Otologic and Audiologic Considerations for COVID-19

Thomas L. Eby, M.D., Alberto A. Arteaga, M.D. and Christopher Spankovich, Au.D., Ph.D., M.P.H.

University of Mississippi Medical Center
Department of Otolaryngology and Communicative Sciences
2500 N. State St.
Jackson, Mississippi 39211

Funding: None

Conflicts of Interest: None

Keywords: COVID-19; hydroxychloroquine, chloroquine, communication, audiology, otology

TLE contributed to the writing and revisions
AAA contributed to the writing and revisions
CS contributed to the writing and revisions and serves as the corresponding author
Abstract

The COVID-19 pandemic has created a number of considerations for Otolaryngology, anosmia and ageusia in particular have gained significant attention. Here we present considerations in regards to treatment with quinine derived drugs and the influence of masks on communication.
A consequence of the COVID-19 pandemic is increased necessity of personal protective equipment (PPE) utilization. The Centers for Disease Controls and Prevention (CDC) has recently recommended wearing cloth face masks in public settings to slow the spread of the virus; they even have a tutorial on making face masks [https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html](https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html). Furthermore, in clinical settings, providers are often using N-95 respirators with additional cloth mask covering and face shields.

A recent study has demonstrated that medical masks such as the N-95 can serve as low-pass filters which attenuate high frequencies important for speech understanding by up to 12 dB leading to distortion in speech perception\(^1\). Masks (cloth or medical) also remove visual cues important for speech understanding. The use of masks can potentially compromise not only patient-provider interaction (provider and/or patient ability to hear), but also everyday communication in the real world, in particular when competing noise is present. The overall impact is even more significant for the Deaf/hearing impairment population that already have compromised high frequency hearing or rely on lip reading for speech understanding\(^2\).

In addition, early reports from China and France of successful treatment of Covid-19 related pneumonia using synthetic derivatives of quinine has led to further study and widespread off-label use; though non-successful outcomes are being reported\(^5\). As of April 20, 2020, over 140 trials have been registered in various national and international databases for synthetic quinine (chloroquine and hydroxychloroquine) treatment of Covid-19. The risk for permanent changes in hearing related to these agents is low\(^6,7\), however, it is reasonable that a segment of patients may experience at least transient episodes of hearing loss, tinnitus, and/or dizziness. Even if synthetic quinine derivatives prove to be ineffective for Covid-19, providers should be aware of these potential side effects and increased risk for communication difficulties.

**Communication Strategies**
Effective communication between individuals and their providers is a critical element of patient-centered care and optimal health care delivery. For patients, communication difficulties created by hearing loss and/or exacerbated by use of a mask can result in difficulty conveying an illness or symptoms, poor or incorrect adherence with therapeutic recommendations, and low satisfaction. Among Medicare beneficiaries, those with communication disability (defined as difficulty hearing, writing, and using a telephone) were observed to be more likely to report dissatisfaction with their medical care. Beyond patient-provider interaction, the use of masks can also interfere with provider communication with colleagues and staff, particularly when hearing loss is present or multiple layer PPE is utilized.

Hearing aids can improve health related quality of life, but only about 1 in 5 individuals that could benefit from hearing aids actually wear one. In addition, patients experiencing transient hearing issues related to possible use of synthetic quinine drugs may not have access to traditional hearing aids. For persons without hearing aids or other hearing devices (e.g. cochlear implant) we recommend use of simple communication strategies (see Table 1) modified in consideration of mask use.

Providers and patients can also consider use of assistive listening devices such as personal sound amplification devices (e.g. Pocketalker). A bodyworn personal sound amplification device can be provided to patients during their visit (while using sanitary headphone cover slips) and sanitized in-between users. Alternatively, if the patient or provider has a smartphone they can download apps that use the microphone from their smart device to transmit to headphones (wired); turning a smartphone/smart device into a personal sound amplification device. One example is the EarMachine app, the app was designed by hearing scientists with funding from the NIDCD-NIH. The EarMachine app allows the user to adjust the loudness and pitch of the sound, but is limited to iOS devices. Android users can consider the Sound Amplifier app. Both apps must be used with wired headphones. In addition, to amplification apps, speech-to-text

This manuscript has been accepted for publication in Otolaryngology-Head and Neck Surgery.
apps can transcribe speech in realtime. For example, the *Otter voice meeting notes* app can provide live captioning and is available for both iOS and android devices.

Communication is a cornerstone to optimal health care. Enhanced use of PPE, in particular face masks, represent challenges for patient interaction and daily communication. Simple communication strategies and assistive listening devices can help to mitigate these challenges.

References


Table 1. Communication Strategies with Masks

<table>
<thead>
<tr>
<th>Attention</th>
<th>Say the person’s name before beginning conversation to get their attention</th>
</tr>
</thead>
</table>

This manuscript has been accepted for publication in Otolaryngology-Head and Neck Surgery.
<table>
<thead>
<tr>
<th>Face the Speaker</th>
<th>Though you may not get visual clues from the patient’s mouth, facing them will improve the signal to noise ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Clear Speech</td>
<td>Talk slightly slower, louder, articulate speech sounds, and take pauses; <strong>This is not exaggerated speech or shouting</strong></td>
</tr>
<tr>
<td>Reduce Noise</td>
<td>Reduce competing noise, move to a quieter space or turn off unnecessary noise sources</td>
</tr>
<tr>
<td>Use Repair Strategies</td>
<td>If you do not understand, ask for clarification by repeating the information heard and ask for repetition or rephrasing of the communication</td>
</tr>
<tr>
<td>Use technology</td>
<td>Use amplifying devices if available (e.g. hearing aids). Consider smartphone based apps (e.g. EarMachine app)</td>
</tr>
<tr>
<td>Have Patience</td>
<td>Try not to get frustrated or blame the other person</td>
</tr>
</tbody>
</table>

*This manuscript has been accepted for publication in Otolaryngology-Head and Neck Surgery.*