Research Paper

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Sensory Neural Hearing Loss Following Snake Bite - A Case Report

Medical Science

KEYWORDS : Hearing loss, audiological evaluation, differential diagnosis

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ABSTRACT

People in rural India are a vulnerable group for snake bites. Only few case studies on hearing loss following snake bite are reported in the literature. We are reporting the case of a 29 year old male, with hearing loss following Krait snake bite in right glunttal region. He was diagnosed as snake bite with delayed presentation of symptoms at toxicology department. The audiological evaluation was carried out to identify degree, type of hearing loss and site of lesion.Puretone audiometry showed bilateral moderate sensory neural hearing loss. Thediagnosis was confirmed with Immitance,. Transient evoked otoacoustic emissions, Click evoked auditory brainstem response testing. From these results, it is evident that the snake bite victim has cochlear hearing loss. This could be due to the venom carried away from the wound by the lymphatics and then is circulated by the bloodstream throughout the body

Introduction

Snake bite is an injury caused by bite from a snake, often resulting in puncture or wounds inflicted by the animal's fangs and sometimes resulting in envenomation. Kraits are an entirely Asiatic group which are shy and retiring during day but deadly at night. Their range is Pakistan,India, Sri Lanka and Nepal.They are about 1.2-1.7 metre long. Usually snake bite presents with symptoms of drowsiness, abdominal pain, neurologic or neuromuscular manifestations such as ptosis, glossopharyngeal palsy (dysphagia),blurring vision, ataxia, and headache. Hearing loss is a rare symptom followed by snake bite. Only few case studies on hearing loss following snake bite are reported in the literature [5]. The venom of Bungaruscaeruleus (krait) contains a mixture of alpha,beta-bungarotoxin and caerulotoxin [2]. Alpha-bungarotoxins cause failure of neuromuscular transmission by binding to post synaptic nAchR at neuromuscular junction, Beta-bungarotoxins contains 20% protein content of the venom and are most toxic components of the venom. They are pre-synaptically active neurotoxic phospholipases [2].Exposure to these toxins in vivo and in vitro causes the failure of neuromuscular transmission for two to three hours and depletion of synaptic vesicles from the nerve terminal boutons.Caerulotoxin is a minor component of the venom are found exclusively in kraits and are structurally similar to alpha-bungarutoxins. Alpha bungarutoxin and caerulotoxin acts on post synaptic membrane [2].

Case report

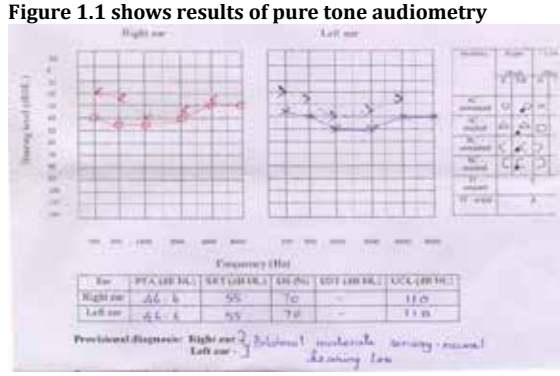
A 29 year old male came with the history of snake bite in right glunttal region at the early hours of morning at his home. The victim identified the snake to be krait.He reported to have developed blurring of vision and giddiness soon after the snake bite. He had a delayed neurological deficit such as pain in the left side of the face, right side of the shoulder and lower back ache and came to the department of toxicology. He was referred to the department of audiology following his complaint of reduced hearing sensitivity and ear fullness. Otoscopic examination revealed absence of ear wax or any other pathology in the ear canal. Tympanic membrane was intact in both ears.

Method

Hearing assessment was carried out using audiological test battery. Routine pure tone audiometry was done to check the air conduction and bone conduction thresholds of the patient. Speech audiometry to find the speech recognition threshold has been carried out. Pure tone audiometry and speech audiometry was done using MAICO MA- 52 instrument. Immittance audiometry to rule out any middle ear pathology has been done using GSI auto tymp .Otoacoustic emissions test has been administered to check the function of outer hair cells. Auditory brainstem responses (ABR) were done to rule out the presence of retrocochlear pathology. Otoacoustic emissions test and auditory brainstem response test was done using Intelligent Hearing System .

Results

Figure 1.1 shows results of pure tone audiometry

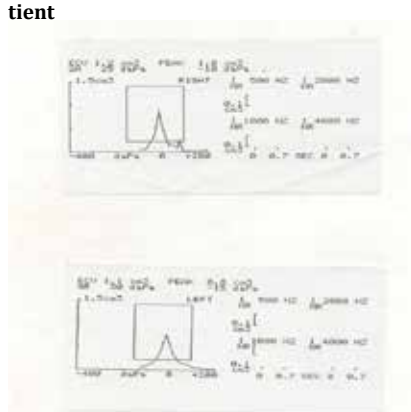


Pure tone audiometry shows bilateral moderate sensorineural hearing loss with fair reliability.

Pure tone average :

Right ear:45dBHL
Left ear:46.6dBHL
Speech audiometry results:
Speech recognition thresholds
Right ear:55dBHL
Left ear:55dBHL

Figure 1.2 shows immittance audiometry results of the patient



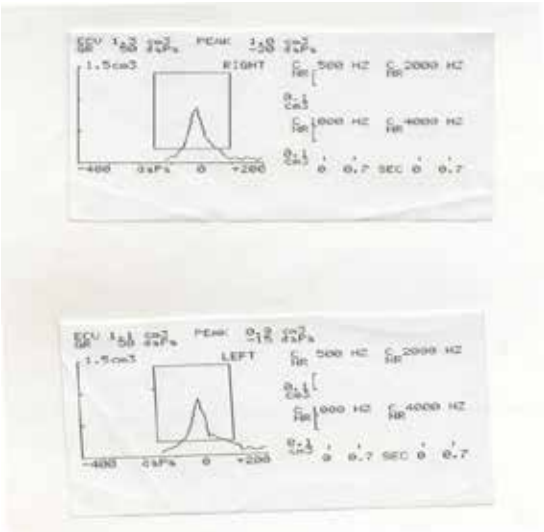
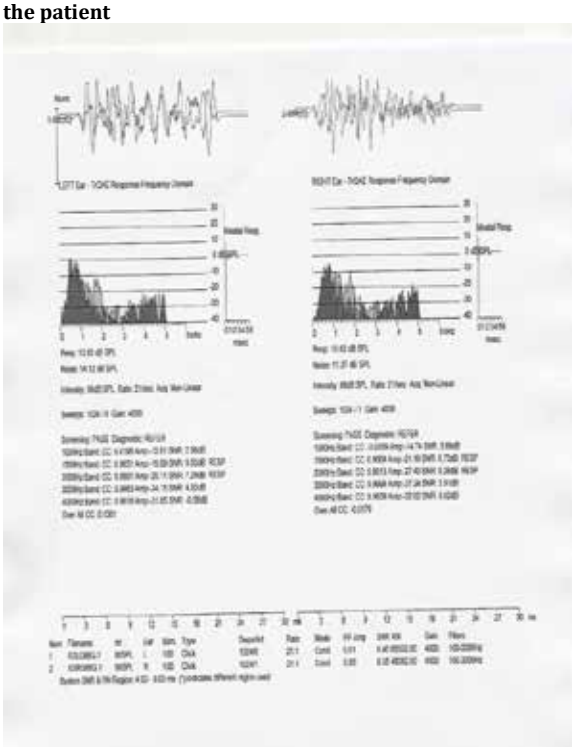


Fig 1.2
Immittance audiometry shows 'A' type tympanogram with absent ipsilateral and contralateral reflexes in both ears suggesting no middle pathology.

Figure 1.3 shows transient evoked otoacoustic emissions of the patient

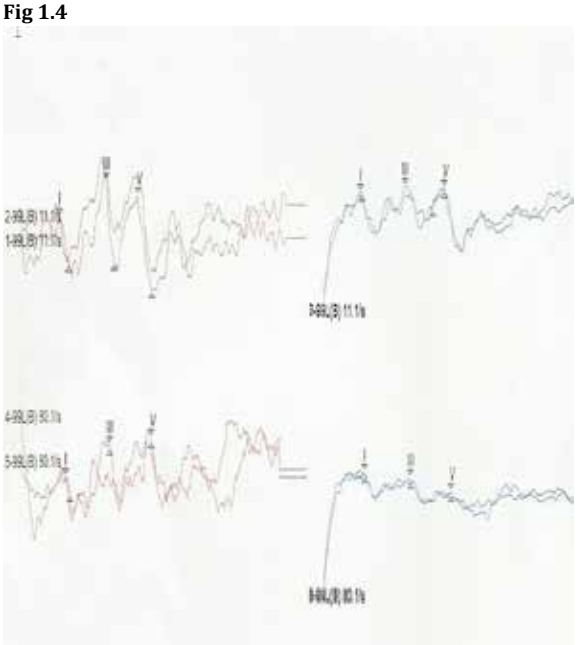


Results of Transient Evoked Otoacoustic Emission rveales absent otoacoustic emissions bilaterally for a click stimuli presented at 85 dBSPL .

Figure 1.4 shows auditory brainstem responses of the patient.
Auditory brainstem responses elicited using click stimuli at the repetition rate of 11.1 and 80.1 per second at 99dBnHL reveals that there is no auditory nerve dysfunction in both ears as the interpeak latencies and the interaural latencies are observed to be within normal limits.

Discussion
There is no documentation of hearing loss in a case with krait snake bite in the literature.We are reporting such a case with a moderate degree of sensorineural hearing

Fig 1.4



loss which is due to cochlear damage. The cochlear damage after snake bite may be attributed to the reason that the venom quickly spreads throughout the body, is carried away from the wound by the lymphatics and then is circulated by the blood stream [1]. The venom which is carried away by the blood stream could have damaged the hair cells of the cochlea which is been proved in the transient evoked otoacoustic emissions test that there has been dysfunction in the cochlear hair cells. The auditory brainstem responses confirmed that there is no auditory nerve dysfunction as the interpeak latencies and the interaural latencies are observed to be within normal limits.

Conclusion
Sudden bilateral deafness following snake bite has been reported by Sabharwal R.K ,Sanchetee P.C, Sethi P.K, Gaudi S.C.(1987). We tried to emphasize that any victim of snake bite or any past history of snake bite must be audiologically evaluated for the presence of hearing loss and the case history must consider snake bite as one of the rare causes of hearing loss.In our case study ,the victim of snake bite krait has confirmed cochlear hearing loss which could be due to the impairment of outer hair cell function. Also there is a possibility of having pre-synaptic or post-synaptic hearing loss which must be ruled out in individuals with snake bite. With this we emphasize on a test battery approach which is essential to differentially diagnose cochlear dysfunction. A test battery consisting pure tone audiometry, immittance audiometry, otoacoustic emissions and auditory brainstem response testing will help in assessment and monitoring such sudden hearing losses.

REFERENCE

1. Russell FE: Snake venom poisoning. Schloium Int 3:256, 1983 2. Bon, C. and Changeux, J.P. (1997). Chemical and pharmacological characterization of toxic polypeptides from the venom of Bungaruscaeruleus. Journal of Biochemistry, 74, 31-42. 3. Roeser RJ, Michael Valente, Dunn HH: Audiology Diagnosis 2:436, 2007 4. Roeser RJ, Michael Valente, Dunn HH: Audiology Diagnosis,2:486, 2007 5. Kularante, S. (1996- 98) Common Krait (Bungarus caeruleus) bite in Anuradhapura, Srilanka: A prospective clinical study, Postgrad Med J, 78 (919), 276-280. 6. Sabharwal, R.K. Sanchetee, P.C. Sethi, P.K. Gaudi, S.C. (1987) Sudden bilateral deafness following snake bite. Journal of Association Of Physicians India, 35, 735-736.