

The 2025 European Society of Cardiology/European Association for Cardio-Thoracic Surgery joint guidelines for the management of valvular heart disease: Revolution or evolution?

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ABSTRACT

The 2025 European Society of Cardiology (ESC)/European Association for Cardio-Thoracic Surgery guidelines for the management of valvular heart disease (VHD), presented at the ESC Congress in Madrid, update the 2021 document and respond to the rapid growth of evidence from randomized trials, meta-analyses, and large registries. Developed by a multidisciplinary Heart Team including patient representatives, the guidelines emphasize patient-centered “lifetime” management, shared decision-making, and treatment at high-volume expert Heart Valve Centers, especially for complex surgical and transcatheter procedures. The scope has been broadened to address cancer and radiation-associated VHD, cardiogenic shock and acute heart failure (HF), multiple and mixed VHD, and sex-specific issues. Key changes in indications for imaging, treatment, and follow-up of VHD are discussed in the perspective of evidence-based medicine. Key updates include earlier intervention in severe, high-gradient, asymptomatic aortic stenosis, refined age thresholds for transfemoral transcatheter aortic valve implantation, and its use in bicuspid aortic stenosis and aortic regurgitation in high-risk or inoperable patients. Recommendations for secondary mitral regurgitation (MR) distinguish atrial from ventricular mechanisms and upgrade mitral transcatheter edge-to-edge repair (TEER) to class I in selected cases of ventricular secondary MR. At the same time, surgery remains first line for primary MR, with defined triggers for early repair and emerging roles for TEER and TEER in high-risk patients. The document also strengthens guidance on tricuspid interventions and structured assessment of right ventricular dysfunction, and simplifies antithrombotic strategies, including restricted use of dual antiplatelet therapy after transcatheter aortic valve implantation in patients without another indication for oral anticoagulation. Implementing these recommendations should streamline care pathways and reduce the burden of VHD.

Key words: Heart Team, heart valve center, multimodality imaging, valvular heart disease

INTRODUCTION

During the annual congress of the European Society of Cardiology (ESC) held in Madrid in August 2025, the new ESC/European Association for Cardio-Thoracic Surgery (EACTS) joint guidelines for the management of valvular heart disease (VHD) were presented and simultaneously published in the *European Heart Journal* and the *European Journal of Cardiothoracic Surgery* [1, 2]. The document is an update

of its 2021 version [3] and integrates the rapid accumulation of evidence from multicenter randomized clinical trials (RCTs), meta-analyses, and large prospective registries. The rapid development of this field reflects the growing societal burden of VHD, the progress in our understanding of the disease mechanisms, significant advances in imaging, and significant advances in the surgical and transcatheter treatment of heart valve diseases.

HEART TEAM, PATIENT INVOLVEMENT, AND SHARED DECISION-MAKING

The document is the result of close collaboration among the multidisciplinary Task Force members, chaired by the two ESC and EACTS representatives, working with a group of cardiologists, methodologists, cardiac surgeons, and, importantly, two patient representatives. The integration of the patient's perspectives into the guideline-building process seems essential, since early treatment decisions, particularly the choice of prosthetic valve, have long-lasting implications. Therefore, patients and relatives should be informed about the disease course and the potential need for subsequent procedures (so-called "lifetime management"), irrespective of the VHD type. This central concept of "lifetime journey" already has concrete implications for aortic stenosis (AS) treatment, driven by a better understanding of structural valve deterioration and the expansion of indications for transcatheter aortic valve implantation (TAVI) to younger patients with longer life expectancy. The immediate advantages of a minimally invasive approach using transcatheter therapies should be balanced against the risk of a future intervention. Risks and invasiveness of the planned procedure must be openly communicated to patients and relatives. The final treatment decision should respect patients' values, preferences, and personal goals, which should be integrated into Heart Team discussions to ensure shared decision-making.

The guidelines are intended to provide concise and practical recommendations for general practitioners, cardiologists, cardiac surgeons, as well as Heart Teams working within Heart Valve Centers.

THE FRAMEWORK FOR DIAGNOSIS AND TREATMENT OF VALVULAR HEART DISEASE

While the diagnosis of VHD is often made by treating physicians and cardiologists, procedural treatment should usually be performed at an experienced Heart Valve Center due to the proven association between operator/center volume and clinical outcomes. For the first time, recently published guidelines identify complex and/or high-risk transcatheter or surgical valve procedures that should be performed at expert centers with interventional cardiology and cardiac surgery services on-site.

WHAT ARE THE NEW RECOMMENDATIONS?

The 2025 guidelines include a total of 28 new and 50 revised recommendations, which highlight the progress in VHD treatment. The scope of the document was expanded to include important clinical aspects of VHD, such as cancer and radiation therapy, cardiogenic shock and acute HF due to VHD, multiple and mixed VHD, and sex-specific considerations.

The role of cardiovascular imaging

Echocardiography remains the cornerstone for screening, imaging, and grading of VHD, while the expanding role of cardiac computed tomography and magnetic resonance imaging is highlighted throughout the document. Indeed, multimodality imaging complements accurate assessment of lesion severity, etiology, and related cardiac damage and is essential for pre-procedural planning, before both transcatheter and surgical interventions.

Coronary computed tomography angiography plays an essential role in the diagnosis of coronary artery disease (CAD) in patients with VHD. It now has a class I indication in patients planned for VHD intervention if the pre-test likelihood of obstructive CAD is moderate or low. In many cases, coronary computed tomography angiography can replace invasive coronary angiography when image quality is sufficient to exclude significant CAD [4, 5].

Management of valvular heart disease-associated conditions

The management of associated CAD in TAVI candidates has been refined based on the results of the NOTION III randomized controlled trial. A new class IIa recommendation indicates that PCI should be considered if $\geq 90\%$ stenosis is present in a vessel with a diameter of at least 2.5 mm [6].

Atrial fibrillation (AF) is another condition coexisting with VHD. In patients with an indication for valve surgery, concomitant surgical ablation with closure of the left atrial appendage has been upgraded, in particular at the time of mitral valve surgery (class I, level of evidence A) [7].

Aortic valve disease

Since the last edition of the document, several clinical studies comparing TAVI to surgical aortic valve replacement (SAVR) with extended follow-up have been published. Based on growing evidence, the indication for transfemoral TAVI as a first-line AS therapy has been extended to patients aged 70 years or older, irrespective of surgical risk scores, if the valve is tricuspid and the anatomy is suitable. SAVR is recommended in patients aged less than 70 years with low surgical risk. This adjustment of the age threshold aims to more accurately reflect the population of patients included in several RCTs showing non-inferiority and similar long-term outcomes for TAVI compared to SAVR [8–12].

For the specific population of patients presenting with bicuspid AS, TAVI is considered an alternative to SAVR, when the surgical risk is high, because most RCTs evaluating the long-term efficacy of TAVI excluded patients with bicuspid aortic valve and more evidence on comparative safety and efficacy is needed. Similarly, the preferred mode of treatment for aortic regurgitation remains surgery, while TAVI is emerging as an alternative in high-risk and inoperable patients, particularly those eligible for implantation of a dedicated aortic regurgi-

tation-dedicated system that can minimize the risk of complications, such as valve embolization [13].

Based on two positive RCTs (AVATAR and RECOVERY) investigating surgery and one with TAVI (EARLY-TAVR), early intervention in patients with severe asymptomatic high-gradient (≥ 40 mm Hg) AS and preserved left ventricular ejection fraction ($\geq 50\%$) should be considered as an alternative to close active surveillance. The lack of symptoms should be confirmed by a negative exercise test, if feasible. If watchful waiting is chosen as a shared decision with the patient, close follow-up every 3–6 months should be scheduled because of the potential for rapid symptom progression in a significant proportion of patients participating in trials [14–17].

Secondary mitral valve disease

For the first time, the guidelines distinguish between atrial and ventricular secondary mitral regurgitation (MR), emphasizing their different causes, pathomechanisms, and prognoses. Diagnostic criteria differentiating these two conditions and treatment pathways are provided. Based on the RESHAPE-HF 2 trial and a meta-analysis of 3 RCTs, the recommendation on transcatheter mitral edge-to-edge repair (M-TEER) has been upgraded to class I, level of evidence A for the treatment of selected patients with severe ventricular secondary MR and impaired left ventricular ejection fraction, who remain symptomatic despite optimization of guideline-directed medical therapy and CRT, if indicated. The presence of specific anatomic and clinical criteria correlates with a higher likelihood of M-TEER success. Studies showed that the interventional strategy can further reduce HF hospitalizations, while patients who do not fulfill these criteria may still be considered for M-TEER to improve symptoms. The therapy modalities for secondary atrial MR are surgery as a first line or M-TEER in high-risk patients. Since AF represents the main pathophysiological driver of MR development, rhythm control should also be considered, if appropriate [18, 19].

Primary mitral valve disease

Surgical repair remains the preferred therapy for symptomatic and asymptomatic primary MR. Updated class I recommendations specify clinical triggers for surgery in asymptomatic patients with primary MR based on indexed LV size thresholds, left atrial enlargement, pulmonary hypertension > 50 mm Hg, AF, and, newly, concomitant at least moderate tricuspid regurgitation (TR). Valve repair is preferred over replacement, if feasible. For individuals at high surgical risk with favorable anatomy, TEER is an alternative intervention with an upgraded class IIa, level of evidence B recommendation. For the first time, guidelines include transcatheter mitral valve implantation for high-surgical-risk patients when the anatomy is unfavorable for M-TEER [20].

Mitral stenosis (MS) can be rheumatic or degenerative. The treatment recommendations for rheumatic MS have not changed from the last edition of the VHD

guidelines. The preferred anticoagulants remain vitamin K antagonists, and the first-line intervention is transcatheter balloon valvulotomy. For degenerative calcific MS, as a distinct pathology with increased risk of mortality, treatment is complex, and intervention (surgery or transcatheter mitral valve implantation) should be performed at experienced Heart Valve Centers [21, 22].

Tricuspid valve disease

Recommendations for tricuspid valve interventions have been updated based on a better understanding of the disease mechanism, prognosis, and progress of surgical and transcatheter therapies. Tricuspid valve surgery is recommended for patients undergoing left-sided interventions when TR is moderate or greater, while repair can be considered in patients with mild TR with annular dilation, balancing the relevant risk of pacemaker implantation. Transcatheter therapies are playing an increasing role and should be considered, to improve the quality of life and right ventricle (RV) remodeling in all high-risk patients with severe symptomatic TR who remain symptomatic despite optimal medical management, in the absence of severe RV dysfunction or pre-capillary pulmonary hypertension. The choice of transcatheter therapies includes TEER, supported by large multicenter registries, single-arm clinical trials, and two RCTs (TRILUMINATE and Tri.Fr), as well as transcatheter tricuspid valve replacement, investigated in the TRISCEND II trial. One of the most important considerations for the treatment of TR is the presence and magnitude of RV dysfunction, and current guidelines for the first time provide structured diagnostic criteria for RV dysfunction [23–25].

USE OF ANTICOAGULATION AND ANTIPLATELET THERAPY IN VALVULAR HEART DISEASE

The guidelines provide a clear overview of oral anticoagulation (OAC) strategies after mechanical valve implantation, including perioperative bridging for non-cardiac surgery and the importance of patient education. They also highlight the expanding role of direct oral anticoagulants in patients with bioprosthetic valves and coexisting OAC indications. Clear algorithms provide practical guidance on antithrombotic management following all types of valve intervention. Importantly, for patients undergoing TAVI without a pre-existing indication for OAC, dual antiplatelet therapy is not indicated unless there has been a recent coronary intervention.

In our opinion, the 2025 VHD guidelines have the potential to change practice dramatically in at least 3 areas. Firstly, the role of non-invasive imaging (contrast cardiac computed tomography) as an alternative to invasive coronary angiography for evaluating CAD will allow us to avoid performing invasive coronary angiography in a significant number of patients planned for VHD treatment in the near future. Secondly, implementing the guidelines will lead to much greater use of minimally invasive transcatheter

therapies across all types of VHD. Lastly, the criteria for the use of such therapies were expanded to include a much wider range of patients.

POLISH PERSPECTIVE

Several recently published registries have evaluated the usage and outcomes of patients treated with modern VHD therapies, such as TAVI and TEER. Such registries provide a basis for quality control and confirm the appropriateness of Heart Teams' decisions in patient qualification. On the other hand, they suggest that the availability of these therapies remains insufficient to meet the demands of an aging society [26–29]. Implementing the current VHD guidelines in Poland will require a significant shift in funding regulations to provide unlimited reimbursement for procedures that improve clinical outcomes, such as TAVI in AS and TEER in secondary ventricular MR. Such interventions have class I indications, and their efficacy and favorable risk-benefit ratio are well established in RCTs. Given the fact that timely AS treatment reduces mortality, and that prolonged wait times are associated with morbidity and mortality, TAVI should be reimbursed without a cap on the number of procedures per center. Similarly, the number of M-TEER procedures in patients with secondary ventricular MR who meet the clinical and echocardiographic criteria associated with improved outcomes should not be limited, as this therapy also reduces rehospitalizations related to HF and mortality. Current usage of M-TEER in Poland is much lower than necessary to meet the demands of patients with class I indications. Given funding limitations, it is unlikely that other therapies, such as tricuspid TEER and transcatheter mitral and tricuspid valve replacement, will be available to Polish Heart Valve Centers in sufficient numbers to be practically significant. On the positive side, Polish Heart Valve Centers have well-established Heart Teams and streamlined diagnostic and treatment pathways to provide the patient-centric care of VHD. Associations for Cardiovascular Interventions, Echocardiography, and Valvular Heart Disease of the Polish Cardiac Society play an important role in educating patients and healthcare professionals on state-of-the-art therapies for VHD.

SUMMARY

The scope of the 2025 ESC/EACTS guidelines reflects the rapid progress of evidence and provides a clear framework for the management of patients with VHD. The document is a collaborative effort by a multidisciplinary team of specialists from two scientific societies with the help of patient representatives. Implementing the guidelines in clinical practice will help reduce the burden of VHD and streamline diagnostic and treatment pathways. Rapid development in the field underscores the need to train physicians and allied healthcare professionals, especially in cardiovascular imaging, and interventional and surgical techniques. The management of VHD requires a multidisciplinary Heart

Team and, in complex cases, referral to dedicated high-volume Heart Valve Centers.

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