The Many Faces of Intra-Aural Tick Clinical Presentation

Norhafiza Mat Lazim[1], Irfan Mohamad[1], Mohammed Khairi Mohammed Daud[1], Rosdan Salim[1]

[1]*Department of ORL-HNS, School of Medical Sciences, University Sains Malaysia, Penang, Malaysia*

ABSTRACT

Presence of ticks or mites in the external auditory canal is known as otoacariasis. It is a well-recognized phenomenon. Both adult and pediatric patients can present with otoacariasis and most of them will come with a complaint of otalgia. Other than otalgia, there are numerous other complications that can result from otoacariasis ranging from bleeding to nerve paralysis and even fatalities. We present three cases of otoacariasis with multiple clinical presentations.

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Correspondence to: Dr. Norhafiza Mat Lazim

Address: Department of ORL-HNS, School of Medical Sciences, University of Sains Malaysia, Penang, Malaysia

E-mail: norhafiza@kck.usm.my

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INTRODUCTION

Otoacariasis is the presence of a live animal in human ear. It is a common phenomenon especially involving insects and arthropods such as tick. The clinical presentation varies, although the commonest being an intolerable otalgia. A neglected otoacariasis can result in complications such as ear infection, cranial nerve involvement and even death. We report three cases of intra-aural tick with different clinical presentations.

CASE NUMBER 1

A 25-year-old Malay woman presented to the emergency department with complaint of left ear pain for three days. Pain was associated with left facial weakness. The facial weakness slowly developed over her left face during the two days after the onset of ear pain. There was no history of ear discharge or ear bleed. Hearing was normal. There was history of contact with domestic animals around the house prior to clinical presentation.

Clinical examination revealed a thin female with obvious facial asymmetry. The patient exhibited loss of wrinkles over left forehead, drooping of left corner of mouth and inability to completely close her left eye. This facial nerve palsy was graded as House-Brackmann Grade 3 (Figure 1). Otoscopic examination revealed an engorged tick in the mildly inflamed left ear canal (Figure 2). Tick feces were noted in the ear canal. The visualized tympanic membrane was intact. The right ear appeared normal and no foreign body was seen in the ear canal.

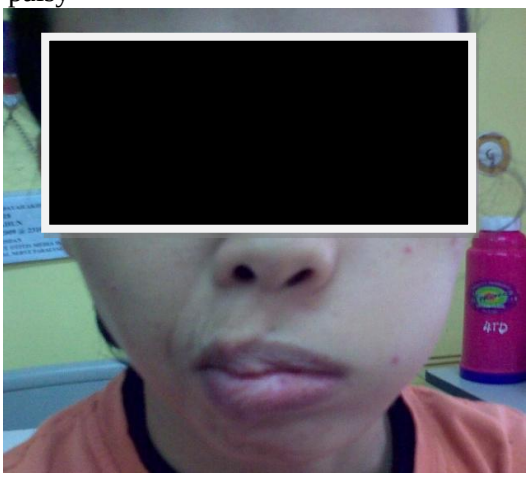
Tick was carefully removed with crocodile forceps under endoscopic guidance after instilling 10% cocaine eardrops. The debris of fecal material was cleared with gentle suction. Patient was prescribed olfloxacin 0.3% eardrops with oral prednisolone 40 mg once daily. Oral steroids were continued for two weeks to reduce nerve inflammation and were subsequently tapered off. On follow up at otorhinolaryngology clinic, patient showed significant improvement after four weeks. Facial paralysis and otalgia had resolved without complications.

CASE NUMBER 2

A 3-year-old girl presented to the emergency unit with a three-day history of left ear pain in association with easy irritability and reduced oral intake. Her parent gave history of travelling to rural areas where patient had contact with domestic animals. There was no other significant history.

Patient was brought to the otorhinolaryngology clinic and had otalgia on clinical examination. Facial nerve was intact. On left ear endoscopic examination, there was an engorged tick at the posterior wall of external auditory canal (Figure 3). Topical 10% cocaine ointment was applied into the left ear canal for five to ten minutes. Gentle suction was done to clean the fecal material together with residual ointment. Removal of the tick was performed under microscope guidance using a Tilley forceps. Post removal otoscopy showed intact tympanic membrane with minimally inflamed external auditory canal.

Figure 1: Patient had left-sided facial nerve palsy



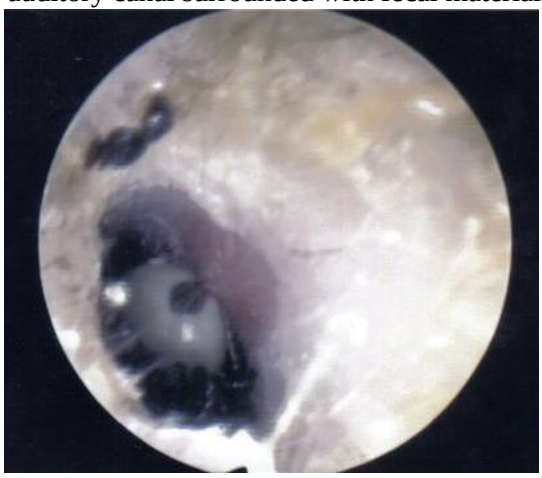
CASE NUMBER 3

A 15-year-old Malay girl who was under regular follow-up for chronic suppurative otitis media presented to the otorhinolaryngology clinic with one-week history of active ear discharge associated with mild otalgia. Routine endoscopic examination showed a tick in the external ear canal near the tympanic membrane. The tick was partly covered by ear discharge. Removal was attempted using a forceps under endoscopic guidance, but the procedure was abandoned as the patient could not tolerate the pain.

Subsequently, the patient underwent tick removal under general anesthesia. Intraoperatively, the tick was seen at the posterior part of the ear canal and was removed using a Tilley forceps. Postoperatively, the patient recuperated well without any complications. Patient was prescribed topical pocin eardrop (hydrocortisone 10 mg, polymyxin B sulphate 10,000 international units and neomycin sulphate 3,400 international units) on discharge for one week to reduce canal inflammation. During follow-up at the clinic, patient was well with no complication.

Figure 2: An engorged tick with surrounding inflammation of the canal

Figure 3: An engorged tick in left external auditory canal surrounded with fecal material



DISCUSSION

Foreign body in the ear is a common presentation to otorhinolaryngology clinics. This foreign body can either be an inanimate object or a live animal. Otoacariasis is the presence of ticks or mites in the ear canal and is a well-recognized phenomenon. Many cases of otoacariasis involving ticks have been reported all over the world particularly India, Sri Lanka, Nepal, South Africa, Chile and Malaysia [1, 2]. These live animals are easily transmitted from domestic animals or pets to humans mainly through direct contact.

Presence of tick in the external auditory canal can result in several complications. These complications range from mild otalgia to generalized paralysis and even death [3]. Among these complications, otalgia is the most common complication which accounts for 90% of cases followed by bleeding (10%), giddiness (5%), tinnitus (5%) and facial paresis (5%) [1]. The time taken from infestation to presentation can vary from two days to several weeks. Immediate presentation, as seen in other aural foreign bodies like cockroach and other insects, are not observed in tick infestation [1].

Ticks also have been associated with other infectious diseases. It is a well-known vector for diseases such as those caused by protozoa (babebiosis), rickettsiae (Queensland tick typhus, Rocky Mountain spotted fever), spirochaetes (Lyme disease, relapsing fever) and viruses

Figure 4: Anatomical structure of tick mouth part showing two lateral palp or cericeral digits and a centrally located hypostome (Steen NA et al.Toxicon. 2006; 47:1-20)

(Russian spring summer encephalitis, Colorado tick fever and Crimean-Congo hemorrhagic fever) [2]. Lyme disease as a cause of facial nerve palsy is infrequent and is commonly associated with constitutional symptoms [4].

Most patients who present with intra-aural tick come with a complaint of otalgia. Otalgia is likely to be caused by enzymes secreted by the ticks during their attachment to the external auditory canal. Once ticks find a site for feeding in the ear canal, they attach themselves to the skin or epidermal layers by means of their mouthparts. There are two lateral palps or cheliceral digits which are used for cutting, ripping and tearing the host skin and a centrally located hypostome which also has the cutting edge that can be inserted into the skin which enables them to remain attached to the skin (Figure 4) [2].

During feeding, ticks secrete saliva together with enzymes and anticoagulants from their salivary glands into the skin [2]. These enzymes are capable of causing inflammation and pain [1]. The true properties of these enzymes, however, have not yet been extensively studied but it might explain the resultant otalgia experienced by patients infested with ticks.

There are two main families of ticks that are of medical importance to humans namely Ixodidae (hard tick) and Argasidae (soft tick) [2]. Of these families, ticks which belong to family Ixodidae have been widely implicated in causing nerve paralysis [2]. In Malaysia, tick species that has been implicated in causing isolated nerve palsy also belong to family Ixodidae [6]. These ticks are capable of producing toxins from their salivary gland during the feeding cycle, which accounts for nerve paralysis. Mostly, female ticks have been implicated in secreting these neurotoxins [3]. These neurotoxins have been shown to interfere with the depolarization and acetylcholine release mechanism in the presynaptic nerve terminal and cause total blockade of transmission at neuromuscular junctions with resultant nerve palsy [6]. In case of *Ixodes holocyclus*, which are the most potent of paralyzing ticks especially in the region of Australia, the passage of neurotoxins commences on about the third day of attachment and peaks on the fifth and sixth days. The onset of clinical signs usually occurs five to seven days after attachment [4].

Cases of isolated local paralysis especially facial nerve palsy have been exclusively reported in Kelantan and Pahang of Malaysia [7]. In Australia, most of the cases presented with generalized paralysis due to massive tick infestations [4]. An isolated case of nerve palsy is, however, rarely reported. Cases of isolated facial nerve palsy have been documented to last three days to three weeks [4].

Localized facial nerve palsy in intra-aural tick infestation can be explained by several theories. It is likely that the presence of perforation in tympanic membrane allow toxins to enter middle ear in which the facial nerve lies in close proximity in the posterior wall of middle ear [8]. This allows the toxin to cause inflammation and edema of the nerve with resultant nerve paralysis. The second theory is that of a direct extension of the inflammatory process to the facial canal through the middle ear which results in edema of the inflamed nerve in facial canal [4].

The other explanation is the presence of canal dehiscence especially in the tympanic segment of facial nerve which will provide direct access to facial nerve. According to Nager and Proctor, congenital bony dehiscence in facial canal is observed in 55% of the temporal bones [9]. These may be accompanied by malformation of the vessels, such as persistent stapedial artery and persistent lateral capital vein. Toxin easily spread to the exposed facial nerve at this dehiscent area causing facial nerve palsy.

Tick paralysis can initially present with vague complaints of irritability, pain, fatigue, paresthesia or ataxic gait up to 1 day prior to the onset of paralysis. If the tick is not discovered and removed immediately, symmetrical flaccid

paralysis may ascend to upper limb within 12-24 hours [10]. This subset of patients may also develop dysarthria, dysphagia, lingual, bulbar and ocular palsy as a complication of tick infestation. Abducens nerve palsy has been described after two days of tick infestation [10]. Studies showed that the nerve of patient infected with tick possess a reduced compound action potential but with normal sensory studies [2]. The reduced compound action potential is responsible for slowing motor conduction. Fortunately, after removal of tick, the nerve conduction returns [2].

In contrast to snake bite or spider bite which produces rapid life threatening changes, tick paralysis evolves gradually but can be equally fatal [2]. Tick toxins may also produce cardiovascular effects, such as arrhythmias, with evidence of echocardiographic changes [11]. In cases of tick toxemia, general paralysis with respiratory muscle involvement can result in death due to respiratory embarrassment. Death has been documented in adults as well as in children due to tick envenomation in Australia [4]. These fatalities mainly attribute to a species known as *Ixodes holocyclus*, which produce holocyclotoxin [4]. This toxin has been shown to resemble botulinum toxin which act presynaptically at the neuromuscular junction [2]. Both tick toxin and botulinum toxin produce low amplitude compound motor action potentials with normal nerve conduction studies [2].

Attached tick needs to be removed carefully and there is much controversy about the best method to remove the tick. It is also not very clear whether the tick should be killed before removal. This is particularly true in children who are easily distressed and irritated which sometimes necessitate removal of tick under general anesthesia [7]. There are multiple ear ointment preparations that have been used to kill the tick before its removal. These include lignocaine, cocaine, and tetracaine [7].

The best method to remove tick is by using a blunt, medium tip, angled forceps followed by an application of antiseptic solutions [12]. To remove the tick properly, it should be grasped with curved forceps or tweezers as close to the skin surface as possible and by applying slow and steady traction until tick is released together with its mouthparts. The remaining mouthpart, if not completely removed, may continue to produce toxins [13]. It has been observed that paralysis and allergic reaction may progress after tick removal presumably due to release of more toxins if the body is squeezed or twisted during removal [14].

There are few acacirides which can be used for treatment of tick infestation and this mainly consists of organophosphates [5]. These acacirides have been used extensively in cases of animal-tick infestation but with several shortcomings. Antitoxins and vaccines to combat this potentially deadly disease are presently at research stages [5].

CONCLUSION

Although tick is a small organism, it can produce multiple complications ranging from mild otalgia to life threatening paralysis. Therefore, detailed physical examination should be carried out in patients with isolated cranial nerve paralysis or peripheral weakness to look for hidden ticks. Most ticks can be successfully removed under vigilant microscopic or endoscopic aural examination.

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