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CLINICAL REPORT

COVID-19 Vaccination and Sudden Sensorineural Hearing Loss: A Case Study

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Abstract This article highlights a client with sensorineural hearing loss reported after 2 days of 2nd dose of COVID-19 vaccination. The audiological evaluations suggest unilateral hearing loss which recovered after the treatment. This article focuses on spreading awareness about the complications after vaccination and the importance of treatment.

Keywords COVID-19 · Vaccination · Hearing loss · Retro-cochlear pathology

Introduction

Coronavirus disease (COVID-19) considered to be caused by a novel coronavirus (SARS-CoV-2) is an acute respiratory disease creating a state of pandemic worldwide. Considering the severity of the problem, COVID-19 was declared a pandemic on 30 January 2020 by World Health Organization (WHO). One of the precautionary measures to avoid the spread of COVID-19 infection and also to reduce the severity of symptoms is vaccination. Vaccination helps to strengthen the body's immune system against viruses. In India, the common vaccines available for COVID-19 are Covishield (Oxford-AstraZeneca), Covaxin (Bharat Biotech), and Sputnik V (Gamaleya Research Institute of Epidemiology and Microbiology). Some of the common symptoms seen after vaccination are fever, body pain, headache, muscle, and joint pain. These symptoms are temporary and usually subsides within two days of the shot. The success rate of vaccination is high but in a very small population, complications are reported like stroke, sudden sensorineural hearing loss [1, 2]. Sudden Sensorineural hearing loss (SSNHL) is defined as the sudden loss of hearing sensitivity of more than 30 dB, at least for three adjacent frequencies within 72 h [3]. The frequently seen causes of SSNHL are vascular issues, viral infection, and autoimmune disorders [4, 5]. This article highlights the audiological findings in a rather unique case of unilateral SSNHL post-COVID vaccination and the recovery of symptoms after five months.

Case Report

A 55-year-old male was referred from the Department of ENT to the Department of Audiology with the complaint of fever, blocking sensation, sudden onset of hearing loss in the right ear four and half months back, along with ringing sensation in his right ear. There was no history of earache, trauma, or discharge from both ears. The left ear was reported to be normal. All these symptoms were seen after 2 days of the second dose of COVID-19 vaccination (Covishield) and symptoms were reported to be persistent. The client underwent his first dose of vaccination on 16th April 2021 and the second was on 22nd July 2021. The client underwent a Reverse Transcription Polymerase Chain Reaction (RT-PCR) test to rule out COVID-19 infection as he developed a fever. The RT-PCR test was negative for the virus. The client had hypertension and was under medication for the same. Negative family history of hearing loss was reported by the client.

The first audiological evaluation was done after 4 months and 20 days of the second dose of the vaccination. The otoscopic examination indicated a normal external auditory

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canal and tympanic membrane on both sides. Puretone audiometry showed moderate sloping sensorineural hearing loss in the right ear and minimal sensorineural hearing loss in his left ear. Speech audiometry showed a good correlation with the pure-tone thresholds. Tympanometry indicated normal middle ear functioning on both sides. Auditory brainstem response (ABR) was done at 90 dB nHL with repetition rates of 11.1/s and 90.1/s. The waveform showed the presence of clear cochlear microphonics on both sides with the absence of ABR peaks. Otoacoustic emission (OAE) measurement showed an absence of DPOAEs in the right ear and normal response in the left ear. After the first audiological evaluation, the otolaryngologist prescribed Nervijen Plus tablets to the client for 15 days. Nervijen Plus is a dietary supplement that consists of multivitamins and minerals. It helps reduce nerve pain and nerve damage in neuropathy. It works by improving blood circulation to peripheral body parts (https://www.apollopharmacy.in/otc/nervijen-plus-capsule).

During the second audiological evaluation after 15 days of medication, pure-tone audiometry showed improvement in hearing thresholds from moderate degree of loss to minimal hearing loss in the right ear and the threshold remained the same in the left ear (Fig. 1). Speech audiometry showed a good correlation with the pure-tone thresholds. DPOAEs were within normal limits in both ears. The acoustic reflex test showed the absence of ipsilateral and contralateral reflex on the right side and the presence of ipsilateral and contralateral reflex on the left side.

Discussion

In the present COVID-19 era, we must get vaccinated against COVID-19 infection, to keep ourselves safe and healthy. However, there are few published reports highlighting the negative effects of COVID-19 vaccination on the auditory system. Sudden sensorineural hearing loss, tinnitus, and Bell's palsy may be complications seen in a small population after the COVID-19 vaccination [1, 2].

In the present client, the hearing sensitivity was reported to be reduced two days after the second dose of vaccination suggesting that vaccination could be a probable cause of hearing loss. The hearing thresholds were significantly reduced in both ears (right ear—moderate sloping sensorineural hearing loss, left ear—minimal hearing loss). The tympanometry reports showed normal middle ear functioning in both ears. In the right ear, DPOAEs before treatment were absent suggesting cochlear damage. However, cochlear pathology alone cannot explain the absence of ABR at 90 dB nHL with just a moderate degree of hearing loss. Furthermore, ABR was absent in the left ear also despite OAEs being the normal and minimal degree of loss. The presence of prominent cochlear microphonics in both ears suggests retro-cochlear pathology in both ears. The expected site of the problem can be at the level of the nerve and/or the brainstem.

In the second follow-up after 15 days (post medication), there was an unexpected recovery in hearing sensitivity in the right ear. There was a recovery of DPOAEs in the right ear also. This is surprising since SSNHL rarely recovers after 15 days. The acoustic reflex configuration of reflexes being present only when the left ear was stimulated (Lt ipsilateral and Rt contralateral) is suggestive of a pathology affecting the facial nerve functioning on the right side suggesting that the retro-cochlear component was yet to fully recover.

It is not clear if Nervijen Plus, a multivitamin tablet led to a recovery in hearing in this case. It may have been a spontaneous recovery, but the chances of that happening 5 months post-onset of hearing loss are low. More research is needed in this direction. Finally, this is just one case report. Findings may be unique and caution must be exercised in

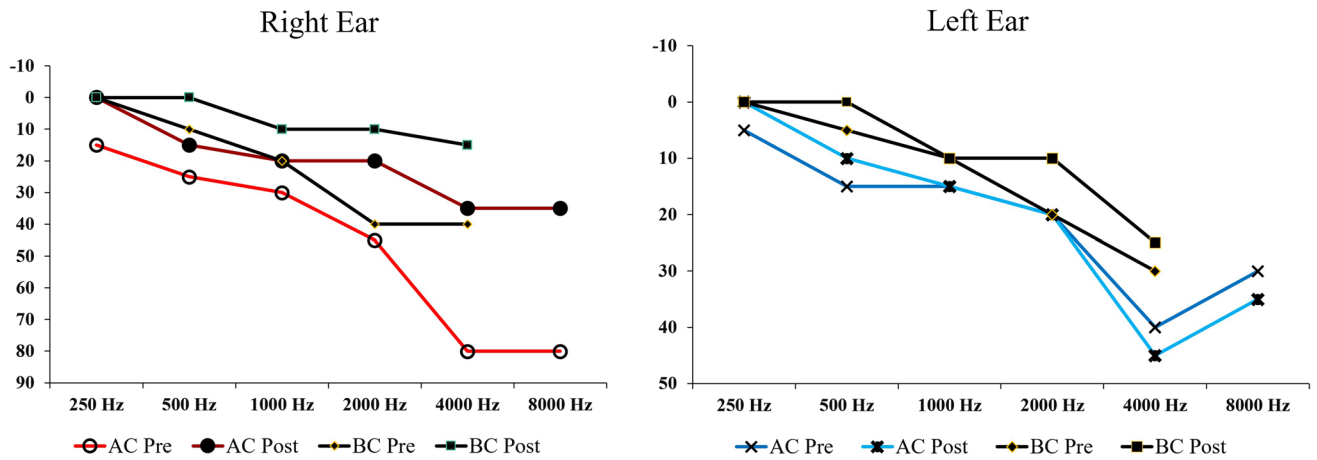

Fig. 1 Air conduction and bone conduction thresholds obtained before and after taking treatment

generalizing them to the population. The key, as always will be to start the treatment as soon as possible.

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Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

Ethical Approval Institutional ethical committee approval was taken before the study.

Consent to Participate Informed consent was obtained from the participant.

Consent to Publish The participant has consented to the submission of the case report to the journal.

Informed Consent Informed consent was obtained from the participant of the study.

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