

CASE REPORT

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The hidden star: mastoiditis as a late sequela of retained foreign body in the nose

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Abstract

Background Acute mastoiditis is an intratemporal complication due to acute otitis media (AOM). Common risk factors include young age (often < 24 months), high values of C-reactive protein and previous antibiotic therapy, previous middle ear infection, or history of ear surgery. The main factor of acute mastoiditis is obstruction of the aditus antrum by granulation tissue or mucosa edema, inhibiting purulent drainage from the mastoid. Retained foreign body in the nose is a rare indirect cause of acute mastoiditis. It may be due to mucosal inflammation and accumulation of secretion causing nasal tract or nasopharyngeal infection leading to otitis media and later manifesting as an intratemporal complication.

Case presentation We report a case of acute mastoiditis as a late sequela of retained foreign body in the nose, and we also emphasize the incidental radiological finding of a star-shaped foreign body in the nose, which was a miss during the initial presentation. Further questioning revealed a history of recurrent unilateral blood-stained, foul-smelling nasal discharge, which was left untreated for years, leading to a delayed presentation of acute mastoiditis. After removing the foreign body and broad-spectrum antibiotic administration, complete disease resolution was achieved.

Conclusion Although rare, retained foreign bodies of the nose must be ruled out in certain cases of mastoiditis. A thorough history with a high index of clinical suspicion is recommended for early diagnosis to prevent complications.

Keywords Mastoiditis, Foreign body in the nose, Otitis media

Background

Acute mastoiditis is the most common complication of acute otitis media, affecting 1 in 400 cases (0.24%) [1]. The pediatric age group is undoubtedly the most prone to mastoiditis in middle ear infection due to anatomical, infectious, and immunological conditions. As children are more susceptible to middle ear infections, they

are also more likely to develop mastoiditis. The main etiopathogenic factor is represented by the obstruction of the aditus ad antrum due to mucosa edema and granulation tissue, which impedes the drainage of purulent exudate from the mastoid air cells [2]. In children, the mastoid bone is more pneumatized with thin bone trabeculae, and the aditus ad antrum is smaller than in adults; therefore, there is a greater predisposition to the accumulation of secretion and osteitic infection.

The presentation of a non-complicated acute mastoiditis generally does not differ from those of AOM, such as fever, otalgia, and otorrhea, but are often more severe with spontaneous pain in the mastoid area, sometimes associated with erythema and swollen post-auricular skin along with protrusion of the pinna as well as evidence of otitis media. Risks of AOM and mastoiditis are often highlighted in many works of literature. Garcia

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et al. reported that the main suspected factors are age (<24 months), high values of C-reactive protein, and history of ear surgery. Other less significant predisposing factors include recurrent AOM, chronic otitis media, and previous antibiotic treatment [3]. A few cases of acute mastoiditis secondary to ear foreign bodies were previously reported. However, to the best of the authors' knowledge, no case of mastoiditis associated with nasal foreign bodies has been reported in English literature yet. This literature is the first case of a nasal foreign body complicated by acute mastoiditis to be reported, and we emphasize the incidental finding of a star-shaped foreign body in the nose, which was a miss at the initial presentation.

Case presentation

A 9-year-old girl with no previous medical illness was brought to us with complaints of right otalgia associated with mucopurulent otorrhea, pain over the right post-auricular region, and fever for 1 week. There was no tinnitus, vertigo, or reduced hearing. The patient denied any nose and throat symptoms. On soft tissue examination, the right pinna was pushed anterolaterally, and a vague painful swelling was noted at the right post-auricular region. An otoscopy examination revealed a severely edematous right external auditory canal (EAC) with mucopurulent discharge, and the tympanic membrane was obscured. Rigid nasoendoscopy showed mucopurulent secretion at the right nasal cavity with granulation tissue at the floor of the nose, congested right osteomeatal complex (OMC) region, and the presence of mucopurulent secretion at the right Eustachian tube and post nasal space. Oropharynx and oral cavity examinations were unremarkable.

Correlating these clinical features, we arrived at a provisional diagnosis of right AOM complicated with right mastoiditis. The patient was admitted for intravenous antibiotic (IV amoxicillin-clavulanic acid 100 mg/kg/day), and due to the severely edematous right EAC, an ear wick soaked with ichthammol glycerin was applied. Throughout the ward stay, the patient's condition improved. Upon removal of the ear wick, the right EAC's swelling was markedly reduced, and a central perforation of 20% with mucopurulent discharge was seen at the pars tensa. Despite the clinical improvement, a high-resolution computed tomography (HRCT) of the temporal bone was performed due to persistent mucopurulent otorrhea. The scan revealed an incidental finding of a hyperdense star-shaped structure measuring 1.4 cm within the right posterior nasal cavity on sagittal view (Fig. 1), and soft tissue component seen within the mastoid cavity with destruction of the normal trabeculation of the mastoid air cells. The soft tissue component in the mastoid air cells was seen extending from the middle ear, and inflammation was also demonstrated at the right post-auricular region (Fig. 2).

Upon further questioning, the mother revealed a history of intermittent right recurrent unilateral epistaxis associated with foul-smelling rhinorrhea for 5 years. She recalled an incident in the past when the child had a star-shaped toy inserted into her right nostril but was never brought to medical attention. The diagnosis of a foreign body in the nose complicated with right otitis media and mastoiditis was made. The patient was put under general anesthesia, and with endoscopic guidance, a piece of rusted star-shaped foreign body was removed from the right nasal cavity (Fig. 3). The foreign body was surrounded by thick mucopurulent discharge, crusting, and



Fig. 1 HRCT of the temporal bone: **a** tubular hyperdense foreign body (arrowhead) in the right posterior nasal cavity, **b** which was demonstrated as a star-shaped foreign body (arrow) on sagittal view

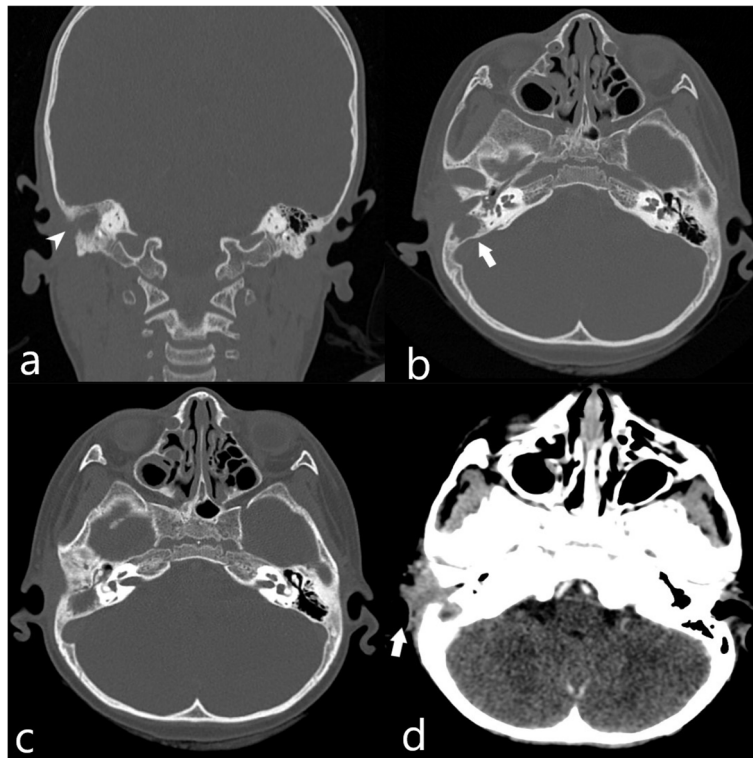


Fig. 2 HRCT of the temporal bone: **a** soft tissue component occupying the right mastoid cavity (arrowhead) with destruction of the normal trabeculation of mastoid air cells; **b** and erosion of the posterior wall of right EAC (arrow); **c** this soft tissue component was seen extending from the middle ear; **d** and inflammation was seen over the post-auricular region (arrow)



Fig. 3 A rusted star-shaped foreign body was removed from the right nasal cavity

granulation tissue (Fig. 4). A complete resolution of the disease was achieved after the removal of the foreign body and upon the completion of the antibiotic.

Discussion

Acute mastoiditis is a severe complication of otitis media. Despite initiated treatment of otitis media, unresolved fever and pain indicate early signs of acute mastoiditis. Harley et al. reported that pain is the most frequent presenting symptom, and most patients exhibited an abnormal tympanic membrane as well as post-auricular inflammatory sign, 58.6% of which were associated with evidence of ear prominence [4]. This reported case has similar symptoms and clinical signs as she presented with right otalgia, pain over the right post-auricular region, and right mucopurulent otorrhea. It was reported that the median age of 1–2 years old is commonly seen in acute mastoiditis, [4–6] and Hawkins et al. asserted that when mastoiditis occurs in an older child, one should suspect other predisposing factors, such as the presence of cholesteatoma [6]. In this case, the risk of AOM and mastoiditis was attributed to the long-standing history of entry of foreign body into her nose in the past, therefore, the late presentation.

Nasal foreign bodies are usually seen in older children aged 2 to 5, where children are exploratory and tend to insert things into their body orifices [7]. It is usually asymptomatic, but a delayed removal may lead to secondary infection. This is supported by a paper published by Balbani et al. in which they reported that in 19.26% of the cases where the parents ignored the history of foreign body insertion into the ear and nose, these patients usually present with symptoms of secondary infection [8]. This is the first case of acute mastoiditis as a late sequela of retained foreign body in the nose to be reported in English literature. The history of star-shaped toy insertion was suspected 5 years ago with symptoms of unilateral recurrent epistaxis; however, it was neglected and had caused a secondary infection to the middle ear and mastoid cavity. While the neglected foreign body in the nose does not directly cause acute mastoiditis, the authors believed it was due to the ascending infection from the impacted foreign body in the nasal cavity and the further spread of infection to the middle ear via the Eustachian tube. In addition, the secretion drainage in mastoid air cells may be impeded due to the obstruction of the aditus ad antrum that results from edema and granulation tissue owing to the secondary infection.

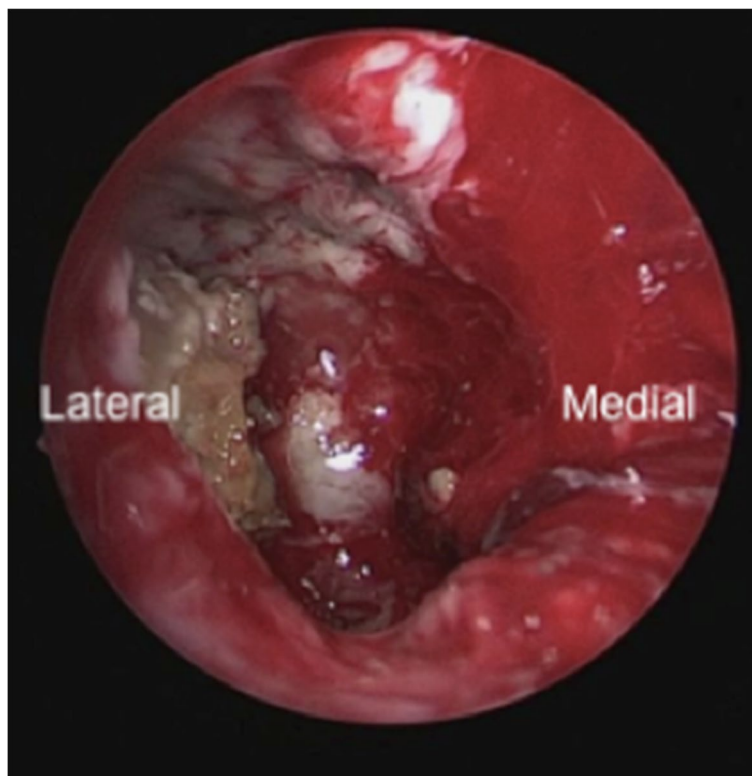


Fig. 4 An endoscopic view of the right nasal cavity revealed crusting and granulation tissue seen on the floor of the nose and the post-nasal space surrounding the embedded foreign body

AOM with mastoiditis is a clinical diagnosis in most instances. Radiography investigations such as plain radiographs and computed tomography (CT) scans are not mandatory to achieve a diagnosis. However, in some instances like this reported case, despite the patient responded to the intravenous antibiotic treatment with the resolution of acute symptoms of mastoiditis, the presence of persistent mucopurulent otorrhea and mucopurulent secretion at the posterior nasal space warranted further imaging to evaluate the possible etiologies, the extension of the disease, and to detect other potential complications. The HRCT of the temporal bone showed an incidental finding of a nasal foreign body, which was a complete surprise as there was no previous suggestive presenting history and nasal symptoms from the caretaker. The commonest site of reported impacted foreign body is in the anterior nasal cavity along the floor between the inferior turbinate and the septum [9, 10]. Posteriorly located nasal foreign bodies are usually more difficult to identify during clinic nasal endoscopy, especially in the pediatric age group. Moreover, a long-standing impacted nasal foreign body may no longer be recognizable in its original form. In this case, the foreign body was embedded in the granulation tissue and surrounded by mucopurulent secretion. All the factors mentioned attributed to why the clinicians could not recognize this entity during the initial presentation.

Nasal foreign body is usually removed in a clinic setting, but a small number require removal under anesthesia, with the causes being failed attempts at the clinic, uncooperative child, posteriorly placed, and deeply embedded foreign bodies. Removal is usually without complication, but there is a risk of pushing the foreign body down to the lower airway tract [9]. Complete recovery is usually expected post foreign body removal. While acute mastoiditis is a severe complication of otitis media, the risk of complications has declined since the introduction of antibiotics. It was reported that a 100% cure rate was achieved for early mastoiditis without intracranial complications and treated conservatively with intravenous antibiotics [4]. Fortunately, a favorable outcome was observed in this patient after removing the nasal foreign body, and complete resolution of the disease was attained after the completion of the antibiotic.

Conclusion

Acute mastoiditis has not been reported as a late sequela of retained foreign bodies in the nose. Although rare, this case highlighted the importance of a complete

history and a thorough evaluation of the upper respiratory tract, including the presence of retained foreign bodies in the nose in cases of mastoiditis in children. A high index of clinical suspicion and an early referral to a tertiary center is recommended for early diagnosis to prevent complications.

Abbreviations

AOM	Acute otitis media
EAC	External auditory canal
OMC	Osteomeatal complex
HRCT	High-resolution computed tomography

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Authors' contributions

YE reported the radiological images and provided legends of each image. NF and IH attended, diagnosed, and involved in the treatment. NF collected medical history and drafted the paper. YE and IH performed study design and article redaction. All authors have read and approved the final manuscript.

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Availability of data and materials

All data generated or analyzed during this study are included in this published article.

Declarations

Ethics approval and consent to participate

This study is registered and approved under National Medical Research Register (NMRR ID-23-01811-WXP).

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Consent for publication

Written informed consent was obtained from the patient's parent for publication of this case report and accompanying images.

Competing interests

The authors declare that there are no competing interests.

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