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CASE REPORT

A case of Cardiocondyla aural parasitosis in Middle East Refugee Camp: insect removal in resource poor environment

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Abstract

We present a case of successful removal of aural foreign bodies from the external otic canal. In this scenario, the foreign bodies were an uncommon insect, the Cardiocondyla. The Cardiocondyla species is within the family Formicidae, otherwise known as the ant. The patient was seen in a remote location, a refugee camp in Jerash, Jordan, with limited resource accessibility. The insects and all aural foreign body contents were successfully debrided with gentle irrigation. This case presents the opportunity to evaluate an alternative insect removal technique when resources are not available. It also reviews the classic recommended techniques, assesses the risks and sequela of retrieval, and appraises the threat of formicidae exposure in the wild.

Keywords: *aural parasitosis*; *aural foreign body*; *Cardiocondyla*; *resource poor settings*

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There are many parasites that invade mammalian ears; however, few involve the human ear. Those that do affect humans are customarily arthropods, such as ticks, mites, and fly larvae [1]. In the instance of larvae, it is termed myiasis. Parasitosis and myiasis in humans are more prevalent in subtropical regions among those of lower socioeconomic status. Otolaryngological orifices, such as the ears, nose, paranasal, and oral cavities, serve as the optimal locations for entry and symbiosis. In North America, a common location for myiasis is chronic wounds in debilitated diabetic patients, much less frequently in the ear. In regards to aural foreign bodies involving insects, this does occasionally occur, though it is typically resolved quickly upon a visit to any local emergency department. Additional predisposing risk factors for these conditions include neglected children, old age, cognitive delay, and poor personal hygiene [2, 3]. The following is a case of parasitic otitis, and possible myiasis due to a rare causative species, Cardiocondyla.

Case report

An 8-year-old boy presents with his mother at the bedside for the evaluation of ongoing auricular discomfort of waxing and waning severity for the past 1 month. The child states that the pain is constant, however, often feels like 'it is moving throughout the ear' and includes both ears. Otherwise the child denies fevers, discharge from the ears, or any other symptoms of concern. On physical examination, the child was well appearing, and all was within normal limits except for the auricular exam, which revealed several (Fig. 1) insects of the genus *Cardiocondyla* (Fig. 2). These insects were observed on examination to be actively alive and moving. Additionally, on further inspection, there were areas of 'clumps' observed, believed to potentially represent these insects in the pupal and larval stages. Typical options for removal in properly equipped emergency departments would include Alligator forceps, ear curette, viscous lidocaine irrigation, saline irrigation via syringe with intravenous catheter, or more recently a Katz extractor. Unfortunately, this clinical setting did not offer any of the aforementioned tools. This patient was seen in a Middle Eastern Refugee camp in Jerash, Jordan, where these instruments were not available. On further inspection of supplies, a 5 mL syringe and 25 gauge 5/8" needle with cap were available, as well as filtered water from a local

*This work was carried out at a refugee camp in Jerash, Jordan. This was at a medical clinic organized by the Emergency Project, Islamic Medical Association of North America (IMANA), and United Mission for Relief and Development (UMR), All within a UNICEF (United Nations International Children's Emergency Fund) and UNRWA (United Nations Relief and Works Agency) organized medical clinic.

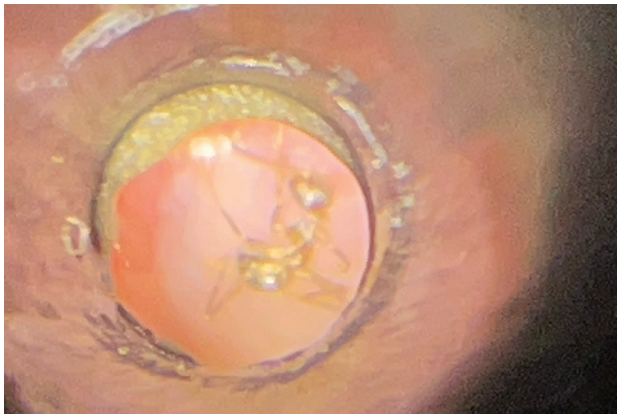

Fig. 1. Otoscopic view of insect when initially visualized during physical exam.

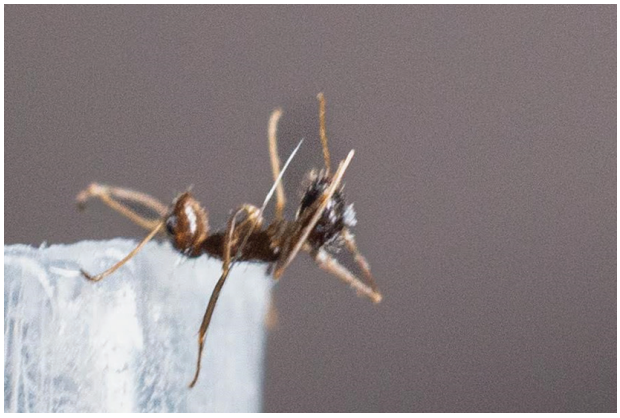

Fig. 2. Macroscopic photo of insect (Cardiocondyla) status post removal.

supply bottle. The decision was made to attempt gentle irrigation utilizing the supplies available. The 25 gauge needle was discarded; however, the cap for the needle was preserved and utilized as the alternative to what typically would be an intravenous catheter. The plastic cap was cut by scissors on a perpendicular angle. Gentle irrigation was then provided via these supplies successfully with complete irrigation of both ears. Fifteen flushes in the left ear and 13 in the right were required for complete evacuation. Repeat examination revealed complete removal of all insect and larval stages of insect from both canals. Patient reported improved symptoms immediately following and was discharged with Ofloxacin antibiotic drops for the subsequent 5 days prophylactically. This was given on the basis of iatrogenic disruption of the auricular canal in the setting of limited options for outpatient follow-up.

Discussion

The human ear and its relationship with the outside world is intricate. Its primary function to provide hearing and equilibrium requires a point of entry that unfortunately also leaves it vulnerable to external harm. This vulnerability is through the external auditory canal, which serves as a means of access to various forms of foreign bodies, to include parasites. Commonly encountered aural foreign bodies are pebbles, popcorn kernels, tissue paper, and small toys [4]. However, in 14% of these cases, the foreign body is due to a parasite. This includes a variety of arthropods (most of which cannot survive long term in this environment); however, parasitic fly larvae and mites can maintain sustained infections [5]. Notably, cockroaches are the most commonly identified arthropods constituting nearly 78% of aural creatures [1]. The middle ear along with the tympanic membrane acts as a barrier and typically will prevent deeper intrusion. Worth mentioning is that there are case reports of entry and infection via perforated TMs with Ascaris Lumbricoides and Enterobius vermicularis [6].

In our case, Cardiocondyla, a diverse genus of ants belonging to the subfamily of Myrmicinae, were extracted from the external ear canal. The majority of these species live in nests constructed under soil and less frequently underneath stones. Nests typically have an entrance hole of only 1–1.5 mm and a very narrow vertical duct, which typically ends in a simple chamber 15–20 mm in diameter [7]. The geometry of the external auditory canal presents an environment similar in size and condition to these ants' nesting chamber, with an average depth of 2.5 cm and width of 0.6 cm [8]. Given their small size (average 1.5–3 mm in worker caste), it seems only fitting the possibility of their infestation into this human orifice. Upon entrance, the risk to humans is likely limited to local inflammation causing discomfort. While they pose a considerable risk to one another (males engage in lethal combat over sexual partners within their nest, beheading and dismembering one another as they compete for access to the queen), there are no reports of harm to humans [7]. Only a handful of species within the Formicidae family are able to cause harm to humans. Most notably, among these is the Bulldog Ant, or Myrmecia, a species found in Australia that is capable of jumping several inches to bite its victim. Once latched to the skin, the Myrmecia releases one of the most concentrated venoms in the insect world [9]. This ant records on average one death to humans every 4 years. Cardiocondyla on the other hand has no reported events causing harm to humans, further adding to the reassuring prognosis in this patient.

Interestingly, foreign bodies tend to be more frequently located in the right ear, corresponding to the predominant handedness in children [10], and Otomicroscopic examination in our case revealed live Cardiocondyla lodged inside both ears. The presence of a live insect moving in the external auditory canal may cause foreign body sensation, tenderness, itching, otalgia, and tinnitus. Other possible presentations may include purulent or blood-tinged aural discharge, vertigo, hearing impairment, and perforation of the tympanic membrane [11].

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Given the potential complications, live insects require urgent removal. Insects should be euthanized with agents like ethanol, mineral oil, or lidocaine prior to attempted removal to prevent excess insect movement during retrieval. The choice of euthanizing agent will likely depend on availability, as the insecticidal activity of different available agents can effectively kill most insect species, including cockroaches, honeybees, and beetles [12]. In an in vivo trial, mineral oil was faster and more effective than other methods to kill cockroaches [1]. Euthanizing the insect results in their immobilization, without which potential for discomfort and otic damage can be caused by the insect attempting to avoid capture. Comfort can be optimized by minimizing the shining of light into the canal prior to euthanizing, as many are light-avoiding insects (cockroaches in particular) [13].

Various extraction methods can be utilized for insect removal. For most objects with sharp or irregular shapes (particularly insects), alligator forceps are the ideal tool for extraction. If unable to grasp an alternative is blunt tipped right angle hook beyond the foreign body, to delicately advance the object. Alternatively, a balloon tipped catheter can be utilized for extraction. This tool, named the Katz extractor, is passed past the object, inflated, and then retracted. Irrigation techniques may also be utilized. These take advantage of the elliptical shape of the external ear canal. It is recommended that warm water or saline be aimed at the objects periphery via a 20 mL syringe with a 14–16 gauge catheter. Irrigation should not be utilized if there is any evidence or suspicion of tyrannic membrane rupture [14].

Conclusion

Subsequent follow-up with the patient 24 h later revealed complete resolution of symptoms. Given the limitations of the environment, direct examination of the patient was not possible. However, post procedural examination was reassuring, revealing a tympanic membrane without rupture and an auricular canal without any foreign body, debris, or inflammatory change. 24 h follow-up phone conversation with the mother revealed patient had complete resolution of complaints. Retrospectively, this case emphasized that consideration should be taken for outfitting medical missions with alligator forceps and large bore catheter for possible Otic foreign body and parasitosis when in resource-limited environments.

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