Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Comment on "Hearing loss and COVID-19: A note"

Dear Sir,

We read with great interest the article by Sriwijitalai W and Wiwanitkit V "Hearing loss and COVID-19: A note" [1]. The authors reported hearing loss in an elderly female patient with novel coronavirus disease 2019 (COVID-19) infection. The patient recovered from COVID-19 infection; however, the hearing loss did not improve. No healing in central hearing loss is likely. Probably, a neuro-auditory problem developed in the patient. Hearing loss in COVID-19 infection has never been reported in the literature so far. We would like to mention how this very rare complication of COVID-19 can develop.

The entry point of COVID-19 is the airways and enters the cell by penetrating to the angiotensin-converting enzyme 2 (ACE2) in the lungs. As the cytosolic pH decreases, the ACE2 binding of the virus becomes easier [2]. Since the cytosolic pH decreases with age, the virus causes easier and heavier infection in the elderly [2,3]. The virus can attach to the hemoglobin and penetrates to the erythrocyte [4]. The virus can be transported with erythrocytes or vascular endothelium, possibly infecting all tissues with ACE2 in its structure. There are plenty of ACE2 in the brain and medulla oblongata [5]. The hearing center is in the temporal lobe of the brain. It is also ACE2 here. ACE2 overexpression in the brain, except medulla oblongata, has a positive effect such as anti-inflammatory antioxidant and blood pressure regulator [5]. However, if cytosolic pH is low, an increase in ACE2 causes an increase in viral load [2,3]. Thus, COVID-19 infection may progress more severely. The virus causes excess cytokine to be released when it occupies the hearing center or its surroundings. Thus, it can cause permanent hearing damage by increasing oxidative damage. When the virus infects erythrocytes, it deoxygenates the erythrocytes. If there was an excessive activation of the virus in the hearing center in the brain, this may have caused the hearing center to remain hypoxic and damaged. Considering the age of the patient, it has seen that she is prone to thrombosis. The virus is known to increase thrombosis risk. It contains ACE2 in vascular smooth muscles, thus the virus can infect them. COVID-19 can infect veins that feed the hearing center. It can create a new clot in these vessels or move it by displacement a pre-existing clot. This clot can block vessels that feed the hearing center, causing ischemic damage. It is not an expected finding to affect hearing functions in COVID-19 infection. Due to impaired vascular structure and susceptibility to thrombosis in elderly patients, hearing problems may occur by the mechanisms mentioned above.

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Declaration of competing interest

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