

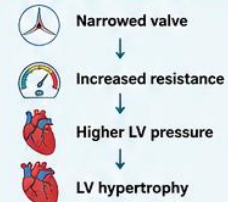
NARROWED AORTIC VALVE

UNDERSTANDING AORTIC STENOSIS AND ITS MANAGEMENT

A GUIDE FOR CHILDREN, TEENS & FAMILIES

Aortic stenosis (AS) is a narrowing at or near the aortic valve that obstructs blood flow from the left ventricle into the aorta. It is most often congenital and may range from mild to critical.

WHAT HAPPENS?



Over time, severe obstruction can lead to symptoms, decreased exercise tolerance, and in rare cases, heart failure.

TYPES OF AORTIC STENOSIS

1. VALVAR AORTIC STENOSIS (Most common)

The valve leaflets are thickened, fused, or abnormal.

- Bicuspid (2 leaflets)
- Unicommissural/unicuspid
- Dysplastic



2. SUBAORTIC STENOSIS

Obstruction occurs below the valve, often from a discrete membrane or tunnel-like narrowing.



3. SUPRAVALVAR STENOSIS

Narrowing occurs above the valve, usually at the sinotubular junction.



SYMPTOMS (OLDER CHILDREN & TEENS)

Many children have no symptoms when disease is mild.

Symptoms with moderate to severe AS:

- Exercise intolerance
- Fainting during exercise
- Shortness of breath
- Palpitations
- Chest pain with exercise
- Unusual fatigue
- Dizziness or near-fainting

Exertional chest pain or syncope in a patient with AS requires prompt evaluation.

HOW IS IT DIAGNOSED?

ECHOCARDIOGRAM IS THE KEY TEST

- Valve anatomy & number of leaflets
- Location of obstruction
- Doppler velocity & pressure gradients
- Aortic regurgitation
- Left ventricular hypertrophy
- LV function (systolic & diastolic)
- Aortic root & ascending aorta
- Associated congenital heart disease

OTHER TESTS MAY INCLUDE



HOW SEVERE IS IT?

Severity cannot be determined by one number alone. We look at the whole picture:

- Valve anatomy
- Doppler velocity/gradients (Gradient = $4 \times \text{velocity}^2$)
- Left ventricular response
- Aortic regurgitation
- Symptoms & exercise findings

Doppler peak instantaneous gradient is not the same as the peak-to-peak gradient measured during cardiac catheterization.

MANAGEMENT OVERVIEW

MILD AS

- Regular cardiology follow-up
- Periodic echocardiography
- Blood-pressure monitoring
- Assess for progression
- Activity guidance

No procedure usually needed.

MODERATE AS

- Closer surveillance. Management depends on:
 - Degree & progression
 - LV hypertrophy & function
 - Symptoms
 - Exercise-test response
 - Aortic regurgitation

Some remain stable for years; others progress.

SEVERE OR SYMPTOMATIC AS

- Consider intervention when there is significant obstruction with:
 - Symptoms
 - Significant catheter-measured obstruction
 - Abnormal exercise response
 - Ischemic ECG changes
 - Progressive LV hypertrophy
 - LV dysfunction
 - Critical obstruction in infancy

Do not base decisions on a single echocardiographic gradient.

INTERVENTIONAL OPTIONS

BALLOON AORTIC VALVULOPLASTY

- First-line for suitable anatomies
- Immediate relief
- No open-heart surgery
- May postpone surgery for many years

Goal: Relieve stenosis while preserving the valve & minimizing aortic regurgitation.

SURGICAL AORTIC VALVOTOMY/REPAIR

- Preferred when:
 - Anatomy not ideal for balloon
 - Significant AR
 - Previous balloon failed
 - Durable repair possible

WHEN VALVE REPLACEMENT IS NECESSARY

For severe recurrent stenosis, significant regurgitation, or mixed valve disease.

ROSS PROCEDURE

Pulmonary valve becomes the new aortic valve.

- Excellent hemodynamics
- Growth potential
- No routine lifelong anticoagulation

MECHANICAL VALVE

- Very durable
- Requires lifelong anticoagulation

BIOPROSTHETIC VALVE

- Usually no lifelong anticoagulation
- Limited durability
- Does not grow

Choice depends on age, size, anatomy, lifestyle, and future plans.

SPORTS & ACTIVITY

- Activity recommendations should be individualized.
- Restrictions are more important with moderate-to-severe AS, symptoms, abnormal exercise response, or arrhythmias.
- Competitive athletes with significant AS need formal cardiovascular evaluation.

DENTAL CARE & ENDOCARDITIS

- Good oral hygiene and regular dental care are important.
- Routine antibiotic prophylaxis is NOT required for native aortic stenosis.
- Follow current guidelines for specific high-risk conditions.

LIFELONG FOLLOW-UP MATTERS

- Even after balloon dilation or surgery, ongoing follow-up is essential.
- Patients may develop:
 - Recurrent stenosis
 - Aortic regurgitation
 - LV hypertrophy or dysfunction
 - Aortic root/ascending aorta dilation
 - Arrhythmias
 - Need for repeat intervention
- Transition to adult congenital heart disease care in young adulthood.

SAFETY PEARLS

- Seek urgent medical care for:
 - New chest pain during exercise
 - Fainting during exercise
 - Significant new shortness of breath
 - Sustained rapid or irregular heartbeat
 - New pallor, cyanosis, or poor perfusion
 - Poor feeding, breathing trouble, or lethargy in an infant

DON'T WAIT. GET CHECKED.



THE KEY MESSAGE

- The goal of treatment is not simply to lower a pressure gradient. The long-term objective is to:
 - Protect the left ventricle
 - Preserve the native valve
 - Minimize aortic regurgitation
 - Maintain safe activity
 - Delay valve replacement when appropriate
 - Provide lifelong surveillance

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