, et al. Factors associated with obesity and coronary heart disease in people with intellectual disabilities.Soc Work Health Car. 2009;48(1):76-89.
3. Suglia SF, Duarte CS, Chambers EC, et al. Social and behavioral risk factors for obesity in early childhood. J Dev Behav Pediatr: JDBP. 2013;34(8):549.
4. Terres NG, Pinheiro RT, Horta BL, et al. Prevalence and factors associated to overweight and obesity in adolescents. Rev. Saude Publica. 2006;40:627-33.
5. Surendran P, Drenos F, Young R, et al. Trans-ancestry meta-analyses identify rare and common variants associated with blood pressure and hypertension.Nat Genet. 2016;48(10):1151-61.
6. Ehret GB, Ferreira T, Chasman DI, et al. The genetics of blood pressure regulation and its target organs from association studies in 342,415 individuals. Nat Genet. 2016;48(10):1171-84.
7. Liu C, Kraja AT, Smith JA, et al. Meta-analysis identifies common and rare variants influencing blood pressure and overlapping with metabolic trait loci. Nat Genet. 2016;48(10):1162-70.
8. Ehret GB, Caulfield MJ. Genes for blood pressure: an opportunity to understand hypertension.Eur Heart J. 2013;34(13):951-61.
9. Page IH. Hypertension research. A memoir 1920-1960. Hypertens. 1990;16(2):199-200.
10. Lafferty WE, Tyree PT, Bellas AS, et al. Insurance coverage and subsequent utilization of complementary and alternative medicine providers. Am J Manag Care. 2006;12(7):397-404.

Citation: *Krittanawong C. Trans catheter aortic valve replacement: A revolutionary approach to aortic valve disease. Curr Trend Cardiol. 2024;8(11):339*