

CASE REPORT

Isolated facial palsy due to intra-aural tick (ixodoidea) infestation

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Abstract A tick in the ear is a very painful condition and removal is difficult because it grips firmly to the external auditory canal or tympanic membrane. Facial paralysis is a rarely reported localised neurological complication of an intra-aural tick infestation. The pathophysiology of localised paralysis is discussed, together with the safe way of handling patients with an intra-aural tick infestation.

Introduction

Intra-aural tick infestation is a common occurrence seen in the Ear, Nose and Throat clinic in the East Coast of Peninsular Malaysia (Indhudharan *et al.*, 1986; Srinovianti and Raja Ahmad, 2004). These cases were usually encountered in the dry months of February until May but can occur at any time of the year. It is diagnosed by performing an otoscopic canal examination or ear endoscopy which will show the presence of tick or its blackish fecal particle.

Tick paralysis is a known complication of tick infestation anywhere in the body and has been reported particularly in Northern America and Australia, but was rarely encountered in this region. People from tropic climate such as ours are more frequently exposed to tick bite and may have developed some immunity to its toxin. However, cases of isolated local paralysis; usually involving facial nerve, are commoner in this part of the world although less commonly reported in the literature. Srinovianti and Raja Ahmad (2004) in their one-year review reported that out of 91 patients with intra-aural tick seen in their hospital, two had developed unilateral facial nerve palsy as a complication. We presented 3 cases of isolated facial palsy due to intra-aural tick infestation, which we encountered in the month of February and March 2005 in a tertiary referral hospital in the East Coast of Malaysia.

Case 1

A five-year old girl was seen in our Otolaryngology Clinic with three days history of

left otalgia, associated with left sided facial asymmetry that occurred suddenly over the night. Otoscopic examination on the left side revealed an engorged looking tick attached to the posterior canal wall near the tympanic membrane, together with its fecal material all over the canal floor. There was left sided lower motor neuron facial nerve palsy, grade IV House and Brackmann's (1985) classification (Figure 1 and Figure 2). The child was cooperative and the tick was carefully removed manually under microscopic view by gentle traction with a crocodile forceps, after flooding the canal with 10% cocaine for ten minutes. The tympanic membrane was intact following the removal. The patient was then admitted and given a short course of intravenous steroids. She recovered well and was discharged 2 days later and the facial weakness completely resolved upon follow-up visit a week later.



Figure 1 Left facial asymmetry (both eyes opened)

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Figure 2 Left facial asymmetry (both eyes closed)

Case 2

A thirteen-month old girl was admitted to a paediatric ward in February 2005, suspected to have meningitis. She presented with four days history of high-grade fever and rigors, poor oral intake and irritable behaviour. Overnight in the ward she developed a right-sided facial asymmetry, which was disfiguring especially when she cried. She was unable to close the right eye fully, with persistent drooling of saliva from the weakened right angle of mouth. She was subsequently referred to us. Upon examination she was easily irritable with spiking temperature. There was a right lower motor neuron facial nerve palsy grade IV House and Brackmann's classification noted. The toddler refused to be touched at the right ear region and screamed in agony when the right pinna was held. Upon otoscopic examination, the right ear canal was inflamed, swollen and clogged with blackish materials, resembling tick fecal particle. She was then brought to the operation theatre where the ear was examined under anaesthesia with a microscope. A tick was found near the tympanic membrane feeding on the canal wall. It was removed gently under general anaesthesia with a small crocodile forceps together with its fecal particle. There was a small perforation noted on the tympanic membrane following removal of the tick. She was then treated for otitis externa with local antibiotic and painkiller. She showed tremendous improvement afterwards when the fever resolved after 24 hours and the facial weakness regressed a week later.

Case 3

In March 2005, we had a referral from a general medical ward in our hospital to see a 78 year-old lady who was a known diabetic for many years. She was admitted with generalized lethargy and weakness with uncontrolled blood sugar level. She was also complaining of tightness on the right side of the face for the past three days. According to the doctor, otoscopic examination showed only impacted wax in both the ear canal. Upon assessment, the elderly lady has a slight right-sided facial weakness of lower motor neuron

lesion grade II House and Brackmann's classification. Otoscopic examination confirmed the findings of bilateral wax impaction but upon pinna manipulation and insertion of the otoscope in the right ear, the lady complaint of tingling pain from inside. The wax appearance was unusually shiny. Subsequently, her ears were examined under a microscope where suction and removal of the wax were performed. Beneath a thin layer of wax in the right ear canal, we found a tick attached to the tympanic membrane. It was already disengaged from the tympanic membrane and we could easily remove it entirely with suction. There was a pinhole perforation noted on the tympanic membrane. The lady's facial tightness gradually resolved and she was discharged from the medical ward four days later. Unfortunately, she defaulted on subsequent clinic follow-up.

Discussion

Ticks are obligate blood-sucking arachnids (Spach *et al.*, 1993). They are easily transmitted through domestic animals and pets to humans. The two major orders of ticks, based on the presence or absence of a hard shield (scutum), are Ixodidae (hard ticks) and Argasidae (soft ticks) (Vedanarayanan *et al.*, 2004). Dermacentor and Ixodes species are the subgroup of hard ticks that seems to be the most potent of all the world's paralyzing ticks (Miller, 2002). In North America, tick paralysis in human is usually caused by Dermacentor species while in Australia; Ixodes holocyclus is responsible for most cases (Malik and Farrow, 1991). In Malaysia both species have been encountered to cause localized facial nerve palsy (Indhudaran *et al.*, 1986; Srinovianti and Raja Ahmad, 2004).

The paralyzing effect of tick is attributed to a toxin secreted in their salivary gland. This toxin is found to interfere with the liberation or synthesis of acetylcholine at the motor end plate of muscle fibre (Vedanarayanan *et al.*, 2004). The severity of paralysis is independent of the number of tick infested (Spach *et al.*, 1993). Sood *et al.* (1997) reported a correlation between the duration of tick attachment and the likelihood of transmission of toxin/infection.

Several theories may explain the pathophysiology of localized facial nerve palsy in an intra-aural tick infestation. It is likely that a presence of perforation in the tympanic membrane enabled the tick saliva (with toxin) to enter the middle ear and reach the facial nerve probably through a natural dehiscence of the fallopian canal causing paralysis (Indudharan *et al.*, 1999). In cases that the tympanic membrane is intact, direct extension of the inflammatory process to the fallopian canal is via persistent dehiscence or direct invasion of the infectious organisms into the facial canal through the middle ear which results in edema of the inflamed nerve within the canal (Miller, 2002). Bayazit *et al.* (2002) found facial nerve dehiscence in 18 out of their 202 patients (8.9 per cent). In addition,

Nager and Proctor (1982) reported a higher incidence of 55% cases of canal dehiscence in the tympanic segment of facial nerve.

Tick attaches to its host with its mouthpart, which not only is imbedded in the skin but is also glued into place with a cement-like secretion. The tick can voluntarily detach from its host, but when forced off, it may leave the attached mouthpart imbedded in the skin. As long as the mouthpart is attached to the patient, the patient remains at risk for tick-borne illnesses (Needham, 1985).

Removal of an intra-aural tick is a traumatizing experience to patients, especially children. Most of the times, the removal is made difficult by the swollen and narrowed canal from previous multiple attempts by inexperienced medical personnel with inadequate instruments. It is always a wise decision to refer patients with insect or foreign body in the ear to the centre with the expertise and adequate instruments for ear examinations.

Two approaches to tick removal have been described: (1) application of a noxious stimulus to induce the tick to withdraw spontaneously and (2) mechanical removal. For the first approach, many reagents have been used with different results depending on the place of practice and the availability of the reagents. Fegan and Glennon (1996) from their experience in Nepal used spirit eardrops for 3 days before syringing the tick out on day 4. Indudharan *et al.* (1986) used 4% lignocaine instead, but only instilling the canal for 10 minutes. Olive oil, sodium bicarbonate, petroleum jelly and liquid paraffin are among various preparations used to facilitate tick removal with none of them proven to be superior to another. We instilled 10% cocaine in our patient's ear canal for 10 minutes and found that we can remove the tick easier by doing ear suction or using forceps under microscopy. The tick is most of the time anaesthetized and disengaged from the tympanic membrane or canal wall after cocaine instillation for that duration. We also found the use of cocaine helps to decongest the swollen canal and reducing the pain, thus calming the patient down. However, in uncooperative children, removal under general anaesthesia is safer and less traumatic to the patients.

The most commonly recommended and successful tick removal method is manual extraction of the tick (Gammons and Salam, 2002). One author evaluated five popular methods of removing ticks and concluded that the tick would best be removed by grasping it close to the skin and exerting a steady, even pressure (Needham, 1985). Another author proposed a technique of mechanical removal involving rotation instead of traction, which he claimed more reliable for rapid and painless removal of the entire tick, including the head, not leaving the mouthpart behind (Schultheis, 1998). After the removal of tick, its fecal particle should also be cleared off the ear canal since tick faeces and body fluids can also be contaminated.

In all of our 3 cases, removal of the tick resulted in rapid reversal of the facial paralysis within a week. Most authors who reported cases of facial paralysis resulting from tick bite have noted complete recovery after removal of the tick within three days to three weeks. However, Clark *et al.*, (1985) and Bingham *et al.*, (1995) found that patients with bilateral involvement were more likely to have residual facial nerve dysfunction.

In conclusion, intra-aural tick infestation is a painful and distressing experience and needs to be handled quickly and delicately with proper instrumentation and expertise to prevent complication. Facial nerve paralysis is a known complication resulting from local spread of toxin to the nerve. It usually resolves quickly after the tick is removed.

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