

Article

COVID-19: POTENTIAL RELATIONSHIP OF ANOSMIA AND AGEUSIA IN SWALLOWING REHABILITATION

Covid-19: Posible relación de anosmia y ageusia en la rehabilitación de la deglución

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ABSTRACT

Anosmia and ageusia are prevalent symptoms in COVID-19 patients and can last for weeks. Sensory and olfactory functions perform an important role in swallowing.

This article proposes the possible negative effect of the symptoms of anosmia and ageusia in the swallowing rehabilitation of dysphagia oropharyngeal and post-intubation in patients with COVID-19. It is important to consider that swallowing is a multisensory and pathological process, where taste and smell play a key role. In accordance with these factors, we propose future research incorporating objective evaluation methods of the affected senses in COVID-19 patients.

Keywords: SARS-CoV-2, COVID-19, anosmia, ageusia, deglutition disorders, airway extubation.

1. Introduction

During the ongoing COVID-19 pandemic, caused by the SARS-CoV-2 virus, approximately 82% of COVID-19 patients have reported ageusia (complete loss of taste), while 75% have experienced anosmia (complete loss of smell), with 19% exhibiting both symptoms simultaneously (Passarelli et al., 2020). The underlying pathophysiology of anosmia and ageusia in COVID-19 remains uncertain. Some proposals suggest that these sensory deficits arise from the viral entry into the neural pathways leading to the functional brain bulbs or nuclei responsible for these senses. This could explain why these symptoms often manifest early after SARS-CoV-2 infection. Recent research conducted on mice revealed that the supportive cells involved in transferring odorous messages to olfactory neurons expressed the angiotensin-converting enzyme 2 (ACE2), which also serves as the cell entry receptor for SARS-CoV-2 (Khan et al., 2020). Furthermore, in COVID-19 patients, the inflammation induced by the virus may impact the integrity of the olfactory epithelium (Nasir & Iftikhar, 2020). Additionally, studies have identified the presence of SARS-CoV-2 receptors, such as transmembrane protease serine-2 (TMPRSS2) and the aforementioned ACE2 enzyme, in the head and neck epithelia. This viral entry leads to an inflammatory response in the aerodigestive tract, affecting functions such as swallowing, smell, taste, and respiration, among others (Lechien et al., 2021). The inflammation in critical areas of the upper airway increases the susceptibility of COVID-19 patients to severe respiratory infections and dysphagia (Vergara et al., 2021).

Another hypothesis proposes that the loss of olfactory function is linked to damage to the olfactory bulbs due to the virus entering the central nervous system through olfactory sensory neurons in the olfactory mucosa (Aragao et al., 2020). This proposal is supported by a case analysis where a reduction in metabolic activity was observed in the orbitofrontal cortex, the region responsible for detecting common odors (Aragao et al., 2020).

Regarding swallowing disorders, a recent prospective review revealed that 45% of hospitalized and 41% of discharged COVID-19 patients screened positive for oropharyngeal dysphagia, with anosmia and ageusia among the risk factors (Zayed et al., 2023).

This article emphasizes the importance of investigating the impact of sensory alterations in COVID-19 patients, particularly in relation to swallowing, as it is crucial for guiding rehabilitation, especially in extubated patients. The hypothesis put forth in this paper is that symptoms of anosmia and ageusia have a negative effect on swallowing rehabilitation in patients with COVID-19, and should be specifically considered in extubated COVID-19 patients.

2. Methods

A qualitative narrative review was conducted, analyzing bibliographic or narrative reviews, meta-analyses, and descriptive or controlled trials that contributed to the understanding of the topic. A literature search was performed in the PubMed database. Initially, key articles were identified using the variables anosmia, ageusia, COVID-19, and swallowing, resulting in a limited sample (1 article). The search was then repeated, excluding the term swallowing. The results focused on adult populations, smell and taste alterations, and included the search terms in their titles, while excluding those not aligned with the theme, as well as case reports and expert opinions.

Possible Impacts of Sensory Disorders on Swallowing Rehabilitation in COVID-19 Patients

The high prevalence of swallowing disorders, specifically oropharyngeal dysphagia, is considered a significant risk factor for smell and taste alterations in COVID-19 patients (Zayed et al., 2023). The average duration of these symptoms is approximately three weeks for both anosmia and ageusia (Lee et al., 2020). Therefore, it is important to explore the relationship between sensory deficits and swallowing rehabilitation.

For intubated COVID-19 patients, a study involving 1,591 patients admitted to intensive care units found that 88% required invasive ventilatory support, with a median requirement of nine days (Grasselli et al., 2020). It is crucial to consider the association between sensory deficits and the prevalence of invasive mechanical ventilation processes, along with their related rehabilitation.

Given the significant and persistent impact of these early-onset sensory disorders, it is essential to consider their potential effects on the functional progression and prognosis of patients. This is particularly important because these disorders can persist for weeks or even months after the extubation process of invasive mechanical ventilation (Lee et al., 2020).

Regardless of the pathological etiology leading to the intubation process, it is worth mentioning that post-extubation or weaning, the literature indicates a high prevalence of clinical alterations, including mobility, cognition, communication, oral attention, respiratory function, and specifically laryngeal anatomofunctional alterations. These changes have functional implications for processes such as swallowing and voice (Brodsky et al., 2018; Mooney et al., 2020). Dysphagia is one such disorder, as orotracheal intubation affects the organic structures associated with all phases of swallowing (Mooney et al., 2020).

Mechanical ventilation via intubation has organic and functional effects on structures related to swallowing and their multimodal integration. Patients with severe COVID-19 infections have shown a higher prevalence of neurological signs and symptoms, including motor centers associated with swallowing and sensory integration, among other regions of the central nervous system (Niazkar et al., 2020).

Swallowing, as a nutritional process involving oral and oral preparatory phases, relies on the interaction of multiple senses, including smell and taste. Taste, in particular, contributes to the perception of consistencies, flavors, detection, selectivity of foods, and functionality of protective reflexes and oropharyngeal motor response (Freitas et al., 2020). Multisensory stimulation, including sensory stimulation during the intubation process, has demonstrated positive impacts on the post-extubation rehabilitation of key functions involved in the feeding process (Hwang et al., 2007). Therefore, further investigation is necessary to explore the potential relationship between taste and smell dysfunctions and the rehabilitation of post-extubation COVID-19 patients.

To establish this relationship, objective evaluations of olfactory function post-extubation, such as the Connecticut Chemosensory Clinical Research Center orthonasal olfaction test (CCCRC), can be utilized to determine the extent of sensory loss. Similarly, taste function can be assessed using validated test taste strips that allow patients to discriminate among general taste stimuli, including acid, sweet, salty, and bitter. These tests can even be self-administered (Wolf et al., 2016). Furthermore, exploration of other orofacial sensory alterations in COVID-19 patients that may impact swallowing and its rehabilitation is necessary.

Given the limited evidence regarding the effects of anosmia and ageusia on swallowing, the development of alternative tools considering possible sensory alterations in COVID-19 patients is necessary. Furthermore, investigations should focus on optimizing the rehabilitation of oropharyngeal dysphagia and extubated COVID-19 patients. Some tools mentioned in the literature include thermal touch, oral stimulation, oral massage, digital manipulation, and cervical range of motion exercises. Additionally, clinical or instrumental tests are required to evaluate the swallowing status and establish the relationship between sensory test results and their impact on swallowing.

3. Conclusions

COVID-19 patients exhibit a high prevalence of oropharyngeal dysphagia, anosmia, and ageusia, which negatively impact the sensory integration involved in the swallowing process. Identifying anosmia and ageusia in extubated COVID-19 patients implies the need to consider specific swallowing rehabilitation strategies targeting the described sensory alterations.

Further research is necessary to understand the impact of SARS-CoV-2 on the loss of taste and smell and how these alterations may affect swallowing in COVID-19 patients.

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RESUMEN

La anosmia y ageusia son síntomas prevalentes en los pacientes COVID-19, cuya duración puede extenderse por semanas. Tanto el gusto como el olfato cumplen un rol fundamental en el proceso deglutorio.

Este artículo propone consideraciones de los posibles efectos negativos de los síntomas de anosmia y ageusia en la rehabilitación de la disfagia orofaríngea y post-extubación en pacientes con COVID-19. Es importante considerar que la deglución es un proceso multisensorial y patológico, donde el gusto y el olfato juegan un papel fundamental. De acuerdo con estos factores, proponemos futuras investigaciones que incorporen métodos de evaluación objetiva de los sentidos afectados en pacientes con COVID-19.

Palabras claves: SARS-CoV-2, COVID-19, anosmia, ageusia, extubación, disfagia.
