

CASE REPORT

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SARS-Cov-2 and hearing loss: Two sibling cases

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Abstract

Various neurological involvements have been reported associated with SARS-Cov-2 virus infection. Hearing loss has been reported in very few cases. It has been shown that the pathophysiological causes of hearing loss can be very different. We are open for discussion cases where two siblings, we bring into consideration the issues of genetic mechanisms may contribute to it.

Keywords: SARS-Cov-2, COVID-19, hearing loss

Introduction

Since the first day of the COVID-19 pandemic, SARS-Cov-2 virus infection has been associated with different types of neurological conditions, along with most common affects respiratory system. The most common neurological symptoms are loss of taste and smell, headache, and dizziness during infection. Sensorineural hearing loss has been reported in a limited number of cases. In this article, we reported two brother patients; one of them who experienced unilateral, sudden onset sensorineural hearing loss after receiving influenza vaccine during the recovery period of COVID-19 infection, and the other who experienced bilateral sudden onset sensorineural hearing loss during the recovery period of COVID-19 infection.

Case presentation

Case 1: A 39-year-old male patient applied to the emergency department with the complaint of sudden onset of hearing loss in his left ear. Before his application, he was in quarantine for 14 days, due to a patient with a diagnosis of COVID-19 in his family. During this period, he also had symptoms of COVID-19 in the form of widespread bone pain, headache, dizziness, loss

of taste and smell. The COVID-19 PCR test was negative during his illness. The coronavirus IgM test was negative and the igg test was positive (17.56 ng/ml), one month after the onset of symptoms. When he applied to emergency department, hearing loss was added as well as the loss of smell, there were no other neurological symptoms. He had no history of chronic disease or drug. He had been vaccinated for influenza on the day his hearing loss started, and it was started approximately 10 hours after vaccination. His neurological examination was normal when he applied to hospital. Otoscopic examination performed by an otolaryngologist was normal. Tympanogram and audiometry tests supported the presence of sensorineural hearing loss in his left ear (Table 1, Picture 1). Hemogram, kidney and liver function tests, biochemistry tests, CRP, fibrinogen, D-dimer, LDH were normal. Except bilateral AICA's vascular loop over VII and VIII nerves in the internal acoustic canal, ear imaging with MRI was normal. He was treated with trimetazidine, flantadine, and vitamin B complex. His hearing function had fully recovered, and he had only tinnitus in the left ear at the follow-up examination 1 month later.

Case 2: A 29-year-old male patient applied to the emergency department with the complaint of bilateral complete hearing loss which he noticed when he woke up. He had history of COVID-19 infection about a month ago and COVID-19 PCR test was positive. He had had taste-smell loss, fever, nausea, headache, dizziness, imbalance during the covid-19 infection. He had been treated with favipiravir for 5 days. When he applied with complaint of sudden onset hearing loss to hospital, his neurological examination was normal. Otoscopic examination performed by

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an otolaryngologist was normal. Tympanogram and audiometry tests supported the presence of bilateral sensorineural hearing loss. Hemogram, kidney and liver function tests, biochemistry tests, CRP, fibrinogen, D-dimer, LDH were normal. Ear imaging with MRI was normal. He was treated with trimetazidine, flantadine,

and vitamin B complex for 14 days and he had also received hyperbaric oxygen therapy. Dramatic improvement was noted on the third day of treatment. After three months, the hearing function had completely recovered, and he had only tinnitus in his right ear.

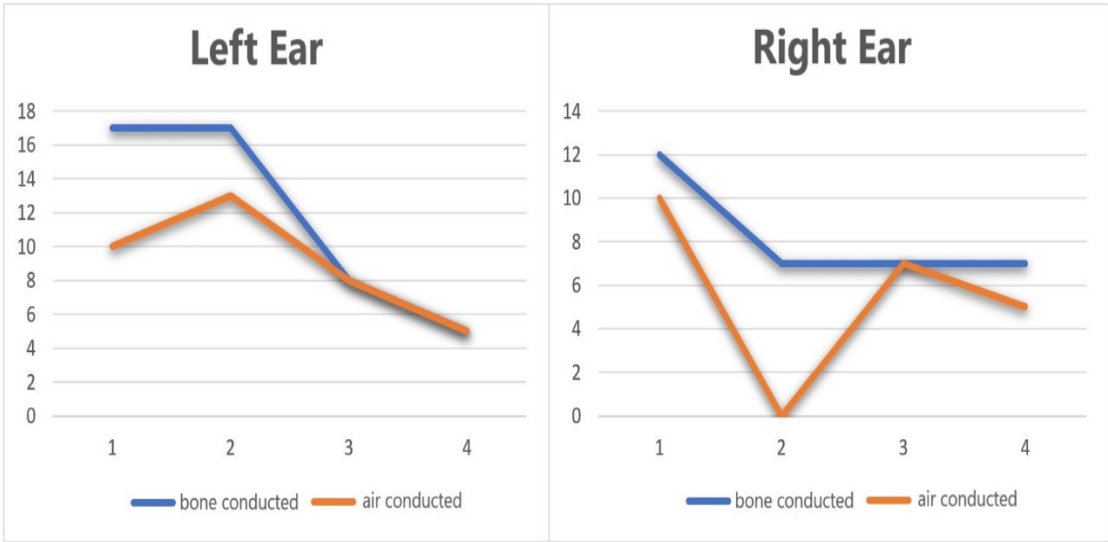


Figure 1. Pure tone average of our first case (500-1,000-2,000 Hz)

Table 1. Pure tone audiometry findings of our first case

Affected side (left)	Right Ear (dB) bone/air						Left Ear (dB) bone/air					
	250	500	1000	2000	4000	8000	250	500	1000	2000	4000	8000
Admission	10	10	10	15	25	35	10	10	20	15	40	35
First week	10	10	10	10	15	30	10	15	10	25	50	45
Second week	10	10	10	10	20	15	10	10	10	10	35	20
Third week	10	10	10	10	20	10	10	10	10	10	30	20

dB: decibel

Discussion

Sudden onset sensorineural hearing loss is mostly seen due to viral infections. Typically, hearing loss due to viral infections is of the sensorineural type. Postinfectious conductive or mixed hearing loss can also seen after some virus infections. Hearing loss is unilateral or bilateral and may heal spontaneously. The second most common cause is vascular circulation disorder. Cardiovascular risk factors, hypercoagulability and inflammatory edema may cause hearing loss through cochlear ischemia during viral infection [1].

It is known that SARS-cov-2 virus affects the cell via the ACE2 receptor. This receptor is expressed in various cell types as well as in respiratory epithelial cells and sustentacular cells in the olfactory epithelium. It is thought that viral infection may affect the auditory nerve similar to the olfactory nerve [2,3].

Cases with reported hearing loss associated with COVID-19 are

generally in the post-infectious recovery period, as in our patients. For this reason, it is, though that autoimmunity cannot be excluded in the pathogenesis. Two of our cases were siblings and had hearing loss during the recovery period, so it showed that genetic predisposition was an important factor. At the same time, this situation supports that their hearing loss may be due to covid-19.

Influenza virus and its vaccine can cause hearing loss. The first case was in the recovery period of the COVID-19 infection at the time of vaccination for influenza. The hearing loss may have been caused by covid-19 or the vaccine. Our opinion on this matter is that both factors may have potentiated each other in terms of this side effect.

Ototoxic side effects are known in drugs such as chloroquine, hydroxychloroquine, azithromycin, lopinavir, ritonavir, interferon, ribavirin, and ivermectin used in the treatment of COVID-19 [4]. However, in the first case, there was no drug use for the treatment of COVID-19. In the second case, favipiravir

was used, but this drug still has no known ototoxic side effects.

It is known that the brain stem is also affected in coronavirus infections. In the pathogenesis, infection is likely to affect the auditory pathways in the central nervous system.

Harenberg et al. hypothesized that sudden hearing loss that developed during COVID-19 infection may cause by microthrombosis and endothelial cell dysfunction in the cochlear structure or cochlear nerve and hearing center in the temporal lobe [3].

Conclusion

Although there are simple neurological symptoms such as headache, taste-smell loss in COVID-19 infection, it has also been associated with a wide range of neurological diseases such as autoimmune encephalitis, transverse myelitis, GBS, ischemic cerebrovascular disease since the first time. More information is needed to understand the pathogenesis.

Conflict of interests

The authors declare that they have no competing interests.

Financial Disclosure

All authors declare no financial support.

Informed Consent

Written consent was obtained from the patient and his parents.

References

1. Chau JK, Lin JRJ, Atashband S, et al. Systematic review of the evidence for the etiology of adult sudden sensorineural hearing loss. *Laryngoscope*. 2010;120:1011–21.
2. Saussez S, Lechien JR, Hopkins C. Anosmia: an evolution of our understanding of its importance in COVID-19 and what questions remain to be answered. *Eur Arch Oto Rhino Laryngol*. 2020; 9:1–5.
3. Harenberg J, Jonas JB, Trecca EMC. A Liaison between Sudden Sensorineural Hearing Loss and SARS-CoV-2 Infection. *Thromb Haemost*. 2020;120:1237–9.
4. Little C, Cosetti MK. Contemporary Review a Narrative Review of Pharmacologic Treatments for COVID-19: Safety Considerations and Ototoxicity. *Laryngoscope*. 2021;131:1626-32.