The Effects of COVID-19 Pandemic in Otolaryngology Practice: A Review of the Literature

COVİD-19 Pandemisinin Kulak Burun Boğaz Pratiğine Etkisi: Literatür Derlemesi

Muammer Melih Şahin, Süleyman Cebeci, Mehmet Düzlü, Recep Karamert, Alper Ceylan

Gazi University Faculty of Medicine, Department of Otorhinolaryngology/Head and Neck Surgery, Ankara, Turkey.

ABSTRACT

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was isolated as the causative agent following the first case reports of pneumonia with unknown etiology in China. The 2019 novel coronavirus disease (COVID-19) significantly affected the health care systems in the world. The disease was accepted as COVID-19 pandemic by WHO. Diagnosis and treatment of COVID-19 infection requires multidisciplinary management and there are currently many ongoing studies for possible vaccination and antiviral therapies for the treatment. The major symptoms are known to be high fever and dry cough. Moreover, new symptoms like olfactory and gustatory dysfunction are defined. The epithelium of upper respiratory tract and related cavities (ear, paranasal sinuses) are known to be reservoir for COVID19 virus. Therefore, otorhinolaryngology physicians are one of the highest risk groups for nosocomial transmission. The pandemic altered standard daily working schedule of otorhinolaryngology physicians in the world. Elective operations such as rhinologic and otological surgeries are suspended, and novel prevention strategies were developed to prevent nosocomial transmission during physical examination and surgery. However, the treatment of emergency diseases like deep neck infections, epistaxis, tracheostomy, and head and neck cancers are still going on as expected. COVID-19 associated ARDS is known to require prolonged intubation and mechanical ventilation. But at the moment, the postitive effects of performing tracheostomy is not clearly identified on the outcomes of COVID-19-affected patients. In this study we aimed to review the literature regarding COVID-19 from an otorhinolaryngology point of view. We wanted to show how the pandemic affected daily otorhinolaryngology practice including outpatient clinic, head and cancer treatment, tracheostomy, and otologic manifestations along with preventive measures. In addition, we aimed to emphasize olfactory and taste disturbances which are now included in the COVID19 symptoms.

Key Words: COVID-19, coronavirus, head and neck, otorhinolaryngology, olfactory dysfunction, tracheostomy

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ÖZET

Yeni tip koronavirüs olan SARS-CoV-2 (COVID-19), Çin'de ortaya çıkan ve etiyolojisi tam ortaya konulamayan, şiddetli solunum yetmezliği ile seyreden bir pnömoni vakası ile tanımlanmıştır. COVID-19 salgını tüm dünyadaki sağlık sistemlerini önemli ölçüde etkilemiştir. COVID-19 salgını, Dünya Sağlı Örgütü tarafından pandemi olarak kabul edilmiştir. SARS-CoV-2 enfeksiyonunun tanı ve tedavisi multidisipliner yaklaşım gerektirir. Aşılama ve anti-viral tedaviler için birçok çalışma yürütülmektedir. COVID-19 hastalığında, başlıca semptomların yüksek ateş ve kuru öksürük olduğu bilinmektedir. Ayrıca koku ve tat alma bozukluğu gibi semptomlar da tanımlanmıştır. Üst solunum yolu ve ilgili boşlukların (kulak, paranazal sinüsler, oral kavite) SARS-CoV-2 virüsü için rezervuar olduğu bilinmektedir. Bu nedenle, kulak burun boğaz doktorları, hastane enfeksiyonu için en yüksek risk gruplarından birini temsil etmektedir. Pandeminin, tüm dünyadaki kulak burun boğaz hekimlerinin günlük çalışma programını değiştirdiği görülmektedir. Rinolojik ve otolojik ameliyatlar gibi elektif operasyonlar askıya alınmış olup, fizik muayene ve cerrahi sırasında bulaşı önlemek için yeni stratejiler geliştirilmiştir. Bununla birlikte, derin boyun enfeksiyonları, burun kanaması, trakeostomi ve baş ve boyun kanserleri gibi aciliyet gerektirebilecek hastalıkların tedavisi hala devam etmektedir. COVID-19 ile ilişkili akut solunum yetmezliği tablosunun uzun süreli entübasyon ve mekanik ventilasyon gerektirdiği bilinmektedir. Ancak, trakeostomi cerrahisinin bu hastaların sağ kalımları üzerindeki etkisi tam olarak bilinmemektedir. Bu çalışmada, kulak burun boğaz hastalıkları açısından COVID-19 ile ilgili literatürü gözden geçirmeyi amaçladık.

Anahtar Sözcükler: COVİD-19, koronavirüs, baş boyun, kulak burun boğaz, koku bozukluğu, trakeostomi

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ORCID IDs: M.M.Ş. 0000-0002-1804-2730, S.C. 0000-0003-2302-3371, M.D. 0000-0002-5641-2915, R.K. 0000-0001-9112-3986, A.C. 0000-0002-6305-4714

Address for Correspondence / Yazışma Adresi: Muammer Melih Şahin, MD Gazi Üniversitesi Tıp Fakültesi Kulak Burun Boğaz Anabilim Dalı, Beşevler, Ankara, Turkey
E-mail:melihsahin@gazi.edu.tr

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INTRODUCTION

The pathobiology of this virus is still incompletely known Since its first outbreak in Wuhan city of China on December 2019, coronavirus disease 2019 (COVID-19) pandemic significantly affected the health care systems in the world (1) . The major symptoms are known to be high fever and dry cough (2,3). Other common and/or minor symptoms are fatigue, myalgia, dyspnea, sore throat, rhinorrhea, expectoration, chest pain, headache, diarrhea and nausea-vomiting (2,3). Recently, new symptoms like olfactory and gustatory dysfunction are defined (4). Currently there is not a proven specific antiviral treatment agent for COVID-19. Chloroquine and hydroxychloroquine are used due to their antiviral activity in vitro (5). There are currently many ongoing studies for possible vaccination and antiviral therapies for the treatment (6).

Diagnosis and treatment of COVID-19 infection requires multidisciplinary management including infectious and chest diseases physicians and radiology doctors (7). However due to necessity or voluntary other physicians including otolaryngologist are also working in inpatient services or intensive care units (ICU) regarding COVID19 treatment in the hospitals. Besides, the pandemic altered standard daily working schedule of otorhinolaryngology physicians in Turkey and in the world. Elective operations are suspended, and novel prevention strategies were developed to prevent nosocomial transmission during physical examination and surgery (8). New guidelines were recommended for special considerations like how to perform tracheostomy during COVID-19 pandemic (9). In this study we aimed to review the literature regarding COVID-19 from an otorhinolaryngology point of view. We wanted to show how the pandemic affected daily otorhinolaryngology practice including outpatient clinic, head and cancer treatment, tracheostomy, and otologic manifestations along preventive measures. In addition, we aimed to emphasize olfactory and taste disturbances which are now included in the COVID19 symptoms.

Viral Transmission and Preventive Measures

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was isolated as the causative agent following the first case reports of pneumonia with unknown etiology in Wuhan city, Hubei province, China (10,11). Later the disease was designated as COVID-19 pandemic by WHO (12). The virus is known to transmit within air droplets or close contact (13). The epithelium of upper respiratory tract and related cavities (ear, paranasal sinuses) are known to be reservoir for COVID19 virus (14). Therefore, otorhinolaryngology physicians are one of the highest risk groups for nosocomial transmission. In general, elective examinations and procedures should be reserved during this pandemic period. However, the treatment of emergency diseases like deep neck infections, epistaxis, tracheostomy, and head and neck cancers are still going on as expected. Thus, special prevention methods are recommended for ENT doctors (8). Appropriate personal protective equipment (PPE) must be provided according to risk of the examination or procedure. In general, wearing surgical mask, head cover and gloves, washing hands before and after the treatment and working with scrubs are adequate if the patient is not infected or suspicious of bearing COVID-19. In addition to these, wearing disposable surgical scrubs, medical protective N95/PP3 air mask, eye protection, face shield are recommended while dealing with infected or suspicious patient or in case of having close contact with the patients during nasopharyngoscopy, laryngoscopy, tracheostomy and transoral surgery. Furthermore, powered airway purifying respirator (PAPR) and negative pressure operation room is preferred if there is high-risk of contamination like tracheostomy procedure for COVID-19 patients (8,15,16).

Tracheostomy

COVID-19 is a respiratory disease caused by a novel coronavirus (SARS-CoV-2). Most of the affected cases are asymptomatic and presents with mild flue like symptoms. Nevertheless, 15% of cases will have severe illness requiring oxygen therapy and 5% of patients needs mechanical ventilation (17). Thereby, large and increasing number of patients are requiring endotracheal intubation and prolonged ventilator support (18).

During COVID 19 pandemics, there is increasing data on tracheostomy indications, timing, precautions to be taken, technical considerations etc., and the are some published guidelines in this topic (17-21).

The tracheostomy is a highly aerosol generating procedure like other airway opereations and directly exposes the entire surgical team to the viral aerosols and secretions, thus increasing the risk of transmission to healthcare providers (17).

Tracheostomy is frequently planned in patients with respiratory failure requiring prolonged mechanical ventilation and for other condititons such as airway compromise from head and neck cancer. COVID-19 associated acute respiratory distress syndrome (ARDS) is known to require prolonged intubation and mechanical ventilation. But at the moment, the postitive effects of performing tracheostomy is not clearly identified on the outcomes of COVID-19-affected patients (22).

Tracheostomy have several advantages such as improved comfort, reduced sedative and paralytic agents need, reducing death space, better secretion control and avoiding complications due to prolonged intubation (22). Moreover, tracheostomy is a useful tool ensuring early ICU discharge and could allow to observe the patients with ongoing invasive mechanical ventilation (IMV) in intermediate care units (23).

The timing of tracheostomy remains a controversial issue and data related to SARS-CoV-2 is limited (24). In general, intubation period longer than 7-10 days is known to cause increased subglottic stenosis risk. However, the overall risk of severe, symptomatic tracheal stenosis rates secondary to prolonged intubation are generally in the 1% to 2% range when modern low-pressure cuffs are utilized (18,22). In several studies elective thacheostomies are recommended to be postponed until tests become negative in COVID 19 positive patients (17-21).

The decision to proceed with tracheostomy should involve a multidisciplinary discussion. When determining the timing of tracheostomy, several factors should be considered such as viral load, expected survival and technical possibilities (19). In the patients who have severe illness and requiring mechanical ventilation, survival was reported to be extremely poor (25,26). It is recommended that, delaying tracheostomy from 14 days to 21 days following intubation should be considered to allow sufficient decline in viral load (19). If the tracheostomy would significantly improve the prognosis of the patients it should not be delayed regardless of SARS-CoV-2 status (19).

For any elective or semi-elective procedure, preoperative COVID 19 testing is recommendanded (17). Performing 48 hours apart two tests may be necessary to increase safety because of false negative rate of the tests (20). In general, it is advised to avoid performe tracheostomy in COVID 19 patients who are still infectious. But this should be considered if the endotracheal tube is insufficient to provide suitable airway. The risks and benefits of the tracheostomy procedure should be discussed for each case indivudually (17). In COVID-19 positive patients, the use of PPE with powered air purifying respirators (PAPRs) (27) is recommendanded during tracheostomy procedure (17). N95 masks alone may not be sufficient according to the experiences in Singapore (28). But PAPRs have some limitations; limited availability, reduced ability to hear communication during the procedure, and inability to wear a headlight is not suitable for emergent situations (17,29).

During this pandemic, while performing tracheostomy in COVID-19 negative patients, it is recommended to wear N-95 masks and full facial/neck protection by the surgical team. Because, there is high risk level of viral contamination in airway surgery and negative results does not exclude the possibility of COVID-19 (17).

Emergent intubation or tracheostomy may be required in acute upper airway obstructions. These patients shuld be considered as if infected with COVID-19. (21). Intubation should be performed by most skilled person available to maximize initial attemp success (30). Likewise the most experienced surgeon available should perform tracheostomy. Reducing unnecessery team members is important to limit potential spread of disease (17). Awake tracheotomy and cricothyroidotomy have very high risk for spread of viral aerosols and should be avoided if possible (19).

Procedural considerations for elective/emergent tracheostomies: (17-21,29)

- Open tracheotomy is preferred to percutaneous tracheotomy
- Perform procedure on general anesthesia or use paralytic agents to avoid caughing
- Limit use of suction and electric cautery
- Use non-fenestrated and cuffed and appropriate sized tracheotomy tube
- Be careful to avoid damage endotracheal tube cuff

- Stop ventilatation, before tracheal incision and perform rapid and accurate tube insetion and early inflate the cuff
- Attach anesthetic circuit to the tracheostomy tube and ventilate gently for minimize cuff leak
- Confirm the absence of cuff leak
- Secure tube to avoid decannulation (eg suture the tube to the skin)

If possible, tracheostomy should be performed in a negative-pressure ICU room to avoid transporting patients through the hospital to the operating room (29).Posttracheostomy management have some considerations for COVID 19 patients. Closed circuit airway and closed suctioning system should be choosen. If possible high-efficiency particulate absorbing (HEPA) filtered heat moisture exchangers (HME) should be used for prevention aerososlization (18). Changing tracheostomy tube should be postponed exept cuff failure or emergent situations (18).

In conclusion, tracheostomy indications, timing and technichal details should be carefully considered during the pandemic. If clinically appropriate, trachesotomy procedures sould be delayed until viral load decreases. Apropppriate PPE usage, including N-95 mask and PAPR is recommended for all procedures.

Head & Neck Cancer Treatment

Regarding comorbidities accompanying with COVID-19 malignancies have the highest risk of disease progression and complications (31). Therefore, COVID-19 positive cancer patients should be primarily treated for the COVID-19 disease and complications. If available testing for COVID-19 must be performed for newly diagnosed head and cancer patients before the definitive treatment. Head and neck mucosal surfaces are known to carry high viral load (14). Viral aerosolization may occur during examinations and operations which may cause viral transmission (14,32). Therefore, elective surgeries in head and neck region like pleomorphic adenoma of parotid gland may be deferred (33). Despite all these measures the treatment of most head and neck cancers cannot be delayed. Otherwise it may cause disease progression which may negatively affect disease morbidity and mortality. Multi-disciplinary meetings are crucial for decision making in cancer treatment (34). Therefore, we are continuing our weekly multi-disciplinary head and neck cancer councils with teleconference in our department for decision making whether the patient will be treated with surgery or chemoradiation. We are recommending radiotherapy for early stage larynx carcinoma, surgery for oral cavity cancers and T4 larynx carcinoma as compatible with NCCN guidelines (35). Broady et al. performed a questionnaire for the head and surgeons to analyze the possible changes in head and neck cancer practice in the current COVID-19 pandemic. In general, the responders recommend surgery for oral cavity cancers and radiotherapy for early stage glottic cancers (36). Recently a consortium of head and neck surgeons from MD Anderson Cancer Center published a guideline regarding the management of head and neck cancers during this pandemic period (37). According to this guideline, non-surgical treatment may must be considered for T1-3 stage larynx and HPV positive oropharyngeal squamous cell carcinoma (SCC) with radiotherapy or chemoradiation. However, T4 larynx carcinoma with cartilage invasion and oral cavity cancers are recommended to be treated primarily with surgery. Rotational or free flaps are occasionally required for reconstruction of locally advanced head and neck cancers. Rotational flaps rather than free flaps may be utilized in the current outbreak (38,39). In addition, before-mentioned preventive measures in this paper must be ensured for head and neck cancer operations.

Olfactory and gustatory dysfunction

Post-viral anosmia is not a new symptom in the otolaryngology. A viral infection comprises about 40% of anosmia etiology in adult patients (40). The prevalence of severe olfactory dysfunction is estimated to be around 5% in the population and the risk is higher in elderly patients and males (41-43). However, in a questionnaire study, both olfactory and gustatory dysfunctions were more common in female COVID-19 patients (44). A study that based on objective tests reported lower smell and taste scores in elderly COVID-19 patients (45).

Many viruses such as rhinovirus, Epstein-Barr virus, parainfluenza cause mechanical obstruction by mucosal inflammation and nasal discharge (rhinorrhea) and these end up with olfactory dysfunction (46,47).

Suziki et al. revealed that coronaviruses could be found in the nasal discharge of the patients with olfactory dysfunction (46). However, COVID-19-associated olfactory disorder has a different pathogenesis which may occur without rhinorrhea (44,45) Lechien et al., showed the absence of rhinorrhea and nasal congestion complaints in 79.7% of the COVID-19 patients with anosmia or hyposmia (44).

There were fewer olfactory and gustatory complaints in Chinese patients. In the study by Mao et al., they observed that olfactory and taste disorders were particularly rare in Chinese population. They investigated for any neurologic dysfunction in 214 COVID-19 patients, anosmia and aguesia were detected in 5.1% and 5.6% of the patients, respectively (48). In contrast, the series reported from Europe revealed a very high frequency of chemosensitive disorders in patients with COVID-19 (44,49-51). In the studies conducted with European patients, they frequently observed these symptoms in the early stages of the disease, moreover these may be the only clinical symptom of COVID-19 (44,50). They claimed that, these chemosensitive disorders may be the initial signs, especially in the asymptomatic patients (44,49-51). Vaira et al. drew attention to the early appearance of these symptoms which usually occur within the first 5 days after clinical onset. Moreover, they supposed that sudden unset of the loss of these sensations within 24 to 48 hours are very suspicious clinical features (45). These chemosensitive disorders are supposed to emerge before the main symptoms such as chough and fever. As these are the first signs in asymptomatic patients, healthcare workers must be aware and alarmed for early recognition of these symptoms to break the spread of the infection.

Almost all the COVID-19 studies investigating odor and taste disorders are based on medical history or clinical observation. To our knowledge taste and smell functions were evaluated with psycho-physiological objective tests only in one study (45). In this study, there was no objective information regarding the functional capacity of the smell and taste functions of the patients in the period prior to infection as expected. They included 72 patients without smell and taste dysfunctions prior to the infection. They excluded patients with psychiatric, neurological diseases and who received surgery or radiotherapy in the nasal or oral cavity. They observed that 73.6% of patients reported at least one of these chemosensitive disorders during the course of the infection (45). The anamnestic and observational studies revealed relatively higher rates of smell and taste disturbance compared to the study based on objective evaluations (44,49-51). Moreover, the recovery rates were lower in the objective evaluations than the questionnaire studies (44,45,49,51). These can be explained by the fact that patients could not notice mild symptoms. In a questionnaire study by Lechien et al., they included 357 patients and found the rates of olfactory dysfunction and gustatory disorder to be 85.6% and 88.8%, respectively. Also, there was a positive association between olfactory and gustatory dysfunction (44). However the high olfactory and gustatory dysfunction ratios revealed in this study was criticized and attributed to questionnaire that was used to determine olfactory disorder (52). In the literature review, the authors did not find a relationship between the severity of chemosensitive disorder and the clinical course of pulmonary disease (44,45). However, Mao et al. suggested that clinicians should suspect for severe acute respiratory syndrome in case of patients with neurologic manifestations (48). They categorized neurologic manifestations in 3 classes: central nervous system manifestations (dizziness, headache, impaired consciousness, acute cerebrovascular disease, ataxia, and seizure), peripheral nervous system manifestations (taste impairment, smell impairment, vision impairment, and nerve pain), and skeletal muscular injury manifestations, and observed that 78 patients (36.4%) had at least one of these neurologic manifestations (48). Since it is a new type of SARS-Corona virus, the clear relationship between COVID-19 and smell and taste disorders has not been clearly elucidated yet. Considering other coronavirus studies, these symptoms may reveal the neurotropic features of the COVID-19 (45). Anosmia, also known as smell blindness, was present in 79.6% of COVID-19 patients who reported olfactory dysfunction (44). Viruses could invade olfactory bulb and central nervous system through infecting peripheral neurons (53). Netland et al. demonstrated that SARS-CoV may enter the brain through the olfactory bulb, that leads to rapid neural spread and may cause neuronal death (54). Electron microscopy, immunohistochemistry and PCR examinations showed the presence of SARS-CoV in brain samples in the autopsy (55).

This feature of the virus may also play a role in the sudden respiratory failure of the COVID-19 patients (56).

Spontaneous recovery rates have been presented ranging from 32% to 67% in the literature (57,58). Lechien et al. observed that 72.6% of patients who reported that their olfactory function improved, recovered olfactory function within the first 8 days following the resolution of the disease (44). Systemic steroids are beneficial to enhance olfactory functions in the patients with post-viral anosmia but topical steroids are not (59). Considering the current WHO guideline for COVID-19, steroids must not be prescribed in the first two weeks for the treatment of olfactory dysfunction (60). Steroid application in the initial period of the COVID-19 may cause serious respiratory disease (61). The effectiveness of alternative treatments such as vitamin A, Omega-3 and alpha lipoic acid cloud be topics of further investigation for the COVİD-19 patients with olfactory dysfunction (62-64).

Otologic concerns in COVID-19 pandemic

Otologic Manifestations

There is a continuous respiratory mucosal lining between nasopharynx, and the middle ear and mastoid cells through the eustachian tube. During upper respiratory infections various respiratory viruses were isolated in the middle ear effusions which were highly correlated with nasopharyngeal specimens (65). Although there is no evidence to date that the novel SARS CoV-2 virus involves the respiratory epithelium of the middle ear and mastoid cells, former coronavirus strains were isolated in middle ear cavity during acute otitis media (66). Therefore, it makes sense to expect SARS CoV-2 may also invade to these spaces. The viral load of SARS CoV-2 in the middle ear is important in two ways. It can lead to infections in the middle ear, and more importantly, it has the potential to cause viral shading during autological examination or surgery. Recently, a COVID-19 case who presented with acute otitis media and did not demonstrate any classical features of the disease was presented (67). The presence of the virus in the middle ear effusion was not confirmed in this case, but it is reasonable to associate the middle ear infection with the isolates in the nasopharynx.

Apart from conductive hearing loss caused by the middle ear effusion secondary to respiratory infections, several viral infections may induce different types of hearing losses by various mechanisms. Viruses may damage the cochlear structures like hair cells directly or by inducing a host immune-mediated cascade and cause sensorineural hearing loss (68). Retro-cochlear involvement is also possible by neurotrophic viruses like herpes zoster virus (69). Although the involvement of the central nervous system with SARS CoV is well established, the neurotrophic potential of the SARS CoV-2 remains to be determined (54). But as in the former SARS CoV, the novel SARS CoV-2 also enters into human host cells by angiotensin-converting enzyme 2 (ACE2) receptor which is also expressed in human glial cells and neurons which make these neural structures a potential target for the novel virus (70). There is no information about the retro-cochlear involvement of the novel SARS CoV-2 in the current literature. A case of concomitant sensorineural hearing loss with COVID-19 was reported recently (71). The authors hypothesized that involvement of the brainstem may be a possible cause of sensorineural hearing loss in this case. The audiological data of the patient was not presented and there was no certain evidence about the etiology of the hearing loss, but it is relatable that SARS CoV-2 is a possible cause of cochlear and retrocochlear damage. Hearing profiles of the asymptomatic SARS CoV-2 patients were documented in a recent study (68). The high frequency pure-tone thresholds as well as the TEOAE amplitudes were significantly worse in the PCR positive asymptomatic patients compared to healthy individuals. These findings may indicate an intracochlear damage, particularly comprising the cochlear hair cells. Hypoacusis was reported in 1.37% of the patients in a large series of COVID-19 infection (72). There was no information about the type of hearing loss and audiologic data was not presented in these cases. The mechanism of the hearing loss and the long-term prognosis of hearing in COVID-19 cases require further investigation.

Nervous system manifestations are common in COVID-19 with a dominance of central pathologies rather than peripheral disease (73). Besides the olfactory bulb, involvement of the peripheral cranial nerves was rarely reported in COVID-19 cases. Although the most common neurologic manifestation is dizziness, peripheral vertigo was never reported in COVID-19 cases to date.

Bell's Palsy associated with COVID-19 was reported in two cases: one was accompanying Guillain–Barré Syndrome and the remainder had no additional symptoms (74,75).

Steroid Therapy

Steroids are commonly used in sudden sensorineural hearing loss and idiopathic facial nerve palsy in otolaryngology practice. But because of their immunosuppressant potential there is tendency in the current literature to avoid from steroid therapies in common otolaryngology urgencies during the pandemic. Although steroids have been used in infectious diseases including SARS CoV to reduce the severity of inflammatory damage, there are studies that claim steroids did not benefit in the treatment of COVID-19 and high dose steroid use may even cause a worse outcome (76,77). In these circumstances, unlike the routine practice, systemic steroid use should be avoided in COVID-19 patients with indications such as sudden hearing loss or facial paralysis due to the possibility of worsening the existing disease.

An important question to be answered is, whether steroid use makes patients prone to COVID-19 or not. Steroid induced immune suppression is not an acute complication. Approximately 14 days of therapy with 2 mg/kg/day of prednisolone or prednisone is required for the development of immune suppression. Shorter courses of steroid therapies are not associated with immune suppression (78). Thus, one can theorize that short time use of steroids do not increase susceptibility to COVID-19. But we still recommend limiting the use of systemic steroids because of the high rate of asymptomatic COVID-19 cases and the low reliability of the diagnostic tests in order to avoid from exacerbating or worsening a possible asymptomatic infection. Intratympanic steroid injection is a good alternative to systemic steroids in the treatment of sudden sensorineural hearing loss and might be preferred during the current pandemic. After intratympanic injection patients are asked to avoid swallowing and spitting their saliva in routine practice, but spitting must be avoided as it may generate aerosol which may cause a viral spread during the pandemic. Unfortunately, there is not such an alternative treatment for idiopathic facial palsy. Some authors suggest to limit the use of systemic steroids to severe forms of facial palsy (House-Brackman Grade 5-6) while others argue to avoid systemic use of steroid for facial palsy of any grade (79,80). We think, after a precise information about the benefits and risks of systemic steroid treatment given and written consent is obtained, systemic steroids can be used in high grades of peripheral facial palsy or if a progression is encountered during the follow-up, but in only patients who are not suspected to be infected with SARS CoV-2. The effect of short course of systemic steroid treatment on COVID-19 are yet to be examined. Further investigations as well as development of more reliable and accessible diagnostic tests will be decisive in our position to use of systemic steroids in the routine otolaryngology practice in the following period.

Considerations About Otologic Surgery

The exposure risk during otologic surgeries is uncertain and require further investigation but a considerable viral load is expectable in the middle ear and mastoid air cells of COVID-19 patients which pose a high risk of virus transmission during otologic surgeries. There is a consensus on cancellation or postponement of elective cases in the literature during the pandemic (80-82). Fortunately, most of the otologic diseases progress slowly, and are diagnosed way earlier before leading to a life-threatening complication. Nevertheless, occasional cases may require urgent surgery. In case of asymptomatic COVID-19 cases or false negative testing, the anesthetic procedure and mechanical ventilation may worsen the infectious status. Therefore, it is important to define the priorities in otologic surgery to protect the medical staff and the patient during the pandemic.

The most common urgencies among otologic diseases are complications of otitis media with or without cholesteatoma. An initial intravenous antibiotic therapy may be trialed in acute mastoiditis but if there is no response or a progression is observed then a surgical intervention is unavoidable. Acute mastoiditis with subperiostal abscess, cholesteatoma complicated with facial palsy or intracranial complications are high priority otologic concerns and require urgent intervention (80,81). A delay for testing may be acceptable in selected cases. Cochlear implantation except in the postmeningitic cases with fibrosing labyrinthitis and any other hearing implants as well as uncomplicated chronic otitis with or without cholesteatoma should not be regarded as urgent and postponed.

Pediatric cochlear implant candidates with pre-lingual profound sensorineural hearing loss are of great concern and have the priority among these cases. As soon as the course of the pandemic allows, a new treatment strategy must be adapted for these patients to avoid unintended consequences in auditory-verbal outcome and communication skills. Priorities in otologic surgery are summarized in Table 1.

Table 1: Priority categorization of otologic surgeries during the Covid-19 pandemic

Urgent	**Scheduling**
-Acute mastoiditis unresponsive to IV antibiotics	
-Intracranial and extracranial complications of otitis media with or without cholesteatoma	
-Perilymph fistula and SNHL due to barotrauma	Within 48-72 hours
-Immediate onset complete facial palsy due to otic capsule violating temporal bone fracture	
-Postmeningitic cochlear implantation in patients with fibrosing labyrinthitis	
Semiurgent	
-Postmeningitic cochlear implantation in patients without fibrosing labyrinthitis	
-Malignancies of the temporal bone	Maybe delayed up to 1 month
-Unknown onset complete facial palsy due to otic capsule sparing temporal bone fracture without an evidence of total denervation in elecrophysiologic tests	
Semielective	Maybe delayed up to 3-6 months.
-Pediatric cochlear implantation for pre-lingual profound SNHL	Close follow-up
-Cholesteatoma with persistant infection or progression	Adapt the treatment strategy according to the course of outbreak and updated literature
-Persistent bilateral otitis media with effusion in children	
Elective	
-Adult cochlear implantation	
-BAHA, middle ear implants	
-Dry tympanic membrane perforation	Postpone surgery until the resolution of the outbreak
-Stable tympanic retraction pockets	
-Stapes surgery	
-Ossiculoplasty	

An important concern in otologic surgery is whether powered instrumentation is required or not, to perform the procedure. Drilling cause significant aerosolization of the bone and other tissues which may contain viruses and may yield to a viral transmission (83). Therefore, drilling the mastoid must be avoided if possible. A hammer and gouge mastoidectomy may be performed instead of using drills in acute mastoiditis. When drilling is inevitable, patients must be tested for COVID-19 prior to surgery when possible and a strict isolation must be sustained until the time of surgery. If there is no time for testing or the patient is already COVID-19 positive, use of enhanced personal protective equipment (N95 respirator plus face shield or preferably powered air-purifying respirator) by all medical staff in the operating room is of great concern (81).

CONCLUSION

In conclusion the COVID-19 pandemic significantly affected routine otorhinolaryngology daily practice. The appropriate preventive measures are very important especially during laryngoscopy and tracheostomy procedures which poses a great risk for disease contamination. During pandemic, tracheostomy indications and timing should be carefully considered. Radiotherapy may be chosen in early stage larynx cancer treatment. However surgical excision is still the main preferred modality for the treatment of oral cavity cancers in this pandemic period. Olfactory and taste dysfunctions are now a well-defined symptoms of COVID-19. There is also an increasing data regarding otological manifestations of COVID-19 and recommendations for otological surgery during pandemic period.

Conflict of interest

No conflict of interest was declared by the authors.

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