Audiological Management of Patients With Traumatic Brain Injuries and Tinnitus

By Paula Myers, PhD

Q: Are there any standards for the diagnosis and management of audiological consequences of traumatic brain injury (TBI)?

A: It’s important for audiologists to determine all of the factors that may have a negative impact on the communication function of individuals with TBI. Because the population with TBI can vary greatly in terms of TBI severity, peripheral and central function, speech perception abilities in quiet and degraded conditions, cognition, and emotional, behavioral, and physical health, there is no universal standardized approach to audiological management of persons with TBI. However, a comprehensive case history and audiological evaluation should be obtained and appropriate referrals made to include evaluation for central auditory processing manifestations of TBI, vestibular evaluation, tinnitus management, ears, nose, and throat (ENT), mental health, and/or others.

Q: What are the challenges of diagnosing and managing the audiological effects of TBI?

A: Like hearing impairment and tinnitus, brain injuries often are not readily visible. Unlike the obvious external blunt or penetrating open TBIs with affected focal areas, closed TBIs from acceleration-deceleration movement of the brain within the skull are invisible to the naked eye and often to magnetic resonance imaging or computed tomography scans, especially concussion/mild TBIs. As mentioned above, because the population with TBI can vary greatly in terms of peripheral and central function, speech perception abilities in quiet and degraded conditions, cognition, and emotional, behavioral, and physical health, there is no universal standardized approach to audiological management of people with TBI. At the James A. Haley Veterans’ Hospital in Tampa, Florida, our interdisciplinary TBI team evaluates and treats the patient with TBI holistically, studying sensory modalities and physical, emotional, behavioral, cognitive, and psychosocial function.

Q: How would you say the audiology community’s current level of awareness is when it comes to the audiological consequences of concussion? How might it be improved, if needed?
A: The media has helped improve awareness of TBI from spotlighting the injuries of returning service members from the current conflicts as well as spotlighting sports-related injuries of athletes. This in turn has improved the audiology community’s level of awareness evidenced by the many topics on the audiological consequences of TBI presented by professionals at national Audiology and Speech Language Pathology conferences, webinars, and journal readings.

Improved awareness among audiologists regarding the possibility of cognitive, physical (to include auditory dysfunction), emotional, and behavioral consequences among people with TBI can enhance understanding and empathy for patients, help audiologists identify reasons for noncompliance, and justify the need for screening and/or clinical referral for further evaluation and treatment of TBI, post-traumatic stress disorder (PTSD), and other emotional sequelae. Displaying posters and handouts on TBI and signs of depression (and where to get help) in an audiology clinic can help increase awareness about the conditions and can be a lifesaving source of information.

We need to continue to increase audiologists’ awareness of the diverse sensory and communication disorders that may result from a TBI so that a team-oriented, patient-centered rehabilitation plan can be formulated and implemented efficiently, thereby enhancing the likelihood of improved outcomes.

Q: What are some examples of a team-oriented, patient-centered rehabilitation plan at your facility?
A: Interdisciplinary therapies have been formed to provide TBI management. Recreational and physical therapists work together to lead participation in team-building exercises with other PTSD/mild TBI patients to target multisensory, cognitive, and physical skills under challenging dual conditions such as a low ropes course. Speech and physical therapists lead cognitive-balance groups in performing a variety of balance tasks while participating in group cognitive challenges (dual tasking). The audiologist and psychologists lead tinnitus management workgroups, with the audiologist providing sound-based therapy education and provision of devices and psychologists providing cognitive behavioral therapy (CBT) coping skill techniques and prolonged exposure imaginal sessions for PTSD as well as other complementary therapies. The interdisciplinary team-oriented therapies have the common goal to help patients enhance their ability to address the everyday challenges and demands of life. The patient-centered goals are the unique, specific challenges that the patient and family identify and that the team collaboratively addresses.

Q: What happens when the audiological effects of TBI are ignored?
A: Because hearing loss limits or takes away one of the primary means we use to communicate, hearing loss has the potential to complicate many of the other side effects of TBI, mainly cognitive and psychosocial problems. Many people with TBI already suffer cognitive, physical, and emotional issues, and these problems are only exacerbated if the patient cannot hear what is going on or is distressed and unable to effectively manage reactions to severe tinnitus.

Because hearing loss, tinnitus, distress, and vestibular dysfunction can influence all other areas of rehabilitation outcomes, it is important that patients receive audiologic evaluation and rehabilitation concurrently with their physical, mental health, and cognitive rehabilitation for their TBI and any additional injuries in an interdisciplinary manner. Screening for hearing impairment, tinnitus, and other sensory disorders across disciplines will help accomplish two important goals:

1. Increase awareness about the various disorders to which people with TBI are susceptible and
2. Help ensure rehabilitation is carried out as soon as possible after injury to take full advantage of the neuroplasticity of the brain that enables it to repair and retrain itself.

Q: Do you have any advice or tips for audiologists about how they can better diagnose and manage the audiological sequelae of TBI in their patients?
A: Audiologists should evaluate and counsel patients according to patient needs. Some patients with TBI require more evaluation and manage-
ment than others, particularly when they have overlapping cognitive, mental, behavioral, or other physical conditions, problematic tinnitus, central auditory manifestations of TBI, or vestibular complaints. The family’s involvement is a very important factor in a patient’s recovery. The audiologist should support the patient and family and provide education and training for real-world success in self-management.

Rehabilitation and education are crucial elements in treating TBI. When counseling patients with TBI, the audiologist should:

- provide a calm and structured environment with minimal auditory and visual distractions,
- reduce the complexity and talk about one topic,
- repeat key points,
- speak slowly,
- pause,
- use tag words (first, last, before, after),
- provide supplemental written and graphic information, and
- ask the patient to “teach back” the information provided to assess learning and reteach as warranted.

**Q:** Is the Clinical Practice Guideline: Tinnitus, which was issued by the American Academy of Otolaryngology – Head & Neck Surgery Foundation in 2014, applicable to those with TBI?

**A:** Yes. According to those evidence-based guidelines, clinicians should:

- Perform a targeted history and exam to identify conditions that might be remediated.
- Perform a comprehensive audiological exam for patients with tinnitus that is unilateral, chronic, or associated with hearing difficulties.
- Distinguish patients with chronic tinnitus from those with recent-onset tinnitus (to prioritize clinical services).
- Provide education about intervention options.
- Recommend a hearing aid evaluation (or sound generator) for patients with bothersome tinnitus and/or hearing loss.
- Recommend CBT for patients with chronic, bothersome tinnitus.

The *Progressive Tinnitus Management* (PTM) approach the U.S. Department of Veterans Affairs (VA) uses is a structured protocol that provides services mostly consistent with the cited guidelines. PTM studies reveal the feasibility of telephone-based tinnitus management for patients with TBI with future implications for expansion into VA Video Connect on-demand visits or scheduled visits via telephone, tablet, or computer. (See related article on page 10).

**Q:** Are there specific resources audiology providers can turn to for help with TBI management?

**A:** The Departments of Defense (DoD) and VA are recognized leaders in TBI care for veterans, but most patients with TBI will seek care in private healthcare clinics. Therefore, all audiologists should learn about TBI symptoms and manifestations from the following resources:

- Brainline: All About Brain Injury and PTSD http://www.brainline.org/
- Defense and Veterans Brain Injury Center http://dvbic.dcoe.mil/

Paula Myers, PhD, is chief of the Audiology Section at the James A. Haley Veterans’ Hospital in Tampa, Florida, where she has worked for 31 years. Her expertise and research focus on development of audiology educational materials, tinnitus management, traumatic brain injury, and auditory rehabilitation. She chaired the VA Audiology Southern Professional Standard Board and National Audiology Patient Education Workgroup, and is a former teacher of the Deaf and Deaf-Blind and assistant professor at University of South Florida.