

Hearing loss and cerebro & cardiovascular disorders.

Information for your patients.



Greater emphasis is being placed on hearing health.

As a physician, you are likely already routinely asking patients whether they have had their hearing checked. Beyond referring patients for hearing tests and encouraging treatment of hearing loss, it is important to inform them of the risks they run if they ignore hearing loss and tinnitus - dangers that include certain life-threatening co-morbidities.

"A growing body of research shows that a person's hearing health and cardiovascular health frequently correspond."¹

Studies have shown that a healthy cardiovascular system has a positive effect on hearing.

A study out of Brigham and Women's Hospital published online in The American Journal of Medicine found that a higher level of physical activity is associated with the lower risk of hearing loss in women. At the same time, the study found that a higher body mass index (BMI) and larger waist circumference are each associated with higher risk of hearing loss.²

The heart and hearing connection.

Poor cardiovascular health causes inadequate blood flow and blood vessel trauma to the inner ear. The inner ear is so sensitive to blood flow that disorders such as hearing loss, particularly at the lower frequencies, may be

an early warning sign of cardiovascular disease.

The two-part Framingham Study³ hypothesized that low-frequency hearing loss was associated with cardiovascular disease. Cardiovascular status was determined for approximately 1,000 patients of the audiology department. Associations between their audiogram patterns and cardiovascular variables were tested and controlled for age and gender. Logistic regression models were used to calculate cardiovascular risk factors from audiogram pattern. The models were applied to a separate group of 90 subjects recruited from cardiology and geriatric medicine clinics, who were also given audiograms.

Results indicated a significant association between low-frequency hearing loss and cardiovascular disease risk factors. When controlling for age, hypertension, diabetes, smoking and hyperlipidemia, low-frequency hearing loss was significantly associated with the following cardiovascular disorders:

- Intracranial vascular pathology (stroke and transient ischemic attacks)
- Peripheral vascular disease
- Coronary artery disease
- Myocardial infarction

Ipsa facto, low-frequency hearing loss may be considered a marker indicating the presence or potential development of cardiovascular disease.

Hearing Systems

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*"We conclude there is a significant relationship between cardiovascular status and audiometric pattern."*⁴

*"(There is) significant evidence that impaired cardiovascular health negatively impacts hearing...improved cardiovascular health may contribute to healthier ears, particularly among older adults."*⁵

Researchers concluded individuals with cardiovascular disorders may be more prone to hearing loss and therefore in need of hearing evaluations. They also found an association between low-frequency hearing loss and numerous cardiovascular disease events.

The negative influence of impaired cardiovascular health on both the peripheral and central auditory system, and the potential positive influence of improved cardiovascular health on these same systems, has been found through a sizable body of research conducted over more than six decades. The most significant positive relationship between improved cardiovascular health and improvements in those auditory systems has been found in older adults. If that relationship continues to be confirmed, then a potential new avenue for auditory rehabilitation on behalf of adults who possess impaired auditory function may be discovered.

Certain audiogram patterns have been found to correlate strongly with cerebrovascular and peripheral arterial disease. Because of this, audiograms represent a screening test for those at-risk. Patients with low-frequency hearing loss should be regarded as at-risk for cardio or cerebrovascular events, and appropriate referrals should be considered.

Cardiovascular disorder and tinnitus

Another hearing disorder associated with cardiovascular health is pulsatile tinnitus. Due to the number of major blood vessels close by the ear, disorders that affect them sometimes manifest as pulsatile tinnitus that closely matches the heartbeat. Some of these disorders include:

- atherosclerosis
- high blood pressure
- head or neck tumors that press on blood vessels
- turbulent blood flow caused by a narrowing or kinking of the jugular vein or carotid artery
- malformation of capillaries.⁶

Certain medication also causes tinnitus as a side effect. Therefore, patients who are on medication for cardiovascular disorders may also be at higher risk for tinnitus. A recent study found that that hypertension treatment with diuretics, ACE inhibitors, and calcium channel blockers were more prevalent in tinnitus patients, suggesting that an eventual ototoxicity of these drugs may be involved in tinnitus pathophysiology.⁷

If a patient has been diagnosed with a cardio or cerebrovascular disorder, it is important to advise them to have their hearing evaluated regularly and to get any hearing loss treated with hearing aids early, in order to preserve hearing levels and improve quality of life. Older patients should routinely be made aware of how important it is to keep their primary physicians informed of any hearing loss or tinnitus because it could be a harbinger of an as of yet undiagnosed cardiovascular disease.

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