Received: 16 October 2023 | Revised: 23 December 2023 | Accepted: 24 December 2023

DOI: 10.1002/ccr3.8412

CASE REPORT

Clinical Case Reports Open Access WILEY

Rare oto-tricho-tussia/tinnitus: A case report

Habib Azimi[1] | **Seyed Mohammad Tabibzadeh**[1] | **Abbas Khalilpour**[2] | **Mohsen Akbaribazm**[3]

[1]Department of Otolaryngology, Khoy School of Medical Sciences, Khoy, Iran

[2]Department of Operating Room, Khoy University of Medical Sciences, Khoy, Iran

[3]Department of Basic Medical Sciences, Khoy University of Medical Sciences, Khoy, Iran

Correspondence
Mohsen Akbaribazm, Department of Basic Medical Sciences, Khoy University of Medical Sciences, Khoy 65371-17636, Iran.
Email: akbarim3@thums.ac.ir; akbarimohsen64@gmail.com

Key clinical message

Oto-tricho is associated with the symptoms of gag reflex and non-neuropathic tinnitus, which can be treated by removing the hair and its follicle.

Abstract

Oto-tricho refers to a disorder of hair growth in the tympanic membrane (TM). In its early stages, it can manifest as symptoms such as tinnitus, chronic pain, cough, and nausea. If left untreated, it can potentially lead to tympanosclerosis, TM micro-perforation, and hearing loss. In this report, we present a case study of a 33-year-old male with hair and follicle growth observed on the left TM. Over the course of the past year, the patient experienced various symptoms including tinnitus, dry cough, and chronic pain. An examination with an otoscope revealed the presence of oto-tricho-tussia/tinnitus. To address the issue, the hair and hair follicles were surgically removed using direct visual guidance. Subsequent follow-up was conducted over a period of 5 months, during which no pain or infection was observed at the site of the TM. The patient's previous symptoms were successfully resolved. Furthermore, further observation of the TM revealed no evidence of hair follicles or hair regrowth.

KEYWORDS

ear, otolaryngology, otoscope, tinnitus, tympanic membrane

1 | INTRODUCTION

Oto-tricho, also known as a disorder related to the growth of hair follicles in the tympanic membrane (TM), is a rare condition that affects the TM and middle ear canal, potentially leading to hearing loss and tinnitus. Tinnitus is a prevalent auditory condition, affecting approximately 10%–15% of the global population.[1] It is more commonly observed in older adults, with a prevalence of up to 30% in individuals over the age of 65.[2] Regarding gender distribution, some studies have indicated a higher prevalence of tinnitus in men compared to women.[3] Histopathological findings suggest that hair follicles may grow in various areas of the TM, leading to involvement of all three layers: outer (squamous epithelium), middle (connective tissue), and inner (cuboidal epithelium). However, research has shown that hair follicles are particularly visible near the cone of light region.[2,3]

Oto-tricho is an extremely rare genetic disorder characterized by hearing loss, tinnitus, and abnormal hair growth in the ear canal or TM. Due to the limited number of reported cases, there is a scarcity of literature available on its

differential diagnoses.[4] However, based on the symptoms, several potential differential diagnoses can be considered, including Meniere's disease. Meniere's disease is an inner ear disorder that presents with episodes of vertigo, hearing loss, tinnitus, and a sensation of fullness in the ear. It can be challenging to distinguish Meniere's disease from other ear disorders, including oto-tricho, due to the overlapping symptoms.[5] Acoustic neuroma is a benign tumor that develops on the nerve responsible for hearing and balance. Symptoms of acoustic neuroma, such as hearing loss and tinnitus, can resemble those observed in oto-tricho.[6,7]

Ototoxicity occurs when certain medications or chemicals have a toxic effect on the hair cells in the inner ear, leading to hearing loss and tinnitus. Diagnosing ototoxicity can be challenging, as it can present with symptoms similar to other types of hearing loss.[8] Presbycusis refers to age-related hearing loss that progresses gradually over time. Presbycusis can manifest symptoms like tinnitus, which may resemble those observed in oto-tricho-tussia.[9] In the current case, an observation was made of a hair follicle in the TM.

2 | CASE REPORT

A 33-year-old male presented at the Otolaryngology clinic with complaints of tinnitus, dry cough, chronic pain in the inner ear, and dizziness that had been ongoing since last year. Initially, he had used non-steroidal anti-inflammatory drugs (NSAIDs) and antitussive drugs to alleviate the symptoms. However, over time, the symptoms progressed and became uncontrollable. The patient noticed that stimulating, washing, or touching the ear canal exacerbated the symptoms, leading to nausea, dizziness, and a gag reflex. Additionally, he reported a sensation of a foreign body in the ear canal.

During the physical examination of the ear canal using an otoscope, a long black hair measuring 3.4 cm was visualized in the cone of light region of the left TM (Figure 1A). The patient did not exhibit any symptoms of neuropathy, and the presence and stimulation of the foreign body were the primary factors exacerbating the symptoms. The tinnitus experienced by the patient was intermittent, decreasing during sleep but intensifying during daily activities. The hair was carefully removed using forceps under direct vision, and the hair follicle was observed at its end (Figure 1B,C). During the 5-month follow-up, the symptoms resolved, and no auditory or speech disorders were observed after evaluating the patient's hearing and speech levels. The patient's tinnitus gradually improved over this period. Furthermore, upon examination of the tympanic membrane, no evidence of hair follicles or hair growth was detected.

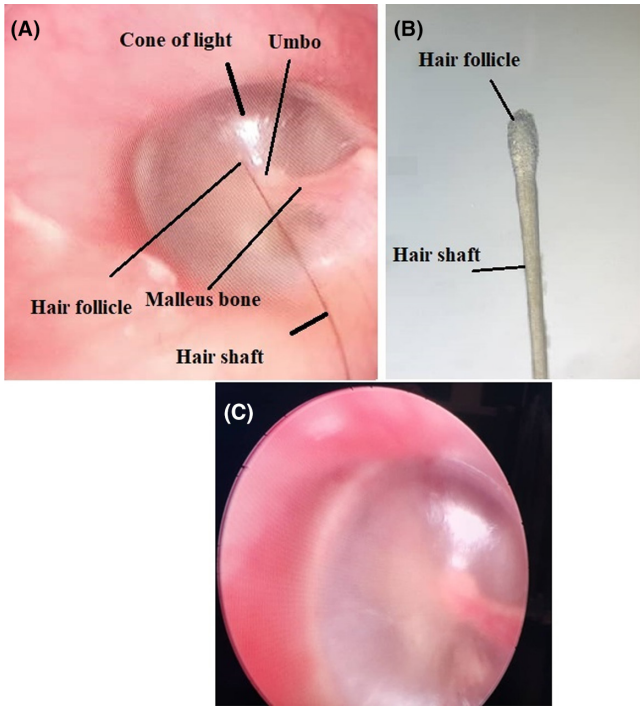

FIGURE 1 (A) Tympanic membrane and its different parts in the otoscope view; (B) Hair and its follicle after being removed from the tympanic membrane; (C) Tympanic membrane after the intervention and outside the hair and its follicle.

3 | DISCUSSION

Oto-tricho is a disorder affecting the TM characterized by abnormal hair growth and neuropathic-like symptoms. These symptoms include tinnitus, chronic pain, continuous headaches, and manifestations related to the Arnold's branch of the vagus nerve, such as gag reflex, cough, and nausea. Failure to treat oto-tricho can lead to complications such as tympanosclerosis, particularly in the posterior and superior quadrant of the pars tensa of the TM, as well as auditory-speech disorders. Deguine and Pulec (1999) demonstrated that oto-tricho occurring in the pars tensa of the TM can cause microperforation, tympanosclerosis, and symptoms like tinnitus and headaches. They also found that removing the hair, along with its follicle under local anesthesia, can promote minor repair of the TM perforation and alleviate the associated symptoms.[10] Additionally, Castro et al.[11] revealed that oto-tricho in the TM can excessively stimulate the Arnold's branch of the vagus nerve, resulting in symptoms such as nausea, neurogenic cough, mild supraglottic hyperfunction, vocal fold paresis, and asymmetric vibration. In the present study, a patient with oto-tricho-tussia/tinnitus exhibited symptoms similar to these reported cases. However, upon evaluating the TM, no evidence of sclerotic or necrotic

damage was found. Timely intervention and appropriate management can lead to restoration and improvement of the associated symptoms.

Research indicates that excessive stimulation of the TM can activate the vagus nerve, leading to non-infectious/non-allergic cough. Conventional anti-allergic drugs and antibiotics are ineffective in treating chronic cough caused by TM stimulation following oto-tricho. Moreover, the utilization of these medications results in additional costs, antibiotic resistance, disruption of the digestive-respiratory flora, and potential toxic effects, further contributing to misdiagnosis.[12] Oto-tricho can give rise to progressive neurological symptoms, including neuropathic manifestations such as tinnitus, chronic headaches, and nausea. Misdiagnosis of these symptoms may lead to the administration of drugs intended for neuropathic conditions, thereby potentially inducing degenerative disorders in the central nervous system.[13] Oto-tricho leads to reduced elasticity, sclerosis of the stratified squamous epithelium, micro-perforation, and tympanosclerosis of the TM. These alterations in the histological structure of the TM impair the transmission of sound energy to the malleus bone, ultimately raising the hearing threshold. Numerous cases have demonstrated that timely intervention involving the detection and removal of hair and its follicle is crucial. Without such action, micro-perforation repair may only be achievable through procedures like myringoplasty and tympanoplasty.[14]

4 | CONCLUSION

Oto-tricho-tussia/tinnitus is a condition characterized by the growth of hair within the TM, resulting in pseudo-neuropathic symptoms like gag reflex, tinnitus, chronic pain, headaches, cough, and nausea. Fortunately, it is possible to address this issue through a straightforward procedure using forceps and a microscope. By removing the hair and its follicle, a progressive improvement of symptoms can be achieved.

AUTHOR CONTRIBUTIONS

Habib Azimi: Conceptualization; data curation; formal analysis; validation. **Seyed Mohammad Tabibzadeh:** Formal analysis; validation; writing – original draft; writing – review and editing. **Abbas Khalilpour:** Investigation; methodology; supervision; validation. **Mohsen Akbaribazm:** Conceptualization; data curation; software; supervision; visualization.

ACKNOWLEDGMENTS

None.

FUNDING INFORMATION

The author(s) received no financial support for the research, authorship, and/or publication of this article.

CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

All data associated with the article are available if required.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

ORCID

Habib Azimi https://orcid.org/0009-0001-1430-9610
Seyed Mohammad Tabibzadeh https://orcid.org/0000-0003-4799-9694
Abbas Khalilpour https://orcid.org/0000-0002-9763-8101
Mohsen Akbaribazm https://orcid.org/0000-0001-9162-8706

REFERENCES

1. Hall DA, Láinez MJ, Newman CW, et al. Treatment options for subjective tinnitus: self-reports from a sample of general practitioners and ENT physicians within Europe and the USA. *BMC Health Serv Res*. Springer New York, NY. 2011;11(1):1-15.
2. Møller AR. Epidemiology of tinnitus in adults. *Textbook of Tinnitus*; Springer, New York. 2011:29-37.
3. Shargorodsky J, Curhan GC, Farwell WR. Prevalence and characteristics of tinnitus among US adults. *Am J Med*. 2010;123(8):711-718.
4. Zheng W, Holt JR. The mechanosensory transduction machinery in inner ear hair cells. *Annu Rev Biophys*. 2021;50:31-51.
5. Lopez-Escamez JA, Carey J, Chung WH, et al. Diagnostic criteria for Menière's disease. *J Vestib Res*. 2015;25(1):1-7.
6. Nelson DI, Nelson RY, Concha-Barrientos M, Fingerhut M. The global burden of occupational noise-induced hearing loss. *Am J Ind Med*. 2005;48(6):446-458.
7. Zanoletti E, Mazzoni A, Frigo AC, Borsetto D, Cazzador D. Hearing preservation outcomes and prognostic factors in acoustic neuroma surgery: predicting cutoffs. *Otology & Neurotology*. 2020;41(5):686–693.
8. Rybak LP, Ramkumar V. Ototoxicity. *Kidney Int*. 2007;72(8):931-935.
9. Gates GA, Mills JH. Presbycusis. *Lancet*. 2005;366(9491):1111-1120.
10. Deguine C, Pulec JL. Microperforation of the pars tensa caused by a hair. *Ear Nose Throat J*. 1999;78(10):738.
11. Castro RA, Zalvan CH, Berzofsky C. Oto-tricho-tussia: an unexpected cause of cough. *Case Rep Otolaryngol*. 2020;2020:3527481.
12. Kariya S, Okano M, Maeda Y, et al. Macrophage migration inhibitory factor deficiency causes prolonged hearing loss after acoustic overstimulation. *Otol Neurotol*. 2015;36(6):1103-1108.

13. Rhee CK, He P, Jung JY, et al. Effect of low-level laser treatment on cochlea hair-cell recovery after ototoxic hearing loss. *J Biomed Opt*. 2013;18(12):128003.
14. Rhee CK, Bahk CW, Kim SH, et al. Effect of low-level laser treatment on cochlea hair-cell recovery after acute acoustic trauma. *J Biomed Opt*. 2012;17(6):068002.

How to cite this article: Azimi H, Tabibzadeh SM, Khalilpour A, Akbaribazm M. Rare oto-trichotussia/tinnitus: A case report. *Clin Case Rep*. 2024;12:e8412. doi:10.1002/ccr3.8412