

# Delayed Surgical Intervention in the Management of Perilymphatic Fistula

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Submission: May 18, 2016; Published: June 18, 2016

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## Abstract

External auditory canal or tympanic membrane (TM) trauma are common reasons for patient presentation to the emergency department. Blunt or penetrating trauma are the usual mechanisms. Associated symptoms include ear pain, bloody drainage, vertigo and conductive hearing loss. Differentiation of isolated external auditory canal or TM trauma from more sinister pathology, such as cochlea-vestibular damage, is essential to achieving optimal outcomes while avoiding unnecessary resource utilization.

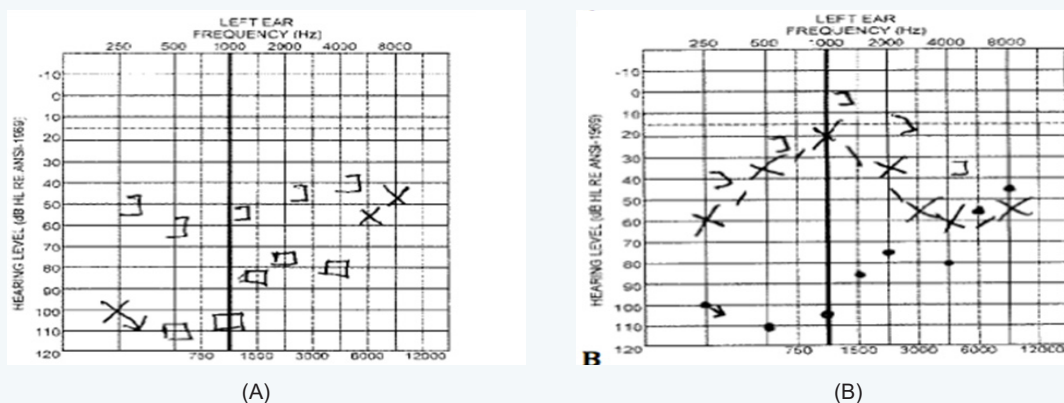
**Keywords:** Perilymphatic fistula, Pneumolabyrinth, Traumatic tympanic membrane perforation

## Introduction

External auditory canal or tympanic membrane (TM) trauma are common reasons for patient presentation to the emergency department. Blunt or penetrating trauma are the usual mechanisms. Associated symptoms include ear pain, bloody drainage,

vertigo and conductive hearing loss. Differentiation of isolated external auditory canal or TM trauma from more sinister pathology, such as cochleovestibular damage, is essential to achieving optimal outcomes while avoiding unnecessary resource utilization. The University of Missouri Institutional Review Board provided approval for this report.

## Case Report



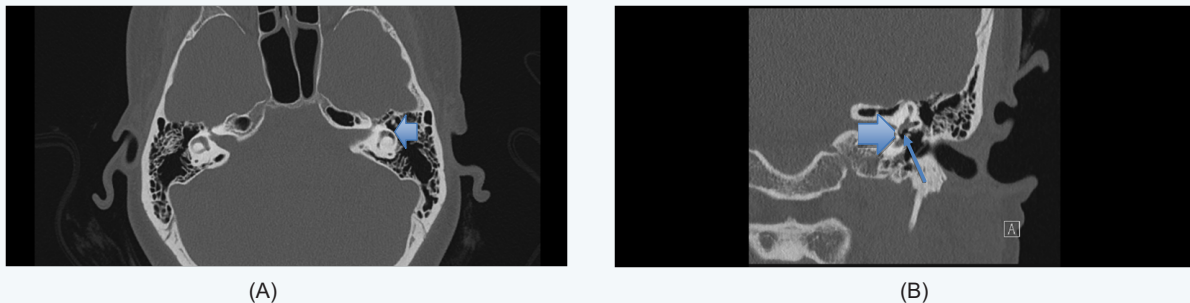
**Figure 1:** (A) Audiogram obtained 3 days following trauma demonstrating a left ear profound up sloping to moderate mixed hearing loss. (B) Audiogram obtained 1 month after surgical repair demonstrating moderate up sloping to normal and down sloping to moderate mixed hearing loss.

A 44-year-old female with no history of otologic disease presented to the emergency department with otalgia, serosanguinotorrhea, and left sided hearing impairment one day after a

hairpin penetrated deeply into her left ear canal. She experienced associated vertigo and left sided tinnitus. She was seen in the ENT clinic two days later where she continued to experience episodic

vertigo and hearing impairment. Otomicroscopy showed a small posterior superior TM perforation. Audiological assessment revealed profound rising to moderate mixed left hearing loss (Figure 1A & 1B) with 60% word recognition. A traumatic perilymphatic

fistula (PLF) was suspected. The patient was started on oral prednisone, stool softeners, and advised to avoid heavy lifting. A CT scan of the temporal bone was obtained that revealed ossicular chain discontinuity and air within the vestibule (Figure 2).



**Figure 2:** (A) Axial CT temporal bone showing air within the left lateral semicircular canal (wide arrow). (B) Coronal CT temporal bone demonstrating depressed stapes (arrow) and air in the vestibule (wide arrow).

Middle ear exploration and possible fistula repair was recommended. Due to comorbidity, the patient required medical optimization/clearance and was briefly lost to follow-up. Thirty-one days after the injury, she underwent middle ear exploration and fistula repair. Intra operatively, the stapes was impaled into the oval window with only the capitulum visible. Leakage of perilymph around the stapes was also observed. The stapes was gently removed and a fat graft was used to seal the oval window. Bucket handle prosthesis was placed with repair of the perforation in underlay fashion. At one month follow-up, the patient denied vertigo and reported significant hearing improvement. A repeat audiogram showed significant pure tone and word recognition improvement (Figure 1B).

## Discussion

Perilymphatic fistula arises from an abnormal communication between middle and inner ear spaces. Trauma, congenital inner ear malformations, and even pinched-nose sneezing increasing middle ear pressure have all been described as causes of PLFs [1]. The key to an accurate diagnosis is performance of a comprehensive history and physical exam with high index of suspicion. Clinical findings suggestive of perilymphatic fistula include acute vertigo and sensor neural or mixed hearing loss following a compatible mechanism. Vertigo may be constant, or episodic; exacerbated by straining or loud noises, known as Hennebert's sign and Tullio phenomenon respectively [1]. The tuning forks exam is a reliable screening tool for conductive and sensorineural losses with an overall sensitivity of 76.9% and specificity of 85.5% [2].

## Conclusion

In this scenario prompt otolaryngology consultation and audiologic assessment should be sought. Conservative management consists of bed rest, head elevation, stool softeners, avoidance

of lifting or Valsalva maneuvers [3]. Radiographic testing may be considered, but imaging is not essential to the diagnosis. Untreated, a PLF may lead to complete sensorineural hearing loss of the affected ear [4]. Vestibular symptoms, however, have a better prognosis for improvement with symptoms gradually subsiding in the majority of patients, yet severe dysfunction of the semicircular canals may persist [4]. Surgical exploration with fistula repair is recommended in fluctuating perceptual hearing loss, progressive hearing loss, or persistent vertigo [3]. Three factors predicting hearing improvement in PLFs are shorter interval to surgery, existence of stapes injury, and bone conduction hearing level at onset of symptoms [4]. Surgical repair is usually advocated within 10-14 days, as this has been shown to significantly improve prognosis of inner ear function [4]. A high index of clinical suspicion is important to diagnose and initiate a prompt intervention among patients with a suspected perilymphatic fistula. While earlier treatment favors improved hearing outcome, delayed exploration and repair can also significantly improve hearing and may be a worthwhile intervention.

## References

1. Al Felasia M, Pierrea G, Mondaina M, Uziela A, Venail F (2011) Perilymphatic fistula of the round window. *Eur Ann Otorhinolaryngol Head Neck Dis* 128(3): 139-141.
2. Vikram KB, Naseeruddin K (2004) Combined tuning fork tests in hearing loss: explorative clinical study of the patterns. *J Otolaryngol* 33(4): 227-234.
3. Prisman E, Ramsden JD, Blaser S, Papsin B (2011) Traumatic Perilymphatic Fistula With Pneumolabyrinth: Diagnosis and Management. *Laryngoscope* 121(4): 856-859.
4. Tsubota M, Shojaku H, Watanabe Y (2009) Prognosis of inner ear function in pneumolabyrinth: case report and literature review. *Am J Otolaryngol* 30(6): 423-426.