

# AORTIC STENOSIS

## Overview

Aortic stenosis (AS) can be congenital or degenerative and is the most common heart valve disease worldwide. It can occur due to many causes (e.g. rheumatic fever or a congenital heart defect) though this condition more commonly develops during ageing as calcium or scarring damages the valve and restricts the amount of blood flowing through the valve. In Europe, approximately one million people over 75 years suffer from severe aortic stenosis (AS), one of the most serious and most common valve diseases, and this disease burden is increasing with the aging population.

The presence of calcific valve disease is associated with older age, male gender, elevated serum lipoprotein levels, diabetes, smoking, metabolic syndrome, and hypertension. Aortic Stenosis is a degenerative and progressive disease and sooner or later a valve replacement is mandatory in order to prevent irreversible hemodynamic changes. Before however symptoms occur, aortic stenosis is preceded by a silent, rather long lasting latent phase characterised by a slow progression at the molecular, cellular, and tissue levels. The disease is often mis-diagnosed and often under-treated.

Aortic stenosis (AS) is associated with a significant reduction of life expectancy and a decline of quality of life. AS is one of the most prevalent cardiac valve diseases among the elderly that requires frequent consultations with the healthcare system, hospital admissions and often interventionist treatment. Symptoms include osteoarthritis, fatigue, chest pain and dizziness or loss of consciousness. However, in some cases the AS is asymptomatic. The diagnosis is based on symptoms, the finding of a typical cardiac systolic murmur and the confirmation of the valvular lesion with cardiac imaging techniques, mainly echocardiography. Once an AS has been diagnosed and there are several treatment options: surgical treatment, treatment with catheter interventions or palliative care supported by drug treatment.

The European Society of Cardiology recommends the consultation of a multidisciplinary heart team in the management of valvular heart disease, heart failure, and myocardial revascularization. Such a heart team normally consists of cardiologists, cardiac surgeons, interventionists, imaging specialists, anesthetists and midlevel providers. In specific cases the expert opinion of a general practitioner, geriatrician or intensive care specialist can be of additional value. According to current evidence, TAVI appears to be an optimal solution (TAVI-in-valve) in high surgical risk populations. For other population segments, conventional open heart surgery remains the optimal treatment. For those clients who cannot undergo a TAVI or an open heart surgery, treatment with drugs is the only option currently.

Recent advances in telemonitoring technologies create opportunities to monitor electrocardiogram (ECG) and vital signs remotely, facilitating redesign of follow-up trajectories. A particularly interesting application of mobile health is telemonitoring, in which mobile sensor applications facilitate remote follow-up of physiological parameters. Accordingly, telemonitoring systems that track vital parameters can create alternative strategies for current in-hospital monitoring. With this approach, patients are no longer confined to the hospital for follow-up of the ECG or other vital signs, which opens doors to redesigning the post-procedural patient trajectory. For the TAVR population, the introduction of remote monitoring technologies raises the possibility of shortening hospital stay length in eligible patients without abstaining from follow-up of pacemaker dependency. As mentioned previously, this can promote fast rehabilitation, procure a patient-friendly post-procedural trajectory, and optimize use of hospital bed capacity. However, further

research regarding the effectiveness of this concept is required, involving evaluation of the overall effects on patient outcome, efficiency, and cost-effectiveness.

## Care Delivery Shortcomings

### **Awareness is low and poses an additional risk to early detection as patients tend to present to late to healthcare services:**

Early detection is of great importance as degenerative aortic stenosis (AS) is associated with a high mortality if diagnosed late and if no valve replacement therapy is performed. Symptoms might remain hidden in a latent asymptomatic stage of the disease until signs of left ventricular (LV) impairment appear. Once symptomatic, AS prognosis is poor unless surgery or TAVI is performed. The biggest catalyst for the implementation of successful disease screening measures is to increase public, patient and physician awareness of AS. According to a recently published survey in almost 9,000 subjects aged  $\geq 60$  years across nine European countries, only 2% of the respondents expressed concerns about VHD. In contrast, 28% of study patients were concerned about cancer and 25% about Alzheimer's disease. When patients were asked about their knowledge of AS, 92% of respondents had no knowledge of the condition or provided an incorrect definition. Many patients who develop symptoms remain undetected in clinical practice because of lack of follow-up or access to care, or because they have subconsciously, often unconsciously, adapted by decreasing their level of activity to avoid symptoms. Further to this, factors such as waiting lists for diagnosis or budget limitations for treatment in early onset stages are delaying early detection.

### **Ease the "watchful waiting" time for patients and trains patients on early onset symptoms.**

Many patients of mild-to-moderate AS are in "watchful waiting". In watchful waiting, the patient has been diagnosed with AS. However, the severity of the disease does not yet require SAVR or TAVR. The watchful waiting does however require that patients recognize and promptly report any symptoms and that they return to the hospital for a follow-up echocardiogram.

### **Lack of cooperation and coordination with social support services and uncoordinated Follow-Up management:**

Out of hospital follow up is limited and the need to improve follow-up is especially relevant for the population of older people. They need special attention during follow-up (FU) to achieve a successful outcome and avoid early and late complications affecting patients' survival and quality of life. The large majority of especially TAVI patients are very old, with many co-morbidities, sometimes with a low socio-cultural level, often alone and without family support. These conditions may lead to substantial management problems which can be summarized as follows:

- Lack of family support and poor compliance to therapy and out-patient visits
- Therapy adjustments
- (Recurrent) hospitalizations

Telemonitoring can be used to improve follow-up procedures for patients, but further research regarding the effectiveness of this concept is required.

### **Educational support for patients should be improved:**

The existence of different treatment options can for example be confusing for the patient. It is important that, when diagnosed with aortic stenosis, the patient, their family and caregiver understand what aortic

stenosis is, and how it can be treated. There is no ICT-Tool for patients' decision support; decisions aids are just available as print material or online booklets. An easy-to-use iPad app exists, explaining the disease, its treatment options and, importantly, what happens after discharge from the hospital, when the level of care is reduced and additional support becomes very important. Dubbed the "Aortic Stenosis Patient Journey iPad App," nursing staff, as well as patients and their family, can download this tool from the iTunes store for free.

**A need for a multidisciplinary valve service to improve monitoring, evaluation, documentation, and timing of intervention for patients with aortic stenosis.**

Key elements would be to ensure effective, multidisciplinary communication between team members, including echocardiographers and clinicians, co-ordinators, interventional cardiologists, and cardiothoracic surgeons as well as shared-decision making processes, also considering the level of fragility of a patient, patients' preferences, needs and values. In order to monitor the extensive set of diagnostic and therapeutic options it is suggested that decision making is performed in a multidisciplinary team, i.e. a Heart Team. "Another advantage of the Heart Team is that the pre-operative diagnostic work-up will become more standardized, since a protocolized and complete pre-operative assessment is a requirement to have a successful multidisciplinary meeting. Finally, an open discussion about therapeutic options in complex patients creates an environment for clinicians to discuss and expand their knowledge. Moreover, complex cases sometimes require creative solutions which are not always supported by protocols and guidelines. The Heart Team offers a platform for "creative solutions," and an opportunity to share responsibility for these treatments. Finally, these discussions can deliver an important contribution to the education of medical students and clinical residents in one of the most difficult and rapidly evolving subjects of medicine. "

## Integrated Care Procurement Objectives

1. Include relevant stakeholders such as social carers and pharmacies in prevention: The interface to patients and their access to services should capitalise on the fact that social workers and pharmacies can be in frequent contact with at-risk patients and so can play a strong role in prevention and early detection. Furthermore, solutions should capitalise on new technologies to increase awareness and outreach among the general population and especially high-risk population segments.

**Related Integrated Care keyword:**

- CARE TEAM BUILDING
- DIGITAL HEALTH
- HOLISTIC AND COMPREHENSIVE APPROACH
- PERSONALISED CARE

2. Find solutions that address the often uncoordinated follow-up of clients discharged from hospital and that support shared-decision making processes, also considering values, needs and preferences of the clients. Innovative solutions should tackle the need of patients and family carers receiving the necessary training to enable a successful transition to the home environment. Patients and family carers often receive insufficient advice on the psychological and emotional impact of aortic stenosis, the impacts of a surgery or TAVI and how they can manage these complex feelings. Furthermore, it seems to be difficult to find and access information and assistance on care and support services after discharge from hospital. Solutions

should also enable a better addressing of the current lack of proactive follow-up either from primary care, the hospital, allied healthcare professionals, and/ or social care services.

**Related Integrated Care keyword :**

- PERSONALISED CARE
- PERSON-CENTRED
- SERVICE, FUNCTION AND CARE INTEGRATION / COORDINATION – TRANSITIONS
- WORKFORCE RESOURCES, TRAINING AND CAPACITY BUILDING

3. Answer client information needs that change over time. ICT tools shall facilitate self-care and management during recovery at home from the patient's perspective.

**Related Integrated Care keyword :**

- DIGITAL HEALTH
- PERSONALISED CARE
- PERSON-CENTRED
- SELF-CARE AND SELF-MANAGEMENT

4. Address lack of electronic care record data integration from technologies designed to motivate and educate people as well as enhance the interface between person and their care team.

**Related Integrated Care keyword :**

- DATA AND INFORMATION SHARING
- SERVICE, FUNCTION AND CARE INTEGRATION / COORDINATION – TRANSITIONS
- WORKFORCE RESOURCES, TRAINING AND CAPACITY BUILDING

5. Find solutions that support the multidisciplinary valve service to improve monitoring, evaluation, documentation, planning, and timing of intervention for patients with aortic stenosis.

**Related Integrated Care keyword :**

- CARE TEAM BUILDING
- DATA AND INFORMATION SHARING
- DIGITAL HEALTH
- SERVICE, FUNCTION AND CARE INTEGRATION / COORDINATION – TRANSITIONS

6. Find solutions facilitating peer-to-peer support. Solutions targeted at self-supporting (perhaps with a regional coverage), and access to experts or expert patients are relevant here too.

**Related Integrated Care keyword :**

- CARE TEAM BUILDING
- WORKFORCE RESOURCES, TRAINING AND CAPACITY BUILDING