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AORTIC STENOSIS IN WOMEN

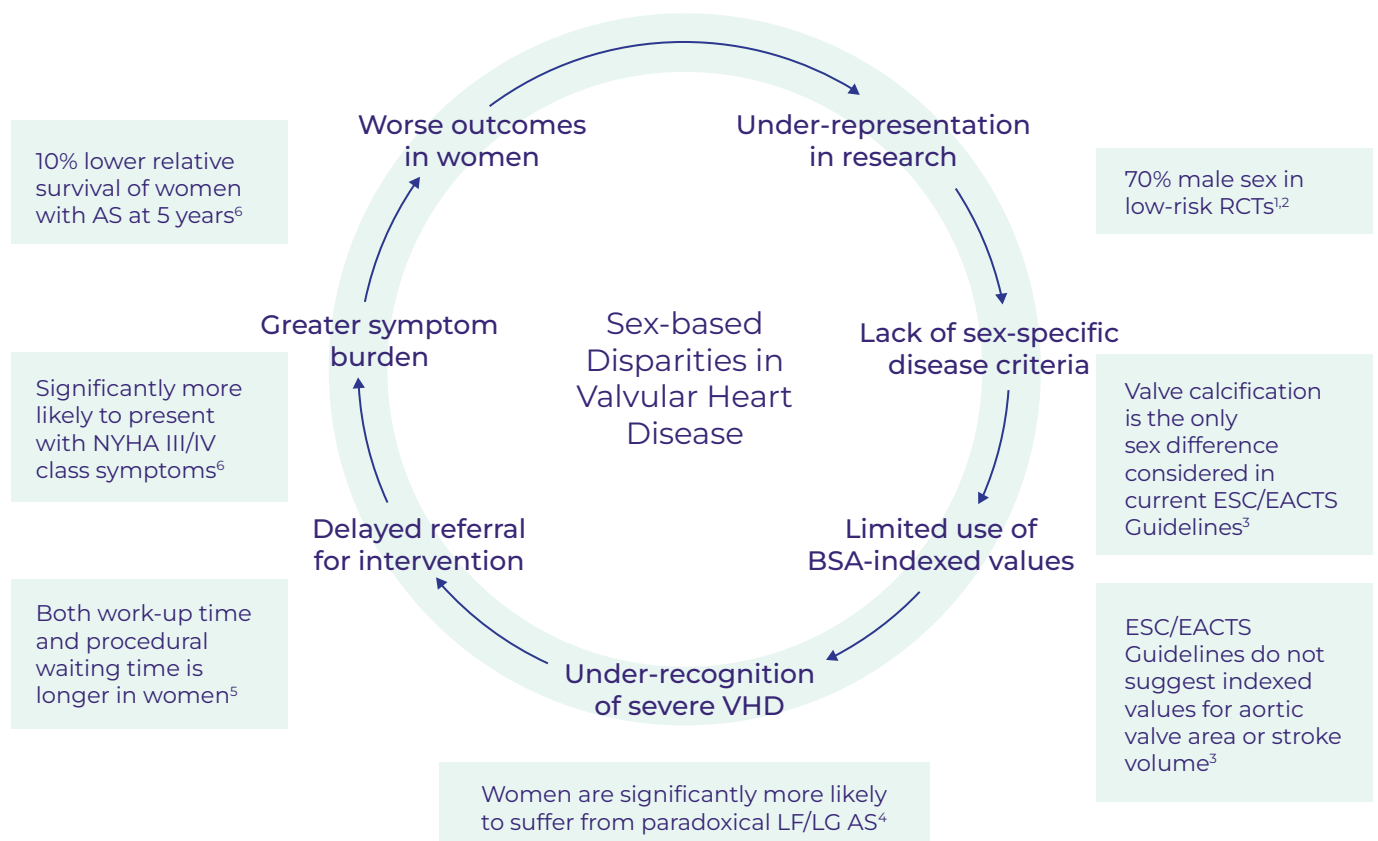
A guide for primary care and referring physicians

AORTIC STENOSIS IN WOMEN

Aortic stenosis (AS) is a heart valve disease that results in aortic valve narrowing and restriction of blood flow from the heart to the rest of the body, causing severe (and potentially life-threatening) complications. Diagnosis involves imaging and catheter-based tests to assess severity. Once aortic stenosis is severe, treatment options include open-heart surgery or a less invasive keyhole procedure via the femoral artery (TAVI).

Aortic stenosis is more common in older women, who often experience different symptoms than men. Women are frequently under-diagnosed and referred later for care, sometimes when heart function is already impaired. Greater awareness of symptoms and treatment options is crucial. This booklet provides key information to aid timely diagnosis and management.¹⁻³

The challenge of treating women with AS



Abbreviations: AS: aortic stenosis; BSA: body surface area; LF: low flow; LG: low gradient; RCT: randomised controlled trial; VHD: valvular heart disease

Figure 1 demonstrates current challenges when treating women with aortic stenosis, including lower 5-year survival in women compared with men, greater symptom burden and the need for sex-specific thresholds at the time of diagnostic imaging.¹⁻³

UNDERSTANDING AORTIC STENOSIS - CLINICAL SCENARIO

Over a period of 9 months, an 82-year-old woman has been experiencing mild shortness of breath and occasional dizziness while walking. She informs her GP, who, through a blood test, identifies iron deficiency anaemia and prescribes iron tablets. Believing her symptoms are due to ageing and the physical strain of caring for her 85-year-old husband, she continues her daily routine without further concern. When asked about her health, she describes her symptoms as “normal for her age.” One day, she develops chest pain and collapses while walking. An ambulance rushes her to the hospital, where an echocardiogram reveals she has severe aortic stenosis.

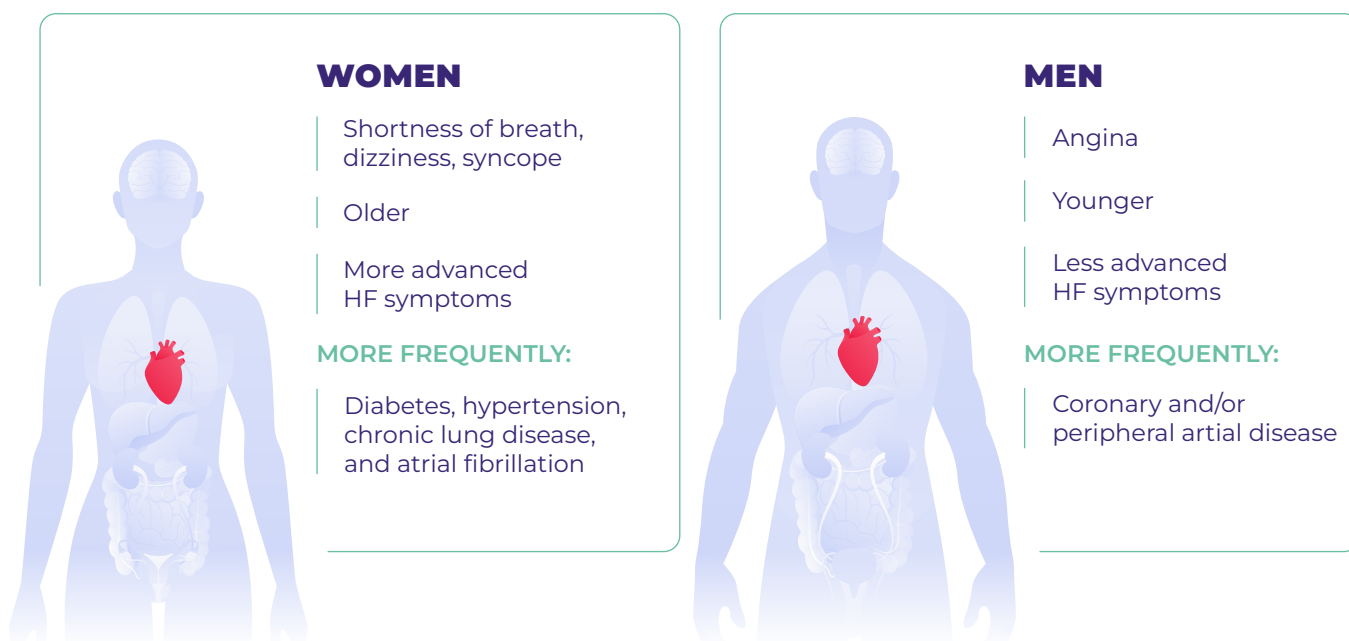


Symptoms

Women with aortic stenosis often present later in life with shortness of breath, dizziness, or syncope, likely due to underestimation of symptoms. As a result, they have more advanced heart failure and are more likely to have diabetes, hypertension, lung disease, and

atrial fibrillation. Men, however, typically present younger with chest pain (angina) and have less advanced heart failure. They are also more likely than women to have coronary or peripheral arterial disease.¹⁻³

Differences in clinical presentation



Abbreviation: HF: heart failure

Anatomical and pathophysiological differences

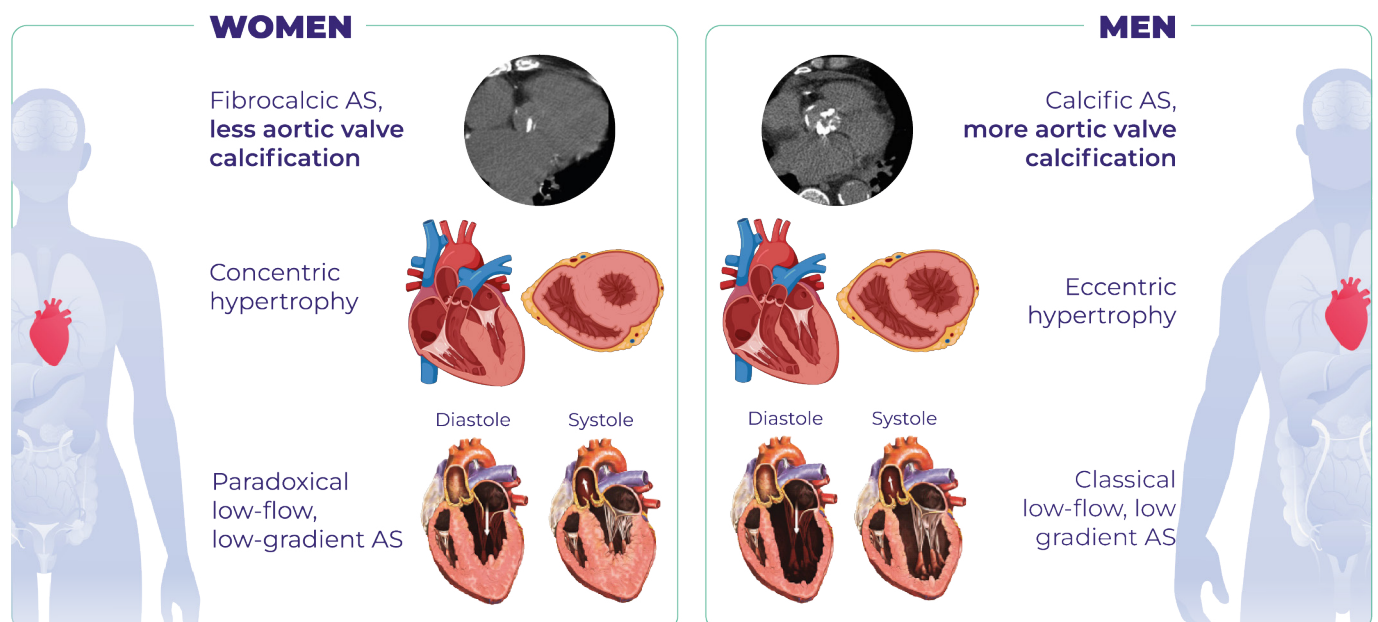
Assessment of aortic stenosis requires consideration of the fact that women typically have a smaller aortic annulus (valve size). Imaging values are therefore indexed to body surface area, with specific gender-based echocardiographic and cardiac CT thresholds.³

Female patients with aortic stenosis often have more valve fibrosis and less valve calcification than men. They also present with concentric left ventricular hypertrophy and are therefore more prone to paradoxical low-flow low-gradient aortic stenosis, whereas men typically present with eccentric left ventricular hypertrophy and more classical low-flow, low-gradient aortic stenosis.³



Aortic stenosis in women presents differently

Pathophysiology



Clinical predictors of severe aortic stenosis

Cardiac auscultation is a key step and a comprehensive physical examination, including auscultation, is essential. An ejection systolic murmur indicates aortic stenosis, but multiple valve involvement may produce varied heart sounds.

Whilst an electrocardiogram may demonstrate left ventricular hypertrophy, an echocardiogram confirms valve calcification and the severity of aortic stenosis. This 30-45 minute ultrasound examination uses a probe and gel to capture images, measure aortic valve area and gradients, and assess left ventricular function. Further imaging may be needed if results are unclear or fail to correlate with clinical findings, and stress echocardiography (using either exercise or dobutamine infusion) can be used to evaluate heart function on exertion.

A 10–15-minute CT scan can also be used to determine the extent of aortic valve calcification (which correlates with the severity of aortic stenosis) and provide further information concerning valve anatomy, dimensions of the aortic annulus and root, and the presence or absence of concomitant coronary artery or peripheral arterial disease – information which is essential in selection of the appropriate mode of intervention and pre-procedural planning (see below).⁴⁻⁵

Why is echocardiography so important?



Echocardiography is the primary tool for the diagnosis of aortic stenosis.

Patients experiencing cardiac symptoms often face delays in referral and many primary care practices can perform portable scans to allow early detection and referral to tertiary centres.

Timely screening is crucial since early detection and prompt referral are essential for effective treatment.

TREATMENT OPTIONS FOR AORTIC STENOSIS

To help patients and healthcare providers make informed decisions, this section outlines treatment options, with a focus on surgical aortic valve replacement (SAVR) and transcatheter aortic valve implantation (TAVI).⁴⁻⁵

Conservative management/surveillance

▪ When it is appropriate

Surveillance is typically reserved for patients with mild or moderate aortic stenosis. Conservative management is sometimes appropriate for those considered unsuitable for valve replacement due to other health conditions and/or severe frailty.

▪ Surveillance

The regular monitoring of the heart and valve condition using echocardiography and clinical assessment every 6–12 months. This includes enquiry concerning symptoms such as worsening fatigue, breathlessness or general decline in exercise capacity.

▪ Limitations

Conservative and pharmacological management do not reverse or slow the progression of severe aortic stenosis.

Surgical aortic valve replacement (SAVR)

▪ What it involves

SAVR is an open-heart surgical procedure where the damaged aortic valve is replaced with a mechanical or biological prosthesis.

▪ Advantages

Surgery has proven long-term durability, especially with mechanical valves. It is highly effective for patients who are good candidates for open surgery.

▪ Challenges for women

Women, particularly those who are older, are more likely to present with smaller annular (valve) sizes and frailty, increasing surgical risk and the possibility of patient-prosthesis mismatch. The procedure may carry a higher risk of complications compared to men and recovery times can be longer.

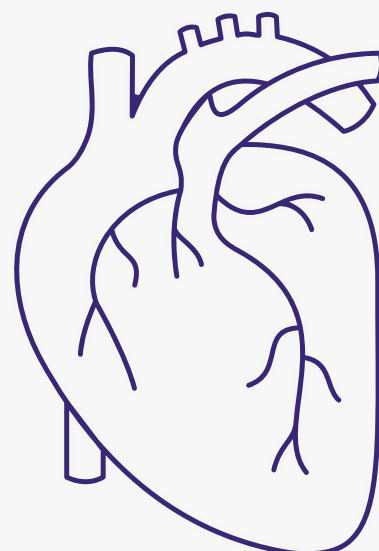
Transcatheter aortic valve replacement (TAVI)

▪ What it involves

TAVI is a minimally invasive procedure (typically undertaken via the femoral artery at the top of the leg) where a new valve is inserted through a catheter and positioned within the diseased valve.

▪ Key benefits

TAVI avoids open-heart surgery and typically results in a shorter hospital stay and quicker recovery. TAVI is now the standard of care for older and higher risk patients.





Shared decision making – the value of the Heart Team

The core Heart Team includes cardiovascular imaging specialists, structural interventionists, and cardiac surgeons who are supported by electrophysiologists, heart failure physicians, care of the elderly physicians, intensivists/anaesthetists and allied health professionals, such as nurses and cardiac physiologists.

Once a work-up is complete, a multidisciplinary Heart Team decision concerning the timing and mode of treatment is crucial for successful outcomes. The potential options should then be discussed with the patient and their families to allow shared decision making and informed consent.

European and US guidelines recommend that interventions such as TAVI and SAVR should be centralised in tertiary Heart Valve centres with adequate procedural volume and on-site interventional cardiologists and surgeons.



TRANSCATHETER AORTIC VALVE IMPLANTATION (TAVI) IN WOMEN

Evidence indicates that women experience better outcomes after TAVI compared to men.



Studies suggest:

- **Lower mortality rates**

Women have lower rates of both procedural and post-procedural mortality.

- **Reduced complications**

Despite anatomical differences such as smaller femoral arteries and a higher risk of vascular complications, women have better long-term survival rates.

- **Improved quality of life**

Many women report significant symptom relief and faster return to daily activities.⁵⁻⁶

Risks and considerations

While TAVI offers numerous advantages, it is important to be aware of potential risks:³

Studies suggest:

- **Vascular complications**

Although the risk is low, women often have smaller femoral arteries and are more likely to experience vascular injuries.

- **Pacemaker implantation**

A small proportion of patients require a permanent pacemaker after TAVI.

- **Long-term durability**

Promising longer-term data on TAVI valve performance are still emerging, especially in younger patients.

HIGHLIGHTS FROM RECENT TRIALS

- **The RHEIA Trial:** The first randomised controlled trial to compare TAVI to SAVR exclusively in women with severe aortic stenosis found that women experienced a shorter hospital stay and reduced rates of rehospitalisation at one year compared to SAVR. Women who underwent TAVI had higher quality-of-life scores compared to those who underwent SAVR, indicating that they were more likely to feel well, able to socialise and perform their usual activities. These findings were replicated in a combined analysis using data from the **PARTNER 3** trial.⁶⁻⁸

COMPARING TAVI AND SAVR IN WOMEN

Outcomes

▪ Lower procedural risk

The less invasive nature of TAVI reduces the risk of complications.

▪ Faster symptom relief

Women tend to report quicker and more significant symptomatic improvements after TAVI.⁵⁻⁶

▪ Improved survival rates

Several studies have demonstrated that women undergoing TAVI have a lower mortality when compared to those who undergo SAVR.

Patient selection

Choosing between TAVI and SAVR depends on multiple factors:⁴⁻⁵

▪ Risk profile

TAVI is generally preferred in intermediate and high surgical risk patients.

▪ Anatomical considerations

TAVI is well-suited for patients with a smaller aortic annulus (a common finding in women).

▪ Age and life expectancy

The durability of surgical valves is well established, and SAVR is generally more appropriate in younger patients with longer life expectancy.

▪ Patient preference

TAVI may be preferred by those seeking a quicker recovery.



CONCLUSION: PERSONALISED CARE FOR WOMEN WITH AORTIC STENOSIS

The treatment landscape for aortic stenosis has evolved significantly, offering more options and better outcomes for women. A detailed understanding of the nuances of TAVI and SAVR is crucial to tailor care to each patient's unique needs.

KEY TAKEAWAYS

- ✓ **Diagnosis is challenging**
as women with aortic stenosis often present later and underestimate their symptoms.
- ✓ **Surveillance** requires regular echocardiography and review of symptom status.
- ✓ **TAVI** offers significant advantages for women, including lower mortality and quicker recovery.
- ✓ **SAVR** remains a durable option, particularly for younger patients and those at low surgical risk.
- ✓ **Individualised treatment decisions** should consider age, health status, anatomical differences, and personal preferences.



References

1. Tribouilloy C, et al. Excess mortality and undertreatment of women with severe aortic stenosis. *J Am Heart Assoc.* 2021;10(1):e018816. doi: 10.1161/JAHA.120.018816.
2. Bienjonetti-Boudreaux D, et al. Impact of sex on the management and outcome of aortic stenosis patients. *Eur Heart J.* 2021 Jul 15;42(27):2683-2691. doi: 10.1093/eurheartj/ehab242.
3. Masiero G, et al. Sex-Specific Considerations in Degenerative Aortic Stenosis for Female-Tailored Transfemoral Aortic Valve Implantation Management. *J Am Heart Assoc.* 2022 Oct 4;11(19):e025944. doi: 10.1161/JAHA.121.025944.
4. Vahanian A, et al. 2021 ESC/EACTS Guidelines for the management of valvular heart disease. *Eur Heart J.* 2022 Feb 12;43(7):561-632. doi: 10.1093/eurheartj/ehab395.
5. Otto CM, et al. 2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease: Executive Summary: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation.* 2021 Feb 2;143(5):e35-e71. doi: 10.1161/CIR.0000000000000932.
6. Eltchaninoff H, et al. RHEIA – Transcatheter versus surgical aortic valve replacement in women with severe aortic stenosis. In press, *Eur Heart J.* 2025.
7. Tchetché D. Transcatheter vs surgical aortic valve replacement in women: a pooled analysis of the RHEIA and PARTNER 3 trials. Presented at: TCT 2024. October 29, 2024. Washington, DC, USA.
8. Herrmann HC, Thourani VH, Wang J, et al. Self-Expanding or Balloon-Expandable TAVR in Patients with a Small Aortic Annulus. *N Engl J Med.* 2024;390(21):1959-1971. doi:10.1056/NEJMoa2312573

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Authors:

JULIA GRAPSA

Brigham and Women's Hospital, Harvard Medical School, Boston, USA

OMAR CHEHAB

St Bartholomew's Hospital, London, United Kingdom

Reviewers:

BERNARD PRENDERGAST

St Thomas' Hospital & Cleveland Clinic London, United Kingdom

DIDIER TCHÉTCHÉ

Clinique Pasteur, Toulouse, France

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