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Case Report

A case report of sudden hearing loss after rabies vaccination

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ABSTRACT

Sudden hearing loss has been seen developing after introduction of rabies vaccine. Rabies is however a viral disease showing encephalitis and death. The treatment is done by active and passive immunization. Neurologic complications occur showing Guillain –Barre syndrome or facial paralysis seen in literature as side effects after dosages of vaccine. Hearing loss occurs which was detected in 11-year-old male patient who took medicines for rabies immunization. This present study reports about sudden hearing loss which develops after immunization, however no aetiological factors were seen and clinical management was discussed by literature.

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1. Introduction

Hearing loss is multi-factorial and vascular pathologies and viral agents are causes. Pathogen invasion, local hypersensitivity or antigen antibody reactions may cause hearing loss and patients have been noticed to be having sensorineural hearing loss sometimes involving vertigo and tinnitus also. Immunization is necessary but side effects causing sudden hearing loss (SHL) develop after mumps, measles, hepatitis B and H1N1 cases also as seen in literature. Such cases are immunized by live virus which develops by triggering of autoimmune reaction.¹

Neural pathological conditions like facial paralysis also develop after rabies vaccination (seen in literature). A male patient of age 11 was referred with complaint of hearing loss in left ear. It was accompanied by rotational vertigo and tinnitus. He had been provided first rabies dose due to bite by infected dog 2 days before. Otoscopic examination was done and bilateral tympanic membrane and middle ear were checked. Weber was lateralized to the left, Rinne was

bilateral positive. Audiometric evaluation indicated hearing thresholds of AC/BC 90/88 dB in the right ear and 28/27 dB in left ear (Figure 1). Hence the patient was hospitalized. He was treated by 0.5 mg/kg/day methylprednisolone.^{2,3} The patient's hemograms and biochemistry values were normal. Serological tests were normal. Inner ear was checked by magnetic resonance imaging with gadolinium and the results were normal. On the 5th day of treatment repeated testing was done. Audiological examination revealed right ear AC/BC 82/65 dB and left ear AC/BC 13/10 dB hearing malfunctioning. Oral steroids were given for 5 days and after 2 months the patient still complaint of hearing loss. Pure tone audiometry thresholds were right ear AC/BC 56/45 dB and left ear AC/BC 23/17 dB. It appeared that last immunization dose caused hearing loss. The patient was then treated by 1 mg/kg methylprednisolone for 10 days. After six months the result was nearly same for right ear AC/BC 55/60 dB and left ear 23/17 dB. This case study proved to be helpful in the clinical routines that we need to be vigilant for hearing loss due to rabies immunization.

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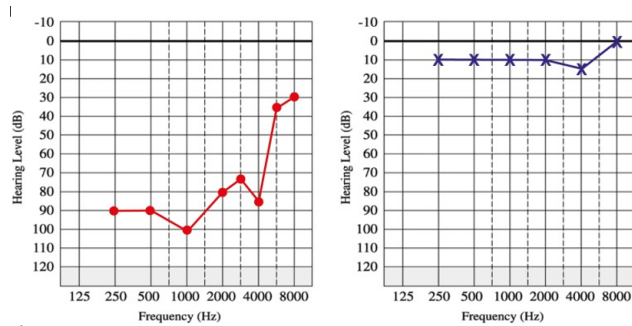


Fig. 1:

2. Materials and Methods

Rabies characterizes encephalitis and death, develops after 20-60 day incubation period. Suspicious contact immunization is by active (Purified Chick Embryo Cell Vaccine-PCECV or Human Diploid Cell Vaccine-HDCV) or passive (Human Rabies Immune Globulin-HRIG). Immune resistance should be gained. Active immunization includes (PCECV, Rabipur®; Novartis vaccines and diagnostics GmbH, Marburg, Germany), our country uses five doses: 0, 3, 7, 14 and 28 days after contact and after the injection 30-74% incidence of pain and 5-40% incidence of headache, nausea, abdominal pain, dizziness are reported. Guillian –Barre syndrome and facial paralysis cases are known from literature. This case however showed sudden hearing loss after rabies immunization. However it could be treatable to little extent.

3. Results and Discussion

There is function loss in sensory hearing organ and treatment is done by steroid, peripheral vasodilators, antiviral agents and hyperbaric oxygen treatment. After immunization by rabies vaccine, however, neutralizing antibodies are formed within 7 days which effect for two years.^{4,5} Corticosteroids, immunosuppressive agents can change the response of antibodies. After immunization the antibody titre of these patients should be examined to check for sufficient levels. On the 10th day of immunization in the present case 0.5 mg/kg/day methylprednisolone was given. There was good response but later hearing loss reoccurred and patient complaint increased. This progress of hearing response occurred to 1 mg/kg/day by methylprednisolone treatment. Also intra-tympanic steroid use was done in place of systemic steroids. This administration did not suppress immune system.^{6,7}

4. Conclusion

MRI scan of the head was done and normal intracranial appearances occurred without any abnormalities at internal auditory meatus or cerebellopontine angles. Blood count, biochemistry and inflammatory markers were also normal,

however viral serology markers for cytomegalovirus, HIV, hepatitis B and C and syphilis serology were negative. EBV (Epstein-barr virus) nuclear antigen IgG and viral capsid IgG were positive showing previous infection. An autoimmune screening was done and with negative antinuclear antibodies, a positive reaction for anticochlear antibodies (anti-HSP-70) occurred.^{8,9} The patient was given 12 day course of oral prednisolone (60 mg) and acyclovir. Repeated pure tone audiograms showed slight improvement in hearing threshold in higher frequencies to 35 and 25 dB at 6 and 8 kHz.

No additional improvements were seen in repeat audiograms and the patient was referred for audiovestibular assessment and tinnitus therapy, which after 6 months show little improvement in terms of severity as loss was profound when patient came initially. Later after treatment thresholds shifted to moderately severe degree in right ear.

5. Summary

Vaccination plays a vital role in prevention and control of diseases and transfer immunity by immune system exposure to antigens and stimulating acquired immunity.^{10,11} Rabies is an acute viral zoonotic disease transmitted from infected animals moving along peripheral nerves to central nervous system causing encephalomyelitis. If untreated 100% mortality occurs. This vaccine is inactivated human diploid cell strain (HDCS) virus sometimes causing post neurological complications like Guillian –Barre syndrome and facial paralysis to demyelinating encephalitis. Localized pain in site of injection, headache, cough, abdominal pain, myalgia, weakness and fever are seen as common side effects. Some cases showed hearing loss, tinnitus and vertigo, and were treated with methylprednisolone, followed by oral prednisolone for 10 days with hearing improvement to 22 dB at 6 months. Immunological memory was created by release of antibodies and cytokines and immunocomplex mediated reactions causing autoimmune response.^{12,13}

Thus rabies immunization may cause sudden onset of hearing loss. Salvage intratympanic steroid injections may be beneficial also.

6. Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

7. Source of Funding

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