



## Tophaceous gout of the middle ear

Stéphane Gargula <sup>a</sup>, Guillaume Poillon <sup>b</sup>, Mary Daval <sup>a,\*</sup>, Marc Williams <sup>b</sup>, Mathieu Veyrat <sup>a</sup>, Homa Adle-Biassette <sup>c</sup>, Denis Ayache <sup>a</sup>

<sup>a</sup> Department of Otolaryngology, Head and Neck Surgery, Foundation Adolphe de Rothschild Hospital, Paris, France

<sup>b</sup> Department of Neuroradiology, Foundation Adolphe de Rothschild Hospital, Paris, France

<sup>c</sup> Department of Pathology, Lariboisière Hospital, Paris Diderot, Paris-Cité-Sorbonne University, Paris, France

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### 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.

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### 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) (Forbess 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

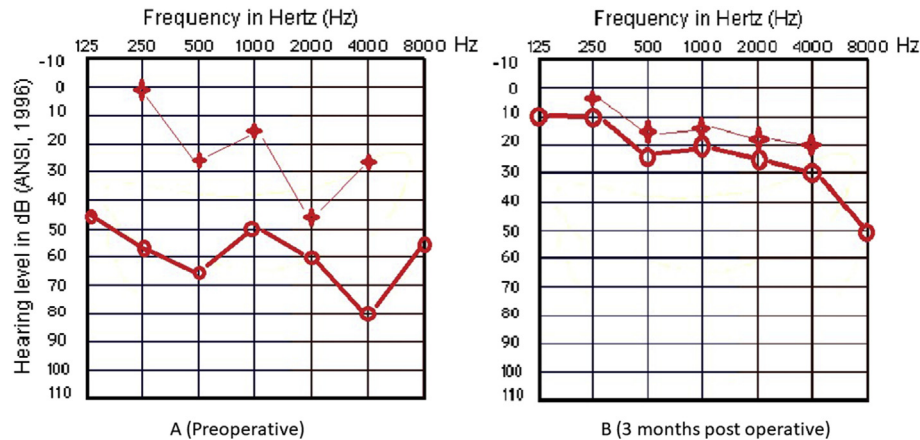
Tophaceous gout is histologically characterized by the presence of monosodium urate crystals deposits (Forbess and Fields, 2012; Koley et al., 2010). Another entity, usually related to chondrocalcinosis, with calcium pyrophosphate dehydrate deposits has also been described and termed tophaceous pseudogout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

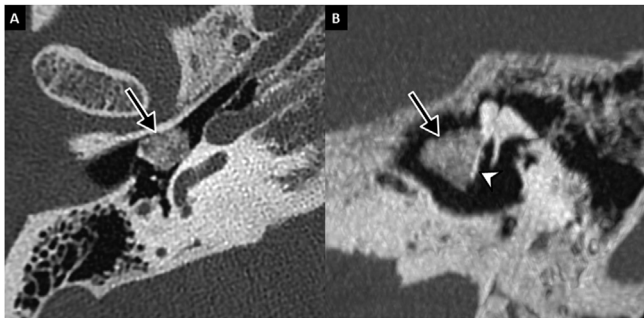
\* Corresponding author. Department of Otolaryngology, Head and Neck Surgery, Foundation Adolphe de Rothschild Hospital, 29 Rue Manin, 75019, Paris, France.

E-mail address: [mdaval@for.paris](mailto:mdaval@for.paris) (M. Daval).

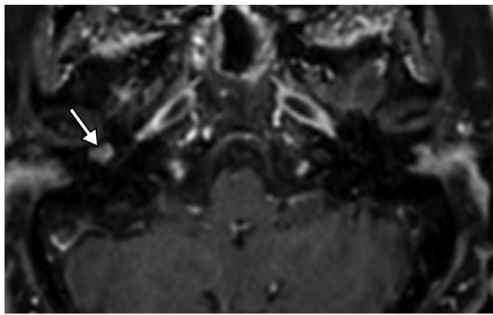
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**Fig. 1.** Right ear preoperative (A) and 3 months postoperative audiometry (B), circles for air conduction, crosses for bone conduction. Near complete closure of air-bone gap was obtained.



**Fig. 2.** Right temporal bone high-resolution Computed Tomography (CT) reformatted in axial (A) and sagittal Maximal Intensity Projection (MIP) (B) planes, demonstrating a well-limited non-erosive calcified semolina-like mass (black arrows) adjacent to the anterior wall of the middle ear and to the malleus handle (white arrowhead).

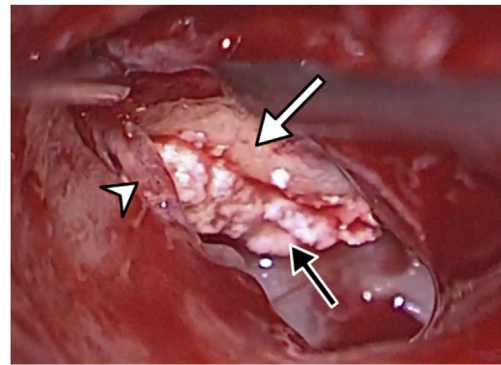


**Fig. 3.** Temporal bone contrast-enhanced T1-weighted Magnetic Resonance Imaging (MRI) reformatted in axial plane, showing the mass of the right middle ear, appearing with high signal intensity (white arrow).

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 (Vérillaud 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).



**Fig. 4.** Intraoperative view of the right tympanotomy, finding a white semolina-like mass (black arrow), localized anteromedially to the malleus (white arrow). Note the chorda tympani (white arrowhead).

#### 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 CTscan is highly suggestive. Surgical resection is the method of choice for improving hearing.

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#### Conflicts of interest

None.

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#### 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.otohns.2009.01.042>.
- Koley, S., Salodkar, A., Choudhary, S., Bhake, A., Singhanian, K., Choudhury, M., 2010. Tophi as first manifestation of gout. *Indian J. Dermatol. Venereol. Leprol.* 76, 393. <https://doi.org/10.4103/0378-6323.66593>.
- Mutlu, A., Dundar, E., Iseri, M., Ercin, C., Cefle, A., 2016. An unusual presentation of gout: tophi in the middle ear. *J. Int. Adv. Otol.* 12, 216–218. <https://doi.org/10.5152/jiao.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.0b013e31817fd4de>.
- 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., Willems, S., Grolman, W., Topsakal, V., 2014. Pseudogout in the middle ear. *tol. Neurotol.* 35, e202–e203. <https://doi.org/10.1097/MAO.0000000000000325>.
- Tausch-Tremel, R., Berghaus, A., 1990. Gout tophus of the middle ear. *HNO* 38, 465–467.
- Vérillaud, B., Guilleré, 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., Stehouwer, 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>.