Systematic Review of Sensorineural Hearing Loss Associated with COVID-19 Infection

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Abstract

A systematic review was performed by searching PubMed and Google scholar without date, geographic location of study, or language restrictions. The current literature describing SSNHL in COVID-19 positive patients with a diagnosis of SSNHL with an aim to describe possible mechanisms.

Methods

Search terms: SENSORINEURAL HEARING LOSS + COVID-19 or SENSORINEURAL HEARING LOSS + SARS-CoV-2 or SENSORINEURAL HEARING LOSS + CORONAVIRUS

Inclusion criteria

- Patient must have a diagnosis of COVID-19 confirmed by polymerase chain reaction (PCR)
- Patient must have a diagnosis of SSNHL
- Articles were peer-reviewed

Exclusion criteria

- Patients without a diagnosis of COVID-19 by PCR
- Patient did not have a specific diagnosis of SSNHL

Introduction

2019 novel coronavirus (COVID-19) In December 2019, a report of a series of patients experiencing pneumonia thought to be from the zoonotic transmission of a novel virus related to a large seafood market in China was made. The World Health Organization declared the 2019 novel coronavirus (COVID-19) a global pandemic on March 11, 2020. Common clinical symptoms of COVID-19 disease include fever, cough, and fatigue, but many patients remained asymptomatic or experienced atypical symptoms. Viral infections have been implicated in the past as etiologic agents for some of these atypical symptoms such as neurological symptoms including hearing loss, anosmia, and facial paralysis. A small number of patients with COVID-19 and symptoms of hearing loss, vertigo, and tinnitus have been described.1 It is imperative that providers be mindful of these rare symptoms to prevent a delay in COVID-19 diagnosis.

Sudden sensorineural hearing loss (SSNHL) SSNHL specifically, is a permanent form of hearing loss resulting from damage to the inner ear or the auditory nerve. SSNHL is defined as loss of 30 dB or more across at least three contiguous frequencies occurring within 72 hours.2

SSNHL: Viral etiology and pharmacologic ototoxicity Mechanisms proposed to explain how viral infection could lead to SSNHL include viral invasion of the cochlear nerve or fluid spaces, reactivation of latent virus within tissues of the inner ear or indirect antibody triggering by the virus. Pharmacologic ototoxicity related to COVID-19 treatment regimens may also be implicated. Chloroquine and hydroxychloroquine are known to be ototoxic.3 They are used in the treatment of malaria and chronic inflammatory diseases. Chloroquine and hydroxychloroquine doses used for patients with COVID-19 are higher than the dosage used for malaria and chronic inflammatory diseases.4

In this systematic review, we identified COVID-19 positive patients with a diagnosis of SSNHL with an aim to describe possible mechanisms.

Results

Figure 1. PRISMA Flow Diagram

Figure 2. Ages of patients who met the inclusion criteria (Female (N=4) and Male (N=3))

Figure 3. COVID-19 Symptoms

Figure 4. Otologic, vestibular or aural symptoms

Conclusion

There is variation in presentation of the novel coronavirus. There are a small number of patients with COVID-19 infection and concurrent SSNHL, but presentation and clinical course varies. The literature suggests multiple possible mechanisms for SSNHL in COVID-19 patients. While all of the patients in our study reported SSNHL, not all of the patients were treated with ototoxic pharmacologic therapies. It is still possible that SSNHL presenting in COVID-19 patients represents the baseline incidence of SSNHL and is not directly caused by the novel coronavirus.

The current literature is insufficient to characterize the pattern of hearing loss or advise about the treatment or outcomes. Future studies require a larger database or population study.

References