Cochlear nerve function test

The vast majority of hearing problems result from peripheral disease, i.e., involvement of the eighth nerve or inner ear. Testing of the peripheral system at the bedside is simple and rewarding. For screening of persons who do not complain of hearing loss, asking them to compare the sound of rustling fingers or a ticking watch in the two ears is a useful test of acuity. This, combined with the Weber test (see below), is adequate. To this might be added the use of a whispered voice, which represents midrange frequencies that frequently are involved in neural deafness.

Two basic instruments can aid in testing the auditory system: a C512 tuning fork (C256 is adequate but not as sensitive; C128 is inadequate except for testing for hyperacusis and cutaneous and bony vibratory perception), and a mechanical watch (watch-ticking is in the 1,500 cps range). The watch is placed next to the patient's ear and gradually moved away. The distance at which the patient ceases to hear the tick is noted and compared with the distance from the opposite side. If the examiner has normal hearing, a useful comparison can be made. High-tone deafness is measured by this test. The C512 (or C256) fork is then used to test for lower tone falloff and, more importantly, to determine whether hearing loss is caused by defects in the conduction system (conductive deafness) or by damage to the inner ear-auditory nerve system (sensorineural deafness). This distinction is important since different types of conditions produce these types of deafness and the Weber test and Rinne test permit bedside differentiation of these conditions.

More detailed clinical evaluation, including special audiometric testing, is carried out in otolaryngological laboratories and can be very useful in differentiating cochlear (inner ear) disease from direct eighth-nerve involvement.

Weber test

Rinne test

The functional disturbances in cochlear functions due to hydrocephalus have been demonstrated with distortion product otoacoustic emission (DPOAE) measurements in a study. DPOAE measurements may be thought as an easily applicable non-invasive method in detection and follow-up of patients with hydrocephalus. This findings should be supported with clinical studies in humans [1].

1)
Ezerarslan H, Beriat GK, Nurhat RH, Kazancı B, Çelikkan FT, Sabuncuoğlu B, Sabuncuoğlu H. Non-invasive detection and monitoring of experimental hydrocephalus with distortion product otoacoustic emissions. Auris Nasus Larynx. 2016 Aug;43(4):404-11. doi: 10.1016/j.anl.2015.11.004. Epub 2015 Dec 29. PubMed PMID: 26743839.