Call for better treatment strategies for musical hallucination, a rare but complex auditory condition

***Highlights from a case of an elderly female with hearing loss and persistent* musical hallucination**

Clinical presentation

- 86-year-old female, who started experiencing musical hallucination at 82 as her hearing loss was worsening.
- She usually hears familiar music (pop songs and Christmas tunes) at a normal volume in both ears.
- The condition is not particularly distressing, although occasionally she hears unpleasant music. She can change the tune by singing along.

Medical history

- Bilateral chronic serous otitis media
- Bilateral sensorineural hearing loss
- Post-traumatic stress disorder
- Hypertension
- Stroke
- Trauma to the brain
- Seizures.

Diagnosis

According to her otolaryngologist, her musical hallucination was due to hearing loss secondary to sensorineural impairment and serous otitis media.

Management strategies

- Hearing aids
- Pressure equalization tubes for the serous otitis media
- Gabapentin
- Quetiapine
- Donepezil

Conclusion

There was no resolution or improvement of symptoms. Patient declined treatment after several years as she adapted to her condition.

Better management strategies are needed for patients who are bothered by their symptoms.

Reference: Cavendish J, Goebel LJ. Musical Hallucinations in an Elderly Female With Hearing Loss. Cureus. 2024 Nov 4;16(11):e72992. doi: 10.7759/cureus.72992.

Summary prepared by Anne John Michael, Medical Writer: July 2025

What are the different types of musical hallucinations?

Highlights from a comprehensive review of the literature to classify musical hallucinations

Based on 294 cases of musical hallucinations from 238 studies, the authors identified

8 types of musical hallucinations based on their underlying pathological etiologies

1 Hearing impairment

2 Psychiatric disorder (eg psychotic disorder, mood disorder, personality disorder, or developmental-related disorder)

3 Brain lesion (eg brain injuries, brain tumors, or strokes)

4 Unknown etiology

5 Surgery

6 Substance use/ adverse side effects from prescribed medications (eg from mirtazapine, tricyclic, ketamine, pentoxifylline, dipyridamole, quetiapine, triazolam, or oxycodone)

7 Infection/ immune disorder (eg Lyme disease, Hashimoto's encephalopathy, or Listeria rhombencephalitis)

8 Neuropathological symptoms (eg epilepsy, Parkinson's disease, or Charles Bonnet syndrome)

Average age of cases = 67.9 years
Sex distribution = 66.8% females & 33.2% males

Reference: Lian X, et al. Classification of musical hallucinations and the characters along with neural-molecular mechanisms of musical hallucinations associated with psychiatric disorders. World J Psychiatry. 2024 Sep 19;14(9):1386-1396. doi: 10.5498/wjp.v14.i9.1386.

Summary prepared by Anne John Michael, Medical Writer: July 2025

Differentiating musical hallucination from musical obsession, as neglect and underdiagnosis of these conditions are common

Highlights from a published report of two cases of musical symptomatology with acquired hearing loss

Musical hallucination	Musical obsession
Acquired hearing impairment is an important risk factor.	Acquired hearing impairment is not an important risk factor but may be a major compounding comorbidity.
The symptoms/perceptions appeared concrete and real; and not dependent on patient's will. The melodies experienced were meaningful and previously observed.	The symptoms can be intrusive and repetitive, and is linked to compulsions and resistance attempts.
	Comorbid obsessive-compulsive disorder
Pleasant ambient sounds, television, and radio can improve symptoms.	Fluvoxamine and risperidone are effective treatments.
Patients should be counselled and educated on the benignity of the condition.	Cognitive behavior therapy can be useful.
Auditory rehabilitation is recommended for tinnitus, but its efficacy for musical hallucination has been inconsistent.	Auditory rehabilitation is not recommended.

Reference: Costa OPF, Dalcim ML, Smaira SI, Lovadini GB. Musical hallucination or musical obsession? A differential diagnosis between two cases. Dement Neuropsychol. 2024 Jun 24;18:e20230073. doi: 10.1590/1980-5764-DN-2023-0073.

Summary prepared by Anne John Michael, Medical Writer: July 2025

What triggers drug-induced musical hallucination?

Highlights from a review of 27 cases from 24 articles published until January 2024 on the pathophysiology and potential treatment modalities for drug-induced musical hallucination

A patient with musical hallucination (a form of auditory hallucination) hears music or songs despite no external auditory stimulus.

Drugs that can trigger musical hallucination include:

- **Antidepressants**
- **Opioids**
- **Anti-Parkinson drugs**
- **Ketamine**
- **Voriconazole**
- **Ceftazidime**
- **Benzodiazepines.**

Majority of drug-induced musical hallucination cases can be resolved within 1 month if the

Drug is stopped

Drug's dose is reduced

Drug is switched to a different formula or route of administration

Drug is switched to a similar drug

Reference: Bakewell B, Johnson M, Lee M, Tchernogorova E, Taysom J, Zhong Q. Drug-induced musical hallucination. Front Pharmacol. 2024 May 22;15:1401237. doi: 10.3389/fphar.2024.1401237.

Summary prepared by Anne John Michael, Medical Writer: July 2025

Audiologists and ENT specialists are familiar with auditory hallucinations in hearing impairment but almost 70% of these clinicians rarely encounter such patients

Highlights from an online survey among clinicians across 10 countries

No	Assessment	Rate
1	Awarenesses of clinicians about the occurrence of auditory hallucinations in hearing impairment	• **Very aware: 29.6%** • **Moderately aware: 39.2%** • Somewhat aware: 12.0% • Slightly aware:16.0% • Not at all aware: 3.2%
2	Source of knowledge about auditory hallucinations in hearing impairment (participants can choose more than one source)	• **Patients with auditory hallucinations : 57.6%** • **Patients mentioning auditory hallucinations: 54.4%** • **Residential training: 42.4%** • **Scientific articles: 32.0%** • Basic medical training: 12.8%
3	Clinicians' opinion of the most perceived sound	• **Music: 56.5%** • Bells and ringing: 18.5% • Voices: 12.1% • Animal sounds: 2.4% • Other: 10.5%
4	Frequency of encountering patients with hearing impairment who have auditory hallucinations	• Never: 4.8% • Less than once a year: 20.0% • Once a year: 12.0% • **Once every six months: 32.8%** • Once a month: 19.2% • Once a week: 4.0% • Several times a week: 4.0% • Daily: 3.2%
5	Choice of typical treatment for patients with hearing impairment who have auditory hallucinations	• **Treatment for hearing impairment: 24.0%** • Psycho-education information: 18.9% • Psychological intervention: 14.5% • Referred to ENT specialist: 10.4% • Referred to psychiatrist: 8.5% • Referred to neurologist: 5.7% • Referred to audiologist: 3.5% • Referred to geriatrician: 1.9% • Prescribed treatment: 1.3% • Other:7.9% • No treatment:3.5%

Results of a survey involving 125 clinicians (68.8% audiologists;18.4% ENT specialists) across 10 countries (37.6% based in Germany, 28.8% in the Netherlands, 22.4% in the United Kingdom, and 11.2% in other countries)

Reference: Marschall TM, van Dijk P, Kluk K, Koops S, Linszen MMJ, Griffiths TD, et al. Hallucinations in Hearing Impairment: How Informed Are Clinicians? Schizophr Bull. 2023 Feb 24;49(12 Suppl 2):S33-S40. doi: 10.1093/schbul/sbac034.

Summary prepared by Anne John Michael, Medical Writer: Aug 2025

An unusual case of musical auditory hallucinations secondary to left frontal lobe ischemic infarction

Highlights from a case study

Clinical presentation

- A 97-year-old woman presented with dysarthria and a right-sided facial droop.
- 24–36 hours prior to the event, she developed intermittent auditory hallucinations, which worsened.
- The auditory hallucination experienced was music familiar to the patient (”Ave Maria” with choral lyrics and instrumental music) which lasts for several minutes each time it occurs.
    - These episodes did not cause the patient fear or distress.
- No behavioral or psychiatric changes.

Medical history

- Age-related hearing loss (no tinnitus).
- No prior neurologic history or acute neurocognitive decline, or psychiatric changes.
- She was able to go about her daily routines.

Diagnosis

- Stenosis of the left-sided M2 branch of the middle cerebral artery.
- Left frontal subcortical and periventricular ischemic infarcts.

Management strategy

- Ischemia was managed with aspirin, atorvastatin, and clopidogrel.
- Dysarthria and facial paralysis were managed in the speech-language pathology department and with appropriate medications.

Conclusion

- After two months, musical hallucination improved but without complete resolution. All other presenting symptoms resolved.
- The uniqueness of this musical hallucination case is the patient’s left-sided pathology and absence of coinciding psychosis.

Reference: Degueure A, Fontenot A, Khan MW, Husan A. Music to the Ears: An Unusual Case of Frontal Lobe Stroke With Complex Auditory Hallucinations. Cureus. 2022 Nov 5;14(11):e31127. doi: 10.7759/cureus.31127.

Summary prepared by Anne John Michael, Medical Writer: Aug 2025

Patients with hearing loss may present with continuous musical hallucination

Highlights from a case study of musical ear syndrome with unilateral hearing loss

Clinical presentation

- A 62-year-old man reported hearing uncontrollable musical tones without external stimuli.
- The onset of the musical sounds was abrupt and started six months earlier.
- The sounds were familiar to the patient (eg nursery rhymes) and occurred several times a day, affecting his daily living.

Medical history

- 20 years of symptomatic mild hearing loss.
- No neuropsychiatric disorder.
- No history of social isolation.
- Not on any medications.

Diagnosis

- Based on clinical and cognitive assessment as well as functional and structural magnetic resonance imaging, the patient was diagnosed with musical hallucination with unilateral hearing loss without any neuropsychiatric disorder.
- The MRI findings indicated increased activity and reduced cortical thickness in multiple cortical areas.

Conclusion

- A patient with hearing loss who experience continuous musical hallucination may have underlying brain abnormalities instead of delusions or psychosis.
- The results from this case indicate a specific association between cortical activation and continuation or activation of musical hallucination.

Reference: Aldhafeeri FM. Musical Ear Syndrome in a Patient with Unilateral Hearing Loss: A Case Report. Am J Case Rep. 2022 Sep 20;23:e936537. doi: 10.12659/AJCR.936537.

Summary prepared by Anne John Michael, Medical Writer: Aug 2025

First reported case of auditory verbal hallucinations with a voice that talks or sings to the patient

Highlights from a case study

Clinical presentation

- 78-year-old Caucasian woman was referred for geriatric psychiatry consultation due to cognitive dysfunction, erotomanic delusion, and complex musical hallucinations.
- The patient described the hallucinations as her neighbor's voice (singing a familiar church song with bell ringing in the background, commenting, or talking to her).
- The symptoms caused distress.
- She had mixed feelings about the neighbor's "voice" (sometimes pleasing, other times distressing and disturbing).
- Listening to music offered some relief.

Personal and medical history

- Illiterate
- Widow for 15 years
- Retired for 25 years (previously worked as a housewife)
- Living with nephew and his daughter
- Hypertension
- Type 2 diabetes mellitus
- Bilateral and symmetric moderate to severe sensorineural hearing loss (diagnosed one year earlier).
- No psychiatric history.

Diagnosis and clinical management

- Neurologic and mental state examination revealed cognitive dysfunction.
- Brain computed tomography revealed small right nucleocapsular and bilateral external capsules hypodensities.
- The patient was prescribed clozapine, zonisamide, donepezil, and memantine. Symptoms improved but did not resolve.

Conclusion

- Literature at the time of submission of this paper have described singing voice hallucination but there was no mention of auditory hallucination that presents as a voice that sings, comments and talks to the patient.

Reference: Canas-Simião H, Nascimento ST, Reis J, Freitas C. Complex auditory musical hallucinations with ambivalent feelings. BMJ Case Rep. 2021 Nov 11;14(11):e245397. doi: 10.1136/bcr-2021-245397.

Summary prepared by Anne John Michael, Medical Writer: Aug 2025

First reported case of visual hallucination due to the amelioration of musical hallucinations with bilateral hearing aids

Highlights from a published case of dementia with Lewy bodies and age-related hearing loss

Case presentation

- A 71-year-old Caucasian man presented with continuous musical hallucinations (i.e. musical choral, folk songs, nursery rhymes, religious hymns, and football chant).
- The patient was moderately affected by the musical hallucination.

Diagnosis and clinical management

- Otorhinolaryngology specialist diagnosed the patient with age-related hearing loss and he was prescribed bilateral hearing aids.

Medical history

- Dementia with Lewy bodies
- Memory difficulties
- 2-year history of resting tremor of the right upper limb
- Difficulty learning new tasks
- Unable to manage financial and other important matters
- Controlled arterial hypertension
- Controlled diabetes mellitus
- Angina pectoris
- Obstructive sleep apnea
- Benign prostatic hyperplasia
- Major depression
- Cataract surgery (left eye)
- Neurological issues (positive Myerson's sign, tongue tremor, resting tremor, cogwheel rigidity of the right arm, mild dystonic posture of the right hand, Parkinsonian gait with mild alteration of postural reflexes, and writing tremor, etc.).

Results and conclusions

- Musical hallucination ceased but patient had some tinnitus (whistling).
- However, he started experiencing visual hallucinations (small spiders), which was successfully alleviated with clozapine (6.25 mg daily).
- This case showed that improving sensory modality to reduce auditory hallucination led to hallucinations in a different sensory modality.

Reference: Montalvo A, Azevedo E, de Mendonça A. Shift of musical hallucinations to visual hallucinations after correction of the hearing deficit in a patient with Lewy body dementia: a case report. J Med Case Rep. 2021 Sep 9;15(1):449. doi: 10.1186/s13256-021-03039-2.

Summary prepared by Anne John Michael, Medical Writer: Sept 2025

Resolution of musical hallucinations in cerebrovascular disease

Highlights from a published report of six cases

Case	Medical history	Clinical management & results
78-year-old female with profound bilateral sensorineural hearing loss and musical hallucinations (e.g. Polish *Happy Birthday* song). The patient also had chronic diffuse ischemic brain changes.	• Arterial hypertension • Myocardial infarction • Hearing loss.	Methylprednisolone improved hearing and significantly reduced musical hallucinations after five days. Hearing aids for both ears were effective as patient did not experience musical hallucinations during 3 years of follow up.
63-year-old female patient with bilateral sensorineural hearing loss and musical hallucinations (i.e. constant replaying of popular folk songs) after a sudden, transient episode of aphasia. The patient also had disseminated ischemic brain changes.	• Arterial hypertension • Transient ischemic attack.	Carbamazepine led to resolution of musical hallucination after nine months.
75-year-old female patient with moderate sensorineural hearing loss musical hallucinations (melodies from her youth). These hallucinations ignited happy memories. The patient also had diffuse ischemic changes and acute ischemic lesion in the right temporal lobe.	• Arterial hypertension • Admitted for dysarthria, left-sided facial drooping and left upper limb weakness.	Carbamazepine and clonazepam led to resolution of musical hallucination after six weeks.

Reference: Limphaibool N, Maciejewska B, Kowal P, Kozubski W, Iwanowski P. Musical hallucinations in cerebrovascular disease. Postep Psychiatr Neurol. 2021 Sep;30(3):177-182. doi: 10.5114/ppn.2021.110759.

Summary prepared by Anne John Michael, Medical Writer: Sept 2025

Resolution of musical hallucinations in cerebrovascular disease

Highlights from a published report of six cases

Case	Medical history	Clinical management & results
52-year-old male patient with musical hallucination (overlapping melodies) three days after embolization for subarachnoid hemorrhage due to aneurysm of anterior communicating artery.	• Arterial hypertension • No mental illness • No cognitive decline.	Piracetam resolved musical hallucinations within three months.
77-year-old male patient with moderate sensorineural hearing loss and musical hallucinations (e.g. carols, lullabies, classical music) for the last two years. The symptoms began two days after the death of his wife. The patient also had disseminated ischemic lesions, and periventricular leukoaraiosis.	• Arterial hypertension • Hyperlipidemia • Hearing loss. • No mental illness • No cognitive decline.	Carbamazepine and vinpocetine reduced musical hallucinations but the addition of rivastigmine resulted in resolution of symptoms within one week of therapy. Treatment was continued and there was no recurrence of musical hallucinations for two years.
31-year-old male patient with musical hallucinations one week after hemiparesis. The patient also had right-sided hemiparesis, diplopia, nystagmus, right-sided extremity weakness and paresthesia, ischemic brain changes, as well as reduced attention and ability to learn.	• Arterial hypertension • Brain stem glioma.	Carbamazepine led to the resolution of musical hallucinations within months.

Reference: Limphaibool N, Maciejewska B, Kowal P, Kozubski W, Iwanowski P. Musical hallucinations in cerebrovascular disease. Postep Psychiatr Neurol. 2021 Sep;30(3):177-182. doi: 10.5114/ppn.2021.110759.

Summary prepared by Anne John Michael, Medical Writer: Sept 2025

Breakthroughs in predicting and designing protein structures using artificial intelligence

Highlights from the Nobel Committee for Chemistry's summary of the 2024 Nobel Prize winning research in chemistry

Design and crystallographic validation of a new protein with the Rosetta computer program

- Using automated computation, researchers designed a new protein, Top7. Based on its structure and sequence, Top7 is not similar to any naturally occurring protein.
- Top7 is a large protein with two α-helices and a β-sheet of five β-strands (a 93-residue α/β-protein).
- The predicted structure matched the experimental structure.

Successful prediction of protein structure for monomeric proteins with the AlphaFold2 (AF2) computer program

- The AF2 program learned probability distributions for interatomic distances between pairs of atom types to accurately predict protein structure.
- The program was used to predict protein structures for the human proteome project and the Universal Protein Resource database.
- The AF2 source code is publicly accessible.

Reference: The Nobel Committee for Chemistry, The Royal Swedish Academy of Sciences. Scientific Background to the Nobel Prize in Chemistry 2024: COMPUTATIONAL PROTEIN DESIGN AND PROTEIN STRUCTURE PREDICTION. Article published on 9 October 2024. Available at https://www.nobelprize.org/uploads/2024/10/advanced-chemistryprize2024.pdf (Accessed on 26 September 2025).

Summary prepared by Anne John Michael, Medical Writer: Sept 2025

Transcatheter aortic valve replacement transformed aortic stenosis management

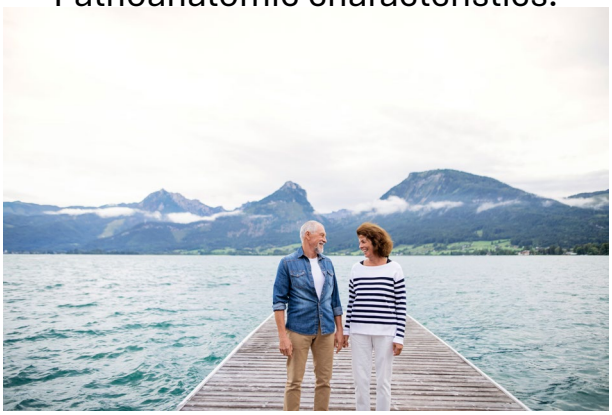
Highlights from a 2021 published review paper on aortic stenosis, a prevalent form of valvular heart disease among the elderly

Treatment indication for aortic stenosis

- Patient with severe aortic stenosis (including classic and paradoxical low-flow, low gradient aortic stenosis) and symptoms of exertional dyspnea, heart failure, angina, syncope, or presyncope by history or on exercise testing.
- Patient with asymptomatic severe aortic stenosis who has reduced LV ejection fraction <50%.
- Patient with asymptomatic severe aortic stenosis undergoing cardiac surgery for coronary artery disease or other indication.

Factors affecting treatment decision

- Expected long-term survival after treatment of aortic stenosis.
- Comorbid factors (potential risks from procedure, early complications and late complication).
- Pathoanatomic characteristics.



Transcatheter aortic valve replacement is the most common treatment for aortic valve stenosis (transcatheter valves consist of a pericardial bioprosthesis)

Positive attributes	Disadvantages
• Not as invasive as surgery. • Good hemodynamics. • May have lower rates of major strokes.	• Lack of information on its long-term durability. • Associated with higher rates of conduction system injury. • Associated with higher rates of paravalvular regurgitation.

Reference: Boskovski MT, Gleason TG. Current Therapeutic Options in Aortic Stenosis. Circ Res. 2021 Apr 30;128(9):1398-1417. doi: 10.1161/CIRCRESAHA.121.318040.

Summary prepared by Anne John Michael, Medical Writer: October 2025

Severity of aortic stenosis and prognosis

Highlights from a 2022 journal editorial, summarizing the authors' clinical experience and key findings from recent studies

Among patients with aortic stenosis, those with a mean gradient < 20 mm Hg had worse survival outcomes versus those with mean gradient ≥ 20 mm Hg.

Patients with low-flow, low-gradient moderate aortic stenosis had worse survival outcomes versus those with normal flow, low-gradient moderate aortic stenosis.

Almost half of the patients with moderate aortic stenosis are symptomatic.

Patients with severe aortic stenosis are treated according to their symptoms.

A patient with aortic stenosis who is symptomatic (aortic valve area <1.5 cm2), may benefit from aortic valve replacement.

Reduced stroke volume is an important prognostic factor in aortic stenosis.

Reference: Oh J, Ito S. Severity of Aortic Stenosis: A Moving Target∗. JACC. 2022;80 (7):677–680. https://doi.org/10.1016/j.jacc.2022.05.037

Summary prepared by Anne John Michael, Medical Writer: October 2025

Tricuspid aortic valve calcification leading to aortic stenosis

Highlights from a journal editorial published in 2020

Factors contributing to the development of calcific aortic stenosis, a common valvular heart disease among the elderly

- Coronary atherosclerotic risk factors
- Anatomic abnormalities in the aortic valve
- Stiff aorta caused by aging
- Turbulent blood flow at aortic valve leaflets
- Osteoporosis, chronic kidney disease, Paget disease and other conditions that affect bone mineral metabolism
- Plasma converting enzyme angiotensin 2 (ACE2) activity

Reference: Boudoulas H, Boudoulas K. Calcific Aortic Stenosis: An Evolution of Thoughts. J Am Coll Cardiol Img. 2020;13(3):665–666. https://doi.org/10.1016/j.jcmg.2019.10.018

Summary prepared by Anne John Michael, Medical Writer: October 2025

Only half of the patients with severe aortic stenosis who would benefit from an aortic valve replacement underwent the procedure

Highlights from a 2022 journal editorial

Findings from a study on the utilization of aortic valve replacement for severe aortic stenosis in the US between 2000 and 2017*

- Only two-thirds of patients with high-gradient aortic stenosis with symptoms or reduced ejection fraction underwent the procedure.
- Only one-third of patients with low-gradient aortic stenosis with symptoms underwent the procedure.

*Li SX, et al. Trends in utilization of aortic valve replacement for severe aortic stenosis. J Am Coll Cardiol. 2022;79:864–877.

Recommendation

- When an echocardiogram report suggests possible or definite severe aortic stenosis, the patient can be referred to a **multidisciplinary heart valve team**.
    - The roles of the **multidisciplinary heart valve team:**
        - Assess disease severity through other imaging tests.
        - Conduct stress testing to assess symptoms.
        - Educate the patient on benefits and risks of treatment options.
        - Encourage shared decision-making with the patient and family,

Reference: Lindman B, Lowenstern A. The Alarm Blares for Undertreatment of Aortic Stenosis: How Will We Respond? JACC. 2022;79(9):878–881. https://doi.org/10.1016/j.jacc.2021.12.024

Summary prepared by Anne John Michael, Medical Writer: October 2025

Patients with moderate aortic stenosis have worse prognosis than those with mild aortic stenosis or no aortic stenosis

Highlights from a meta-analysis of 15 studies involving 11,596 patients with moderate aortic stenosis

Characteristics of study patients

- Mean age: 75.7 years
- Sex: 70% male, 30% female
- Prevalence of diabetes: 31.2%
- Prevalence of hypertension: 66.2%
- Prevalence of dyslipidemia: 38.0%
- Prevalence of chronic kidney disease: 17.9%
- Prevalence of coronary artery disease: 25.7%
- Prevalence of atrial fibrillation: 19.4%
- Prevalence of previous stroke: 7.7%
- Prevalence of peripheral artery disease: 5.9%
- Prevalence of beta blockers use: 49.8%
- Prevalence of renin-angiotensin-aldosterone system inhibitor use: 47.0%
- Prevalence of statin use: 56.5%
- Prevalence of antiplatelet use: 50.4%
- Prevalence of oral anticoagulant use: 26.1%

Characteristics of aortic valve paraments of study patients

- Mean aortic valve area: 1.3 cm^2
- Mean peak aortic jet velocity: 3.2 m/s
- Mean left ventricular ejection fraction: 61.5%

All-cause mortality rates in the studies

At 1-year follow up	
Moderate aortic stenosis **10.7%**	Control* 4.5%

At 2-year follow up	
Moderate aortic stenosis **17.7%**	Control* 7.6%

At 3-year follow up	
Moderate aortic stenosis **23.0%**	Control* 9.9%

At 4-year follow up	
Moderate aortic stenosis **27.9%**	Control* 11.9%

At 5-year follow up	
Moderate aortic stenosis **32.4%**	Control* 14.2%

*mild or no aortic stenosis

Reference: Morelli M, Galasso M, Esposito G, Soriano FS, Nava S, Da Pozzo C, Bossi I, Piccaluga E, Bruschi G, Maloberti A, Oliva F, Oreglia JA, Giannattasio C, Montalto C. Natural history and clinical burden of moderate aortic stenosis: a systematic review and explorative meta-analysis. J Cardiovasc Med (Hagerstown). 2023 Sep 1;24(9):659-665. doi: 10.2459/JCM.0000000000001490.

Summary prepared by Anne John Michael, Medical Writer: October 2025

In-hospital mortality among patients with severe aortic stenosis increased seven-fold with comorbid hypertrophic obstructive cardiomyopathy

Highlights from a 2023 journal editorial based on a retrospective observational study

Impact of comorbid hypertrophic obstructive cardiomyopathy on patients who underwent transarterial valve implantation*

In-hospital mortality	**7-fold increase**
Aortic dissection	**4-fold increase**
Cardiogenic shock and vascular complications	**3-fold increase**

*Analysis of patients from a US National Inpatient Sample (2014–2018) which included 2,430 patients who underwent transarterial valve implantation without hypertrophic obstructive cardiomyopathy and 810 patients who underwent transarterial valve implantation in the presence of hypertrophic obstructive cardiomyopathy.

Reference: Barasch E. Aortic Stenosis Associated with Hypertrophic Cardiomyopathy: A Double Trouble. Cardiology. 2023;148(3):287-288. doi: 10.1159/000530663.

Summary prepared by Anne John Michael, Medical Writer: November 2025

Clinical outcomes associated with cardiac damage one year after transcatheter aortic valve implantation

Highlights from a retrospective analysis of a prospective transcatheter aortic valve implantation registry (1139 patients)

Stages of cardiac damage (associated with aortic stenosis)	Percentage of patients		
	All-cause death at 1 year	Cardiovascular death at 1 year	New York Heart Association functional class status III or IV at 1 year.
Stage 0 (no cardiac damage)	7.7%	0.0%	0.0%
Stage 1 (left ventricular damage)	2.6%	0.0%	8.1%
Stage 2 (left atrial or mitral valve damage)	9.6%	6.8%	9.8%
Stage 3 (pulmonary vasculature/tricuspid valve damage	14.1%	9.2%	10.9%
Stage 4 (low flow state or right ventricular dysfunction or both)	17.4%	12.4%	15.0%

Table adapted from Okuno T et al, 2021

Reference: Okuno T, Heg D, Lanz J, Praz F, Brugger N, Stortecky S, Windecker S, Pilgrim T. Refined staging classification of cardiac damage associated with aortic stenosis and outcomes after transcatheter aortic valve implantation. Eur Heart J Qual Care Clin Outcomes. 2021 Oct 28;7(6):532-541. doi: 10.1093/ehjqcco/qcab041.

Summary prepared by Anne John Michael, Medical Writer: January 2026

Patients with aortic stenosis can achieve good outcomes with surgical or transcatheter aortic valve replacement

Highlights from a 2024 published review

Two-year mortality rate for untreated aortic stenosis is 30–50%.

The **severity of aortic stenosis is determined** through

- Clinical symptoms
- Echocardiographic assessment of aortic valve area, velocity and pressure gradient
- Computed tomography calcium scoring.

A patient is **diagnosed with aortic stenosis** when there is an ejection systolic murmur in the right second intercostal space, typically radiating to the neck.

An **effective treatment for aortic stenosis** is aortic valve replacement (transcatheter or surgical valve prosthesis). A heart team (consisting of a cardiologist, cardiothoracic surgeon, geriatrician, etc) will evaluate the patient's suitability for surgical or transcatheter intervention, based on

- Clinical symptoms
- Reduction in ventricular systolic function
- Risk scores (EuroSCORE and Society of Thoracic Surgeons score)
- Procedural factors.

Reference: Rahman A, Rowe MK. Aortic stenosis: Update in monitoring and management. Aust J Gen Pract. 2024 Jul;53(7):444-448. doi: 10.31128/AJGP-05-23-6836.

Summary prepared by Anne John Michael, Medical Writer: November 2025

Results from first in-human study of a non-invasive ultrasound therapy for calcified aortic stenosis

Highlights from a published editorial

Study population (n=40):

- Severe aortic valve stenosis.
- Inoperable.
- Elderly (mean ± standard deviation age 83.5 ± 8.4 years).
- 20 males and 20 females.
- From three hospitals (France, the Netherlands, and Serbia).

Study device:

- 60 minutes of high-energy ultrasound pulses guided by real-time echo.
- Non-invasive.
- Potential side effects: Long-lasting calcium fractures, detachment of calcific valve tissue, and damage to surrounding organs.

Study results:

- No procedure-related deaths within 30 days.
- Improved valve function at 6 months.
- No clinically significant strokes.

Reference: Messas E. Non-invasive ultrasound therapy for aortic valve stenosis: State of the art. Arch Cardiovasc Dis. 2024 May;117(5):301-303. doi: 10.1016/j.acvd.2024.03.002.

Summary prepared by Anne John Michael, Medical Writer: January 2026

Disease phenotyping for aortic stenosis using AI

Highlights from a 2021 retrospective cohort study in Germany.

Study population (n=366):

- Severe aortic stenosis
- Underwent transcatheter aortic valve replacement

Study method:

Categorizing patients according to clinical presentation using unsupervised agglomerative clustering of echocardiographic and hemodynamic parameters from right heart catheterization.

Study results:

The AI-determined categories of severe aortic stenosis according to clinical presentation.

Disease phenotype	No of patients	Two-year survival rate
Regular cardiac function with no PH	164	90.6%
Postcapillary PH with preserved left and right ventricular structure and function.	66	85.8%
Pre- and postcapillary PH with left and right heart dysfunction.	45	77.3%
Postcapillary PH with dilatation of all heart chambers and high prevalence of mitral and tricuspid regurgitation.	91	74.9%

PH: pulmonary hypertension

Reference: Lachmann M, Rippen E, Schuster T, Xhepa E, von Scheidt M, Pellegrini C, Trenkwalder T, Rheude T, Stundl A, Thalmann R, Harmsen G, Yuasa S, Schunkert H, Kastrati A, Laugwitz KL, Kupatt C, Joner M. Subphenotyping of Patients With Aortic Stenosis by Unsupervised Agglomerative Clustering of Echocardiographic and Hemodynamic Data. JACC Cardiovasc Interv. 2021 Oct 11;14(19):2127-2140. doi: 10.1016/j.jcin.2021.08.034.

Summary prepared by Anne John Michael, Medical Writer: January 2026

Angiotensin receptor blockers may reduce valvular fibrosis in women with aortic stenosis

Highlights from a Canadian observational, cross-sectional study of 1321 patients with moderate or severe aortic stenosis who underwent aortic valve replacement

Baseline characteristics

Mean age ± SD	71 ± 9 years
Gender	Males: 65% Females: 35%
Severity of aortic stenosis	Moderate: 11% Severe: 89%
Bicuspid valve • In males • In females	41% 43% 36%
Use of angiotensin receptor blockers • In males • In females	28% 43% 36%

SD, standard deviation

Variables that are more likely to be associated with predominant fibrosis	Multivariate odds ratio [95% CI]	P-value
Female sex	1.45 [1.08–1.95]	0.01
Bicuspid valve	1.42 [1.10–1.82]	0.007

Angiotensin receptor blockers significantly lowered fibrosis scores in women patients (P<0.001) but not in men.

Reference: Carter-Storch R, Le Nezet E, Ali M, Powers A, Haujir A, Demers K, Couture C, Dumont É, Trahan S, Pagé S, Dagenais F, Pibarot P, Dahl JS, Clavel MA. Angiotensin II Receptor Blockers Are Associated With Reduced Valvular Fibrosis in Women With Aortic Stenosis. Can J Cardiol. 2024 Sep;40(9):1690-1699. doi: 10.1016/j.cjca.2024.03.009.

Summary prepared by Anne John Michael, Medical Writer: April 2026

Toronto aortic stenosis quality of life questionnaire – A 16-item self-administered tool to measure quality of life in patients with aortic stenosis

Highlights from a study validating the use of the questionnaire in 62 patients with severe aortic stenosis who underwent transcatheter aortic valve implantation.

Domain	No	Item
Physical symptoms	1	Shortness of breath.
	2	Ratings of overall health.
Physical limitations	3	Heart problems interfering with doing daily chores.
	4	Heart problems interfering with being able to walk without resting.
	5	Shortness of breath or extreme tiredness when exercising.
	6	Ratings of ability to do things.
Emotional impact	7	Worried about having a heart attack or dying.
	8	Frustrated about having to stay or go to the hospital because of heart problems.
	9	Feeling discouraged about being very tired.
	10	Worried about what will happen to your family if you don't get better.
	11	Worried about what will happen financially.
	12	Feeling unable to make plans for the future.
	13	Enjoyment of life limited by health problems.
Social limitations	14	Heart problems interfering with going out with friends or to social events.
	15	Heart problems interfering with going out to visit family.
Health expectations	16	Rating of hope for health improvements.

Study findings on the attributes of the Toronto Aortic Stenosis Quality of Life Questionnaire

- ✓ Valid and reliable.
- ✓ Significant improvements from baseline across assessments ($p < 0.001$).
- ✓ Assesses quality of life goals that are important to patients (see table).
- ✓ Relevant and sensitive to changes in quality of life after treatment.
- ✓ Short, self-administered, and easy to score; suitable for busy clinics.

Reference: Styra R, Dimas M, Svitak K, Kapoor M, Osten M, Ouzounian M, Devins G, Deckert A, Horlick E. Toronto aortic stenosis quality of life questionnaire (TASQ): validation in TAVI patients. BMC Cardiovasc Disord. 2020 May 5;20(1):209. doi: 10.1186/s12872-020-01477-2.

Summary prepared by Anne John Michael, Medical Writer: May 2026