

FIGURE 112-7 Evaluation of deafness (unilateral and bilateral). C-P, Cerebellopontine; MR, magnetic resonance. (Modified from Baloh RW: Hearing and equilibrium. In Goldman L, Bennett JC, editors: Cecil textbook of medicine, ed 21, Philadelphia, 1998, WB Saunders, p 2250).

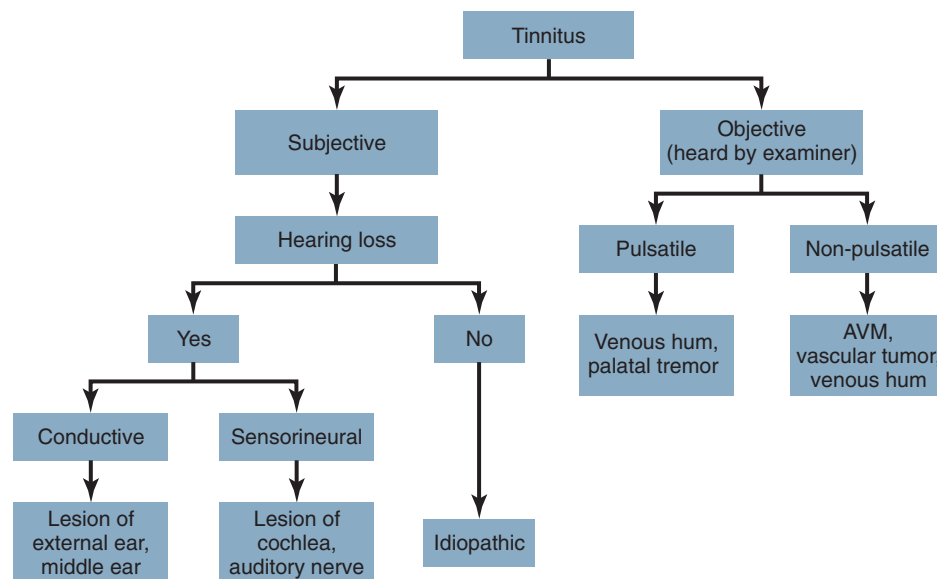


FIGURE 112-8 Algorithm for the approach to the patient with tinnitus. AVM, Arteriovenous malformation.

Subjective tinnitus, heard only by the patient, can result from lesions involving the external ear canal, tympanic membrane, ossicles, cochlea, auditory nerve, brainstem, and cortex. The character of the tinnitus does not usually aid in determining the site of the disturbance. For this, one must rely on associated symptoms and signs. When tinnitus results from a lesion of the external or middle ear, it is usually accompanied by a conductive hearing loss. The patient may complain that his or her voice sounds hollow and that other sounds are muffled. Because the masking effect of ambient noise is lost, the patient may be disturbed by normal muscular sounds such as chewing, tight closure of the eyes, or clenching of the jaws. The characteristic tinnitus associated with Meniere's syndrome is low pitched and continuous, although fluctuating in intensity. Often the tinnitus becomes very loud immediately preceding an acute attack of vertigo and then may disappear after the attack. Tinnitus resulting from lesions within the central nervous system is usually not

associated with hearing loss but is nearly always associated with other neurologic symptoms and signs. High-dose salicylates frequently result in tinnitus.

Examination of the Auditory System

A quick test for hearing loss in the speech range is to observe the response to spoken commands at different intensities (whisper, conversation, and shouting). The examiner must be careful to prevent the patient from reading his or her lip movement. A high-frequency stimulus such as a watch tick should also be used because sensorineural disorders often involve only the higher frequencies. Tuning fork tests permit a rough assessment of the hearing level for pure tones of known frequency. The Rinne test compares the patient's hearing by air conduction with that by bone conduction. A 512-cps tuning fork is first held against the mastoid process until the sound fades. It is then placed 1 inch from the ear. Normal subjects can hear the fork about twice as