

Hazardous complications of animate foreign bodies in otology practice

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Abstract

Background: Animate foreign bodies in the ear are frequent occurrences in otology practice. Such foreign bodies may lead to hazardous complications.

Method: This paper describes a retrospective study of six patients with a recent history of an insect in the ear who presented with various complications following intervention received elsewhere.

Results: An insect was retrieved from the external auditory canal in four cases and from the antrum in two cases. The patients presented with progressive otological complications: two patients who presented with orbital apex syndrome and cavernous sinus thrombosis succumbed to the disease; three patients suffered sensorineural hearing loss; and two patients had persistent facial palsy. One patient with sigmoid sinus thrombosis, who presented early, experienced complete recovery.

Conclusion: Insects in the ear can lead to hazardous complications. Animate foreign bodies should preferably be managed by a trained otologist, even in an emergency setting. Patients with delayed presentation and complications have a guarded prognosis.

Key words: Foreign Bodies; Insects; Mastoiditis; Complications

Introduction

Foreign bodies are common otological problems. Usually, these foreign bodies are inert objects and are easily removed by general practitioners. However, some foreign bodies, such as insects, are known to be troublesome.

Insects pose a challenge in removal and are associated with a high risk of complications. Typical complications include manipulation injuries to the canal wall or tympanic cavity. The simple technique of killing the insect by instilling oil and retrieving it is mostly successful.

Some patients can develop severe local or systemic reactions that may prove fatal. We present a series of six patients in whom catastrophic complications occurred as a result of insects entering the ear.

Case details

A retrospective evaluation of the charts of six patients was performed. All of these patients had a history of animate objects (insects) entering the ear. The clinical profiles of these patients are summarised in [Table I](#).

All patients (four female and two male) had a definite history of an insect entering the ear, and all received

intervention for retrieval of the insect before presenting to our centre. In four cases, the insect was retrieved from the external auditory canal. One patient had presented with symptoms and signs of acute mastoiditis, with intratemporal complications; on exploration, the surgeon had retrieved an insect from the mastoid antrum. One patient was investigated at our centre and an ant was removed from the antrum (case number five; [Figures 1 and 2](#)).

Five patients presented at our tertiary care centre with progressive otological or systemic symptoms, even after insect removal. The medical management comprised broad-spectrum antibiotics, anti-inflammatory agents, and symptomatic treatment for facial palsy, vertigo or otalgia.

The overall prognosis of patients was poor. Two patients who had extratemporal complications with multisystem involvement at the time of presentation were managed in intensive care units and required ventilator support. One of these patients had pre-existing diabetes and uncontrolled hypothyroidism. Both patients had a subsequent fatal outcome. Two patients with intratemporal complications (facial palsy and sensorineural hearing loss) were treated surgically by

TABLE I
CLINICAL PROFILE AND OUTCOME OF PATIENTS WITH COMPLICATIONS DUE TO ANIMATE AURAL FOREIGN BODIES

Case no	Age (y), sex	Co-morbidities	Ear affected & insect type	Primary intervention	Presentation delay* (d)	Presenting complaints	Diagnosis	Management in hospital	Outcome
1	45, M	None	L ear, small household insect	Removed by GP at 0 d	5	Bilat periorbital swelling, vision loss	L mastoiditis with petrositis & bilat cavernous sinus thrombosis	Medical [†] , ventilator support	Mortality at 5 d (due to intracranial complications)
2	50, F	Diabetes mellitus type 2, hypertension, hypothyroidism	R ear, household insect	Removed by GP at 2 d, cortical mastoidectomy at 5 d	20	R facial palsy, R vision loss	R mastoiditis with petrositis & orbital apex syndrome	Medical [†] , ventilator support	Mortality at 20 d (due to intracranial complications)
3	12, F	None	L ear, small flying household insect	Removed by otologist (by syringing)	2	L ear pain, fever	L AOM with mastoiditis & sigmoid sinus thrombosis	Medical [†]	Complete recovery
4	40, M	None	R ear, household insect	Removed by GP; traumatic perforation occurred. Patient later underwent orbital exenteration for cellulitis	20	Pain & discharge from R ear, discharge from R orbital cavity	R skull base osteomyelitis	Medical [†]	Partial recovery (reduced discharge & pain, but hearing impairment persisted)
5	20, F	None	L ear, small red ant	GP attempted removal by syringing, but could not remove insect	15	L ear pain, hearing loss, vertigo, facial weakness	L mastoiditis with labyrinthitis & facial palsy	Surgical: mastoidectomy (necrosed, sloughed middle ear, with granulations in mastoid & ant in antrum)	Reduced pain & vertigo, moderate sensorineural hearing loss, facial palsy HB grade 4
6	20, F	None	L ear, ant (removed from mastoid)	Cortical mastoidectomy (diagnosis of AOM with complications); insect in antrum with surrounding granulations	45	L ear pain, hearing loss, facial palsy	L mastoiditis with labyrinthitis & facial palsy	Surgical: mastoidectomy with facial nerve decompression (pale granulations in mastoid, first genu)	Sensorineural hearing loss, facial palsy HB grade 4

*To our centre. [†]Medical management included broad-spectrum injectable antibiotics, anti-inflammatory agents, treatment for co-morbidities, and symptomatic treatment for pain, vertigo or facial palsy, as required. No = number; y = years; d = days; M = male; L = left; GP = general practitioner; bilat = bilateral; F = female; R = right; AOM = acute otitis media; HB = House–Brackmann



FIG. 1

Ant in mastoid antrum, with surrounding granulation (case number five).

mastoidectomy and facial nerve decompression at our centre. Only partial resolution of the symptoms could be achieved. The only patient with complete resolution (case number three) had presented early (on the 2nd

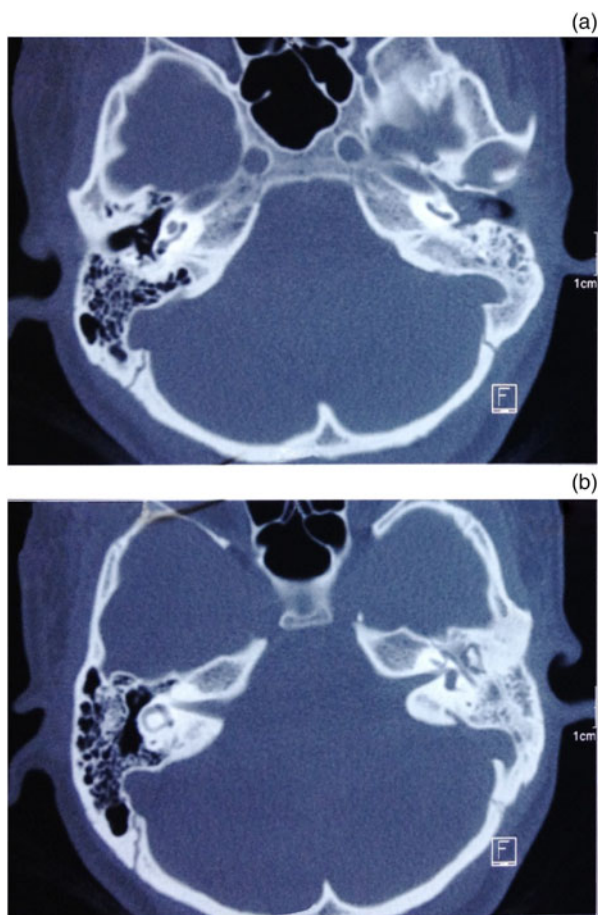


FIG. 2

High-resolution, axial computed tomography scans of case number five (a and b), showing diffuse soft tissue density in the mastoid and middle ear.

day after removal of the insect) with persisting headache as a result of sigmoid sinus thrombosis, and responded well to medical management.

Discussion

Animate aural foreign bodies can rarely present with catastrophic complications. Such complications have been described very infrequently in the literature.¹⁻⁵ Several large case series of aural foreign bodies have been reported.¹⁻³ The complications described had mostly been caused by untrained manipulation in an attempt to remove the aural foreign body.

In a series of 462 cases of aural foreign bodies treated over a period of 7 years, Fornazieri *et al.* reported that 27.5 per cent of these cases were the result of animate foreign bodies; 26.3 per cent of such cases had complications.⁴ Injury to the canal wall was the most common complication, which could be attributed to attempts at removal by general practitioners. Following a detailed analysis of various parameters of type and duration of aural foreign bodies, including management techniques, Schulze *et al.* recommended early referral to an ENT specialist (within 24 hours) for all children and for adults where the foreign body was difficult to visualise.⁵ In the literature, there are no studies on catastrophic complications as a result of animate aural foreign bodies. Ugwu and Okolugbo reported a series of four cases of otogenic tetanus, in which one patient had a history of an aural foreign body.⁶ Trauma during retrieval was thought to be the cause of the tetanus.

In our series, all six patients had a recent history of animate aural foreign bodies. The foreign bodies were retrieved from the external auditory canal in four cases; in our experience, mastoiditis frequently develops in this clinical scenario. In two cases, initial mastoiditis had progressed to intracranial and intratemporal complications, with a subsequent fatal outcome. Permanent hearing impairment was the most common intratemporal complication. Three patients developed complete facial palsy. Such catastrophic outcomes can be attributed to the patients' immunological status or retained parts of the insect in some cases, but in others, disease progressed despite complete insect removal.

The exact pathogenesis of the catastrophic responses to aural insects as noted in this study remains unclear. The effects may be caused by the direct effect of toxins in insect stings. Another possible explanation is a 'localised anaphylactic' reaction to the toxins or proteins in insect saliva. The immune response may also be caused by body proteins of dead insects trapped in aural cavities. The clinical cases reported here additionally seem to indicate a propensity for hypercoagulability and venous sinus thrombosis.

Insect sting allergy is known to occur at all ages, and can occur even after a number of previous uneventful stings. Even without intervening stings, sensitisation can develop over decades, resulting in a subsequent anaphylactic reaction.⁷ The frequency of large local

reactions is uncertain, but about 50 fatal sting reactions occur each year in the USA.⁸ A similar allergic reaction to polypeptides in mosquito saliva has been termed Skeeter syndrome.⁹ Though the clinical manifestations of Skeeter syndrome are similar to that of bacterial cellulitis, they progress more rapidly in the former condition, with progression over the course of hours (rather than days as is typically seen in cellulitis). To the best of our knowledge, insect-induced localised idiosyncratic types of inflammatory response involving the middle and inner ear, with a spectrum of consequences as described here, have not been previously described in the literature.

Important factors in the patient's history are the time of foreign body removal and the skill of the doctor involved at first presentation. In case number five, the complications experienced could certainly have been avoided if the patient had been referred to an otologist at an earlier stage. The various published reviews equivocally opine that otologists are superior to emergency physicians in removing a foreign body from the ear as they use a surgical otomicroscope for visualisation.^{1,2,10}

- **In rare cases, animate aural foreign bodies can cause catastrophic intratemporal and extratemporal complications, even after successful retrieval**
- **Localised anaphylaxis associated with an immune response or direct toxicity of the insect sting could explain these events**
- **Once complications have arisen, prognosis is guarded; early intervention is likely to be pre-emptive**

This case series aimed to report an unusual observation of catastrophic complications as a result of animate foreign bodies in the ear. The possible mechanism of these complications is discussed. The prognosis was invariably poor in all but one case.

Conclusion

Animate aural foreign bodies should be managed meticulously. Early and complete insect retrieval by

an experienced otologist is key to complication prevention. An idiosyncratic type of localised inflammatory response to an insect's sting can lead to dangerous complications. In cases where intervention is delayed and in patients with systemic co-morbidities, prognosis is guarded. In patients with progressive local symptoms, prompt surgical intervention should be considered, especially if there is suspicion that part of the foreign body has been retained. The ideal algorithm for medical and surgical management of patients presenting with complications remains unclear.

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