Tophaceous gout of the middle ear

Stéphane Gargula, Guillaume Poillon, Mary Daval, Marc Williams, Mathieu Veyrat, Homa Adle-Biassette, Denis Ayache

Department of Otolaryngology, Head and Neck Surgery, Foundation Adolphe de Rothschild Hospital, Paris, France

Corresponding author. Department of Otolaryngology, Head and Neck Surgery, Foundation Adolphe de Rothschild Hospital, 29 Rue Manin, 75019, Paris, France.
E-mail address: mdaval@for.paris (M. Daval).

Peer review under responsibility of PLA General Hospital Department of Otolaryngology Head and Neck Surgery.

Keywords:
Gout
Middle ear
Hearing loss
Conductive hearing loss
Computed tomography

ARTICLE INFO
Article history:
Received 12 July 2019
Received in revised form 18 August 2019
Accepted 22 August 2019

ABSTRACT
We present a very rare case of tophaceous gout of the middle ear causing conductive hearing loss, with special emphasis on Computed Tomography presentation.

© 2019 PLA General Hospital Department of Otolaryngology Head and Neck Surgery. Production and hosting by Elsevier (Singapore) Pte Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

Gouty tophi are usually located in the great toe or other affected joints (Wijnands et al., 2015). Ear locations have already widely been reported to the pinna (Griffin et al., 2009) but rarely within the middle ear (ME) (Forbes and Fields, 2012). We report an isolated ME tophaceous gout in an otherwise healthy patient.

2. Case report

A 64-year-old woman presented with a right hearing loss for two years. She reported no previous medical history and did not take any treatment. Micro-otoscopy of the right ear showed an anterior white-colored calcified mass under a closed tympanic membrane. Hearing test revealed a right conductive hearing loss with a 50 dB air-bone gap (ABG) (Fig. 1A). High-resolution Computed Tomography (CT) of the right temporal bone demonstrated a non-erosive nodular calcified mass located at the anterior part of the tympanic cleft attached to the malleus handle and to the anterior wall of the ME (Fig. 2). Magnetic resonance imaging was also performed and showed a hyposignal mass on T1-weighted images, enhancing with gadolinium (Fig. 3). She underwent a right exploratory tympanotomy under general anesthesia. We found a white calcified but friable, semolina-like, mass localized anteromedially to the malleus (Fig. 4). The ossicular chain was intact but totally ankylosed by the mass firmly attached to the malleus handle and medial and anterior walls of the ME. The mass was totally resected and the ossicular chain returned to normal mobility. Histopathologically the material exhibited monosodium urate crystals deposits highly suggestive of a tophaceous gout. Postoperatively, hearing dramatically improved with a near-total closure of the ABG (Fig. 1B). A thorough rheumatologic evaluation showed no evidence of chronic arthritis or any other systemic disease.

3. Discussion

Tophaceous gout is histologically characterized by the presence of monosodium urate crystals deposits (Forbes and Fields, 2012; Koley et al., 2010). Another entity, usually related to chondrocalcinosis, with calcium pyrophosphate dehydrate deposits has also been described and termed tophaceous pseudogout (Saliba et al., 2003; Shamil et al., 2014).

Less than 10 cases of tophaceous gout or tophaceous pseudogout have been reported in the literature (Mutlu et al., 2016; Reineke...
et al., 2009; Saliba et al., 2003, 2019; Tausch-Treml and Berghaus, 1990). To our knowledge, the vast majority of the cases were isolated without any association to chronic arthritis.

The main differential diagnosis of a nodular bony mass within the middle ear is the osteoma (Verillaud et al., 2011). On CT scan, the osteoma presents as a very dense bony mass, whereas tophaceous gout or pseudogout display a semolina-like structure.

In case of isolated tophaceous gout or pseudogout localized to the middle ear, the treatment of choice relies on surgical excision (Mutlu et al., 2016; Saliba et al., 2003).

### 4. Conclusion

Tophaceous gout, or its variant termed tophaceous pseudogout, is a very rare lesion of the middle ear that can cause significant conductive hearing loss. Semolina-like aspect on CT scan is highly suggestive. Surgical resection is the method of choice for improving hearing.

### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### Conflicts of interest

None.

### Acknowledgements

None.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.joto.2019.08.002.
References

Forbess, L.J., Fields, T.R., 2012. The broad spectrum of urate crystal deposition: unusual presentations of gouty tophi. Semin. Arthritis Rheum. 42, 146–154. https://doi.org/10.1016/j.semarthrit.2012.03.007.

Griffin, G.R., Munns, J., Fullen, D., Moyer, J.S., 2009. Auricular tophi as the initial presentation of gout. Otolaryngol. Neck Surg. 141, 153–154. https://doi.org/10.1016/j.ento.2009.01.042.

Koley, S., Salodkar, A., Choudhary, S., Bhake, A., Singhania, K., Choudhury, M., 2010. Tophi as first manifestation of gout. Indian J. Dermatol. Venereol. Leprol. 76, 393. https://doi.org/10.4103/0378-6323.65593.

Mutlu, A., Dundar, E., Iseri, M., Ercin, C., Celle, A., 2016. An unusual presentation of gout: tophi in the middle ear. J. Int. Adv. Otol. 12, 216–218. https://doi.org/10.5152/oao.2016.1293.

Reineke, U., Ebmeyer, J., Schütte, F., Upile, T., Sudhoff, H.H., 2009. Tophaceous gout of the middle ear. Otol. Neurotol. 30, 127–128. https://doi.org/10.1097/MAO.0b013e31817dfde.

Saliba, I., Bouthiller, A., Desrochers, P., Berthlet, F., Dufour, J.-J., 2003. Tophaceous gout and pseudogout of the middle ear and the infra temporal fossa: case report and review of the literature. J. Otolaryngol. 32, 269–272.

Saliba, J., Sakano, H., Friedman, R.A., Harris, J.P., 2019. Tophaceous gout of the middle ear: case reports and review of the literature. Audiol. Neurotol. 24, 51–55. https://doi.org/10.1159/000500514.

Shamil, E., Willemis, S., Grolman, W., Topsakal, V., 2014. Pseudogout in the middle ear.tol. Neurotol. 35, e202–e203. https://doi.org/10.1097/MAO.0000000000000325.

Tausch-Treml, R., Berghaus, A., 1990. Gout tophus of the middle ear. HNO 38, 465–467.

Velilland, B., Guillere, L., Williams, M.T., El Bakkouri, W., Ayache, D., 2011. Middle ear osteoma: a rare cause of conductive hearing loss with normal tympanic membrane. Rev. Laryngol. Otol. Rhinol. 132, 159–161.

Wijnands, J.M.A., Viechtbauer, W., Thevissen, K., Arts, I.C.W., Dagnelie, P.C., Stenhove, C.D.A., van der Linden, S., Boonen, A., 2015. Determinants of the prevalence of gout in the general population: a systematic review and meta-regression. Eur. J. Epidemiol. 30, 19–33. https://doi.org/10.1007/s10654-014-9927-y.