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Short Communication

Expanding the Role of TAVR to Subaortic Membrane and LVOT Obstruction: A Commentary

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ABSTRACT

Subaortic Membrane (SAM) is a rare cause of fixed Left Ventricular Outflow Tract (LVOT) obstruction or Subaortic Stenosis (SAS). Surgical membrane resection has long been the mainstay of treatment. However, in elderly, inoperable or high-risk patients, this approach is often not feasible. Transcatheter Aortic Valve Replacement (TAVR), though not designed to address subvalvular pathology, has been explored in select cases with coexisting Aortic Stenosis (AS) and Subaortic Stenosis (SAS). This commentary discusses the emerging application of TAVR in managing Subaortic Stenosis (SAS), focusing on clinical rationale, procedural challenges, available evidence and the need for further research.

Keywords: Transcatheter Aortic Valve Replacement (TAVR); Subaortic Membrane (SAM); LVOT obstruction; Subaortic Stenosis (SAS); Aortic stenosis; Valve disease management; Structural heart intervention; Inoperable; High-risk surgery

DESCRIPTION

Subaortic Membrane (SAM) is a fibromuscular ridge or tunnel located just below the aortic valve that causes fixed subvalvular obstruction. Though frequently congenital, SAM can present or progress later in life, and often coexists with other valvular abnormalities, particularly Aortic Stenosis (AS). Standard treatment includes surgical resection of the membrane, with or without Surgical Aortic Valve Replacement (SAVR), depending on valve morphology and severity [1].

Despite generally good surgical outcomes, certain populations-particularly elderly or comorbid patients-are deemed inoperable or high-risk for open-heart surgery. In such cases, Transcatheter Aortic Valve Replacement (TAVR) has emerged as a less invasive alternative. However, its utility in the context of Subaortic Stenosis (SAS) remains investigational. Because TAVR targets valvular pathology and leaves the subaortic membrane untouched or cover it partially, the hemodynamic outcomes can be variable and depend heavily on the individual anatomy and membrane characteristics and the distance between the membrane and the aortic valve [2].

Clinical indications for TAVR in SAM

- **Concurrent aortic stenosis:** Patients with coexistent AS and SAS who are not surgical candidates may benefit from TAVR as a means of relieving the dominant valvular gradient or covering both aortic valve and sub-aortic membrane if feasible.
- **Palliative strategy:** For patients with significant symptoms and no other options, TAVR can serve as a palliative measure, especially if SAM is non-dominant, relatively thin or close to the aortic valve [3].
- **Bridging therapy:** In certain cases, TAVR may be used to stabilize the patient, potentially allowing for delayed surgical resection of the membrane when the patient's condition improves.

Procedural and anatomic considerations

Pre-procedural planning is essential. Multimodal imaging-including echocardiography (Transthoracic and trans-esophageal) and contrast-enhanced CT-helps assess the distance between the sub-aortic membrane and the aortic annulus, membrane thickness, associated calcifications and LVOT geometry. A

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narrow LVOT or prominent thick SAM may prevent proper valve deployment or affect anchoring and expansion [4].

Device choice is also crucial. Balloon-expandable valves, with greater radial force, may perform better in rigid LVOTs, whereas self-expanding valves may reduce trauma in anatomically sensitive areas. Persistent LVOT gradient and paravalvular leak post-TAVR are known risks. Post-deployment imaging is recommended to assess residual gradients and paravalvular leak in particularly if the valve will be in low-seated deployment [5].

Current evidence and limitations

Literature on TAVR in patients with SAS is limited to case reports and small series. Outcomes vary based on the anatomical characteristics of the membrane and valve disease severity. Some reports demonstrate favorable symptom relief and gradient reduction, while others note continued symptoms or residual obstruction. To add to it, the long-term durability post-TAVR is not well documented. Given this variability, the use of TAVR in SAS must be approached cautiously and ideally within a research or registry framework or as a last resort [6].

CONCLUSION

TAVR is not currently a standard treatment for isolated Subaortic Stenosis (SAS) but it may serve as a valuable alternative in select inoperable and high-risk patients, especially those with coexisting aortic stenosis. Procedural success depends heavily on patient selection, imaging, and careful planning. Future investigations should focus on long-term outcomes and the development of adjunctive trans-catheter techniques for direct Subaortic Membrane (SAM) modification or resection. Until then, TAVR in Subaortic stenosis remains an evolving and cautiously off-label promising intervention.

REFERENCES

1. Vahanian A, Beyersdorf F, Praz F, Milojevic M, Baldus S, Bauersachs J, et al. 2021 ESC/EACTS Guidelines for the management of valvular heart disease: Developed by the Task Force for 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. 2022;43(7):561-632.
2. Hira RS, Vemulapalli S, Li Z, McCabe JM, Rumsfeld JS, Kapadia SR, et al. Trends and outcomes of off-label use of transcatheter aortic valve replacement: Insights from the NCDR STS/ACC TVT registry. JAMA Cardiol. 2017;2(8):846-54.
3. Assiri S, Alshammakh MS, Alzahrani SM, Alfawara MS, Al-Shaibi K. TAVI in complex dual-level obstruction: A case of severe aortic stenosis and subaortic membrane. Methodist Debakey Cardiovasc J. 2025;21(1):53.
4. Finkelstein A, Keren G, Banai S. Treatment of severe valvular aortic stenosis and subvalvular discrete subaortic stenosis and septal hypertrophy with percutaneous corevalve aortic valve implantation. Catheter Cardiovasc Interv. 2010;75(5):801-803.
5. Tayel H, Elhakim A, Elsoudi M, Nour A, Saad M. Transcatheter aortic valve implantation in patient with combined aortic and subaortic membrane stenosis: A case report. Eur Heart J Case Rep. 2024;8(12):ytae621.
6. Zhang Q, Xu Y, Wang H, Pang X, Meng Q. TAVR for severe aortic valve stenosis with LVOT stenosis: A case report. Int Med Case Rep J. 2024:719-723.