

ACOUSTIC TRAUMA AND HEARING LOSS

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1. Goal. Many patients exposed to acoustic trauma (that is, injury to the hearing mechanism in the inner ear) will experience hearing loss, which can be either temporary (temporary threshold shift, TTS) or permanent (permanent threshold shift, PTS). This CPG is designed to identify quickly and to treat hearing loss, and to preserve as much function as possible, while in the combat theater.

2. Background. Acoustic trauma is the most common cause of sensory hearing loss from exposure to excessively loud noise. The symptoms of hearing loss due to acoustic trauma includes tinnitus (ringing in the ear), aural fullness, recruitment (ear pain with loud noise), difficulty localizing sounds, and difficulty hearing in a noisy background. TTS will resolve with time. A PTS occurs when the patient's hearing loss does not resolve over the ensuing days or weeks. There are no clinical predictors of which patients with a temporary shift will progress to develop permanent shift. Dizziness expressed as unsteadiness or vertigo (spinning sensation) following acoustic trauma injury is mostly associated with Traumatic Brain Injury (TBI) and may be associated with damage to the inner ear (where both the hearing and balance organs reside).

Significant exposure to Acoustic trauma may cause perforation of the tympanic membrane (TM). 90% of TM perforations resolve spontaneously; the smaller the perforation, the greater the likelihood of spontaneous closure.

3. Evaluation and Treatment. All patients exposed to loud burst noise such as those occurring from IED's, rockets, and small arms fire, should specifically be asked about hearing loss, in addition to an evaluation for TBI, during their initial trauma evaluation. Remove all debris from the external auditory canal (EAC) and visualize the TM. Do not irrigate the ear as it may provoke pain and vertigo. If there is debris in the EAC or in the middle ear (as seen through a TM perforation), treat the patient with a fluoroquinolone-steroid containing topical antibiotic, e.g., five (5) drops of Ciprodex in the affected ear bid for seven (7) days. Hearing loss that persists 72 hours after acoustic trauma warrants a hearing test. When hearing loss is present, individuals should be restricted from hazardous noise environments and kept on base if possible. This is important to allow time for healing. A Soldier with hearing loss is less effective during missions, and hearing loss can negatively impact mission accomplishment. Consider evacuation out of theater (without Level III evaluation) for patients with hearing threshold shifts greater than 60 dB on three consecutive audiograms frequencies and ten or more days after noise exposure. Patients should also keep water out of their EAC until the TM perforation is healed.

4. Absolute Indications for Otolaryngology (ENT) Referral.

- Vertigo that does not resolve within three (3) days even if episodic
- Clear ear drainage
- Persistent discolored ear drainage that does not resolve after 7 days of topical antibiotic-steroid combination drop therapy

Joint Theater Trauma System Clinical Practice Guideline

5. **Absolute Indications for Audiology Referral.**

- Average hearing thresholds of frequencies 500, 1000, and 2000 Hz greater than 30 dB OR greater than 35 dB at any of these frequencies, *or*
- any hearing threshold greater than 55 dB at 3000 or 4000 Hz
- New onset asymmetrical hearing loss, defined as a difference of 25dB between two adjacent frequencies in either ear, i.e., 10 dB at 2000 Hz in the right ear and 35 dB at 2000 Hz in the left ear.

6. **Relative Indications for Otolaryngology (ENT) Referral.**

- TM perforations greater than 50% of the surface area
- Debris in the external ear (EAC) that does not resolve with topical ear drops
- Inability to visualize the TM despite removal of debris from the EAC.
- Persistent dizziness, even if not true vertigo

7. Relative Indications for Audiology Referral. Significant communication problems regardless of the hearing test results. Tinnitus that interferes with the patient's duty performance or lifestyle, regardless of hearing test results.

8. Responsibilities. It is the trauma team leader's responsibility to ensure CPG adherence.

9. References. None

Approved by CENTCOM JTTS Director, JTS Director
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