Aortic Insufficiency (Aortic Regurgitation) —
Symptoms and Treatment

See online here

Acquired valvular heart disease may manifest as insufficiency (i.e. incomplete closure of the valve), as a stenosis (i.e. a narrowing of the valve), or as a combined valvular defect. All valves can be affected. Aortic valve stenosis and mitral regurgitation are particularly frequent.

Definition of Aortic Insufficiency

A frequent cause of aortic valve insufficiency is bacterial endocarditis, but even congenital diseases or defects can cause this disorder. Aortic insufficiency can remain asymptomatic in its chronic course, in which case the prognosis is favorable.

Acute and Chronic Aortic Insufficiency

Aortic valve insufficiency describes the incomplete closure of the aortic valve with pathological reflux into the diastole (regurgitation). It can be acute or chronic and has different causes.
Etiology of Aortic Insufficiency

Acute aortic insufficiency

The acute form of aortic valve insufficiency is frequently observed in conjunction with bacterial endocarditis that affects the aortic valve. An aortic dissection type A or trauma may also be responsible for the insufficiency.

Chronic aortic insufficiency

The chronic form may be due to a congenital defect, such as a bicuspid valve, or the consequence of dilation in the valvular region. Aortic valve insufficiency is also seen as parts of diseases, such as Marfan syndrome, Ehlers-Danlos syndrome, or syphilis.
Classification of Aortic Insufficiency

Severity of aortic insufficiency

The severity of aortic insufficiency can be classified according to the degree of diastolic reflux (regurgitation fraction). This can be evaluated as part of cardiac catheterization, with the introduction of a contrast medium into the ascending aorta.

- **Level I**: Regurgitation fraction < 20%. Very little contrast medium enters the left ventricle; it is completely excreted during systole.
- **Level II**: Regurgitation fraction 20–39%. The left ventricle fills up completely but is weak after several heartbeats with the contrast medium.
- **Level III**: Regurgitation fraction 40–60%. The left ventricle fills up completely with the contrast medium; the contrast medium density in the left ventricle corresponds to the density in the ascending aorta.
- **Level IV**: Regurgitation fraction > 60%. The left ventricle fills up completely with the contrast agent during the first heartbeat; the contrast agent density is higher in the left ventricle than in the ascending aorta.

Pathophysiology of Aortic Insufficiency

Changes due to aortic insufficiency
Due to the constant backflow of blood into the left ventricle, the volume load rises; therefore, a chronic aortic valve insufficiency causes an isolated left ventricular hypertrophy. Initially, the cardiac output can be maintained, and the patient remains asymptomatic. With persistent insufficiency, however, the compliance of the ventricle decreases, so that normal stroke volume can no longer be maintained.

The perfusion of the left ventricle with oxygen cannot sufficiently occur, peripheral resistance increases, and the duration of the diastole is extended. This change can increase the magnitude of the insufficiency.

### Symptoms and Clinical Presentation of Aortic Insufficiency

Acute aortic valve insufficiency leads to a rapid left cardiac decompensation with pulmonary edema. Chronic insufficiency can be tolerated for decades and remain asymptomatic. The first signs are palpitations. With the progression of the disease, reduced performance and signs of left ventricular failure become apparent. Syncope, dyspnea, or arrhythmia, as well as angina pectoris and sudden death, can be symptoms, but compared to aortic stenosis, this occurs only rarely.

### Diagnosis of Aortic Insufficiency

**Murmurs due to aortic insufficiency**

The diastolic, decrescendo murmur is best heard at the left third intercostal space (second aortic area).

- Hand grip → increases afterload → increase murmur.
- Valsalva and standing → decrease preload → decrease murmur.

Diagnostics can be divided into physical and instrument-based diagnoses. In the physical examination, the **Austin Flint murmur** with punctum maximum above the Erb point can
be auscultated. Additionally, **low diastolic blood pressure** with a high pulse amplitude and **water hammer pulse (collapsing pulse)**, as well as the **Musset sign** and the **Müller sign**, can be found in cases of severe insufficiencies. **Rapid raising carotid pulse with sudden collapse can also be seen.**

### Treatment of Aortic Insufficiency

**Medical Treatment Involves:**

1. Vasodilators to decrease afterload, such as angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs)/nifedipine

2. Decreasing pulmonary congestion with diuretics or digitalis.

Aortic valve insufficiency can be treated **conservatively** if patients are asymptomatic. Patients who have a hemodynamically significant insufficiency should **exercise regularly but avoid excessive efforts**. Surgical intervention is indicated if patients are symptomatic or if asymptomatic patients show an ejection fraction less than 50% or a left ventricle (LV) end-diastolic diameter of more than 70 mm—alternatively an end-systolic diameter of more than 50 mm.

### References


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