



Approach to otolaryngology emergency in COVID-19 pandemic

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ABSTRACT

Since the first case of novel coronavirus disease (COVID-19) was reported in China on December 31st, 2019, it spread almost all over the world rapidly and was declared pandemic by the World Health Organization (WHO) on March 11th, 2020. The first case in Turkey was also reported on the same day. COVID-19 is mainly transmitted through droplets and infected individuals may remain asymptomatic. As the reservoir of the virus is the upper respiratory tract, otolaryngology (ENT) examinations carry a high risk of infection to the physician and fever, sore throat, cough, shortness of breath and general illness, which are frequent COVID-19 symptoms, can be also seen in various ENT diseases. In case of severe upper respiratory obstruction, unstoppable nasal bleeding, or septal hematoma, which should be promptly intervened as ENT emergencies during the pandemic, patients should be accepted as COVID-19-positive and intervened accordingly. Thus, personal protective equipment (PPE) with eye protection/goggles, face shield, bonnet, disposable protective drape, and FFP3/N99 mask, if available and FF2/N95, if not must be used. In cases where the procedure can be postponed for some time, patients such as nasal fracture, and otitis-sinusitis complications should be requested polymerase chain reaction (PCR) for COVID-19 exclusion and thoracic section should be included in the computed tomography examination, if required. If possible, it is recommended to use powered air purifying respirators in surgical procedures to the upper respiratory tract. In case of sudden hearing loss and facial paralysis, systemic steroid therapy should be avoided due to its immunosuppressive effects.

Keywords: COVID-19, emergency, otorhinolaryngologic diseases, SARS-CoV-2.

On December 31st, 2019, the World Health Organization (WHO) China Office reported first cases of pneumonia with unknown etiology in Wuhan of Hubei province, China. The culprit was identified on January 7th, 2020 as a new coronavirus (2019-nCoV) that has not previously been detected in humans and, later, this virus was considered as severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) due to its similarity to SARS-CoV and, thus, the disease was considered novel coronavirus disease 2019 (COVID-19).^[1] The disease has spread rapidly due

to its ability to spread from person to person. The first COVID-19 cases were reported in Turkey on March 11th, 2020.^[2] According to the latest report published by the WHO on April 20th, 2020, the number of patients diagnosed with COVID-19 since the onset of the epidemic was 2,319,066, and the number of non-survivors was 157,970.^[3]

The COVID-19 is mainly transmitted through droplets. Asymptomatic individuals may also become infected, as the virus can be detected in respiratory secretions of these patients. The mean incubation period is between 5 to 6 days

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(range, 2 to 14 days) and, in some cases, it can be extended up to 14 days. Although the transmission time of COVID-19 is not clearly known, it is thought to start one or two days before the symptomatic period and end with the loss of symptoms.^[2]

The diagnosis of COVID-19 is based on clinical findings, polymerase chain reaction (PCR) test for the SARS-CoV-2 virus in the samples taken from the upper respiratory tract, and computed tomography (CT) imaging findings.^[2,4]

Otolaryngology (ENT) examinations carry a high risk of disease transmission to the physician due to the upper respiratory tract of the reservoir and aerosols that may occur during the examination.^[5] Since fever, sore throat, cough, shortness of breath, and general disease, which are important COVID-19 symptoms, can be also seen in various ENT emergencies, caution should be taken in patients admitted to outpatient clinics with these complaints and these patients should be directed to the COVID-19 triage areas or outpatient areas of the relevant hospital.^[2] In cases where an urgent intervention is required, the patient should be accepted as COVID-19-positive and be intervened by taking appropriate measures.^[6]

In this review, we discuss common ENT emergencies under certain headings and the general approach during COVID-19 pandemic.

UPPER AIRWAY OBSTRUCTION

Upper airway obstruction is an otolaryngology emergency, which may present with a very high mortality. In adult patients, malignancies, angioedema-related laryngeal edema, and traumas are common causes. Inflammatory causes such as croup and epiglottitis in pediatric patients; congenital causes such as bilateral choanal atresia, laryngitis, and foreign body aspiration are the leading causes of serious airway obstruction.^[7]

With a rapid evaluation in the patient admitted with respiratory distress, an assessment should be made on whether this obstruction is acute or chronic and caused from lower or upper airway, and continuity of air flow should be ensured. Taking the medical history of the patient in detail, the time of the occurrence

of respiratory distress is documented, and the history of trauma or foreign body aspiration is questioned. Malignancies should come to mind in middle-advanced age male smokers with hoarseness for long time. If there is face and lip edema after drug use or insect bite, angioedema and laryngeal edema should be kept in mind.^[8] The history of cyanosis while sucking and recovering cyanosis while crying of an infant is valuable in terms of choanal atresia. Again, in infant who also has upper respiratory tract symptoms, mild fever with cough in the form of barking for several days may be suggestive of croup, whereas respiratory distress occurring with high fever may suggest acute epiglottitis. Retropharyngeal abscess should be considered in cases accompanied by torticollis or swelling in the neck.^[9]

Stridor is the most important finding of respiratory obstruction. In general, inspiratory stridor appears in supraglottic and glottic reasons, and expiratory stridor appears in pathologies related to the lower trachea and bronchi. For upper trachea, subglottic and glottic causes, biphasic (both inspiratory and expiratory) stridor can be observed. In the airway obstruction, nasal flaring, suprasternal, intercostal retractions, and cyanosis can be seen in more severe cases. Again, in these cases, hoarseness indicates laryngeal involvement, while a muffled sound suggests supraglottic exposure. Air leak while talking can be observed in vocal cord paralysis.^[10] The most important diagnostic tool in patients with respiratory distress is an endoscopic examination to evaluate the entire upper airway from the nose to the subglottic area. Bronchoscopy is an invaluable diagnostic method for lower respiratory tract.^[8] In cases with foreign body aspiration, direct graphs and in cases with abscess-trauma, CT can provide highly valuable information.^[11]

In the treatment of a patient with respiratory distress, the basic attempt is the maintenance of the airflow and varies depending on each individual patient. Medical treatments such as steroids, adrenaline or antibiotics can be given in cases of croup, angioedema, epiglottitis accompanied by edema in upper airways, while conditions such as abscess and bilateral choanal atresia require procedures to eliminate existing

obstruction.^[9] In cases of bilateral vocal cord paralysis, glottic level foreign body aspiration, or malignancy obstructing the laryngeal airway, where conservative treatments are inadequate, tracheotomy and cricothyroidotomy should be performed to ensure airway opening.^[12]

Respiratory distress and shortness of breath are important findings of COVID-19 infection. The COVID-19 disease must be excluded in patients presenting with these complaints during the pandemic.^[2] Laryngoscopic examination, which is the step after medical history taking and inspections in patients who apply to the otorhinolaryngology outpatient clinic, increases the risk of spreading a high number of respiratory particles to the environment and, thus, to the physician.^[13] Therefore, in patients with respiratory distress during the pandemic, the neck CT can be added to thoracic CT, which should be taken to rule out COVID-19, for the evaluation of the upper respiratory tract and laryngoscopy should be reserved for situations which would change the approach. Patients who have no COVID-19 findings on CT and whose upper respiratory tract pathology is considered as the cause of respiratory distress, a rapid antigen/antibody test is performed, if the oxygen saturation is low, and the COVID-19 PCR test is requested considering that a further surgical procedure may be required in the patient who is not desaturated. In addition, personal protective equipment (PPE) with eye protection/goggles, face shield, bonnet, disposable protective drape and FFP3/N99 mask, if available and FF2/N95, if not must be used. Topical local anesthetic spray is recommended to reduce the gag reflex before laryngoscopic examination.^[13,14]

As a result, the approach should be modified on the basis of each patient in case of suspected airway obstruction during the pandemic. After the use of an analgesic, the patient with respiratory distress and an angioneurotic edema can be followed closely and laryngoscopy can be postponed after the treatment is arranged. To the patient, who has a laryngeal mass on neck CT and has severe respiratory distress, can be taken to the operating room with the necessary precautions, and tracheotomy and biopsy can be performed. If an infant diagnosed with bilateral choanal atresia is intubated, PCR is requested

to rule out COVID-19. Therefore, necessary precautions should be taken and the patient should be operated. In airway surgeries, it is recommended to use a powered air purifying respirator (PAPR) in addition to the appropriate PPE, if available.^[14]

The approach to COVID-19-positive or suspicious patients should be decided on the patient basis and it should be kept in mind that unnecessary examination and intervention in the upper respiratory tract may increase the risk of contamination.

EPISTAXIS

Epistaxis is one of the most common emergency problems in our country, as well as all over the world. It is reported that 60% of the population suffer from nosebleeds during their lifetime, and only 6% of them need treatment.^[15] In addition, it is known that anticoagulant and thrombolytic therapy, which have entered in routine treatment of COVID-19 patients in our country^[2] increase the frequency of epistaxis.^[16]

Epistaxis can be clinically classified as anterior and posterior bleeds. Approximately 90% of the bleeding is caused by anterior bleeds. The bleeding in the anterior region is mainly caused by the vascular network known as the Kiesselbach's plexus, while the posterior bleeds are mainly caused by the Woodruff's plexus.^[17] Although the cause of epistaxis is idiopathic in 80% cases, the region in which it originates provides information about the etiology. Posterior epistaxis is mostly seen in adult or elderly patients, and usually occurs due to hypertension and presents with postnasal hemorrhage. Anterior epistaxis is usually caused by a trauma, infection, bleeding disorders, or neoplasms and usually presents with bleeding from nostrils.^[18]

Before evaluating epistaxis during the pandemic, it should be remembered that general ENT examinations and endoscopic examinations are risky procedures for SARS-CoV-2 virus transmission, and ensure that appropriate PPE is worn by all members of the team before the examination.^[14]

After taking a brief medical history of the patient, anterior rhinoscopy should be started

and endoscopic examination should be avoided as much as possible. The initial intervention is that the fingers of the nostrils are pressed on the septum with the Trotter maneuver, if the bleeding is mild. The patient's risk factors should be also controlled (i.e., hypertension or hypercoagulability state) and tranexamic acid should be applied, if necessary. If this intervention fails, unilateral bioresorbable dressing should be inserted (e.g., NasoPore[®], Polyganics, Groningen, The Netherlands). Chemical cauterization can be done if bleeding persists; however, bipolar electrocoagulation should be avoided, as it can cause high aerosol release. In case of non-stop bleeding with this method, the unilateral application of nasal packing which does not dissolve (e.g., Merosel[®], Medtronic Inc., Minneapolis, MN, USA) should be done. If the bleeding stops, the patient should be informed and discharged with a scheduled follow-up visit after antibiotic prescription for prophylaxis and bilateral or posterior packing should be performed, if bleeding persists. Endoscopic sphenopalatine artery ligation may be also considered in cases of unstoppable bleeding with the aforementioned methods.^[19] The rules of general operating room during the pandemic must be followed (the use of PAPR in addition to the appropriate PPE) in endoscopic sinus surgeries, if possible.^[20] Also, in endoscopic surgeries, creating an opening that only the endoscope can pass with the help of a surgical mask/drape, significantly reduces the aerosol scattering during surgery.^[21] The treatment approach for epistaxis which we apply in our clinic during the pandemic is summarized in Figure 1.

NASAL FRACTURE AND SEPTAL HEMATOMA/ABSCESS

The nose is the region most affected by facial trauma. As a result of trauma, nasal bone fractures, dislocations or both can be seen. The diagnosis of nasal fracture is made by physical examination. On examination, pain, sensitivity, swelling, bruising, shifts in the roof of the nose, slips, collapses, mobility, the level differences between bones and cartilage, feeling of protruding bone structures by hand, and sound (crepitation) are the signs of nasal

fracture.^[22] Anterior rhinoscopy should be done and epistaxis, presence of septal fractures, and hematoma should be evaluated carefully. Septal hematomas should be ruled out in the presence of a unilateral or bilateral red or blue mass-like lesion in the septum on examination. Septal hematoma is the collection of blood between septal cartilage and mucoperichondrium as a result of damage to submucosal vessels after nasal trauma and, in particular, if not intervened in pediatric patients, abscess can develop or saddle-nose deformities due to cartilage necrosis, septum perforation, columellar retraction may occur. Therefore, it requires an early intervention.^[23] In the diagnosis of nasal fractures, lateral nasal X-ray and CT scans can be used in certain cases.^[24]

In the treatment of nasal fractures, it is appropriate to correct the nasal bone within the first few hours before edema develops; however, since common edema can make reduction difficult, correction can be performed within three to five days after swelling regresses.^[22] Open surgical procedures may be preferred instead of reduction, as fixation may develop in the nasal bone after 14 days.^[25] Reduction can be performed in closed and open ways under local or general anesthesia. Non-displaced nasal fractures can be manually reduced. Complicated nasal fractures should be treated with open reduction, while complicated nasal fractures may be accompanied by conditions such as intracranial pathologies or skull base fractures, and their exclusion is required. In such cases, reduction should be postponed and open surgery should be considered after the patient's condition is stabilized.^[22,25] Intranasal dressing/splint application and external nasal splinting can be performed based on the basis of each patient.^[26]

During the pandemic, appropriate PPE must be worn before performing the examination of the patient admitted with a suspicion of nasal fracture.^[14] When the examination is started, the displaced and non-displaced nasal fractures should be distinguished and non-displaced nasal fracture should be reduced manually as much as possible. In case of displaced fractures, closed reduction should be initially planned for the patient. The COVID-19 PCR test should be performed before the reduction is performed

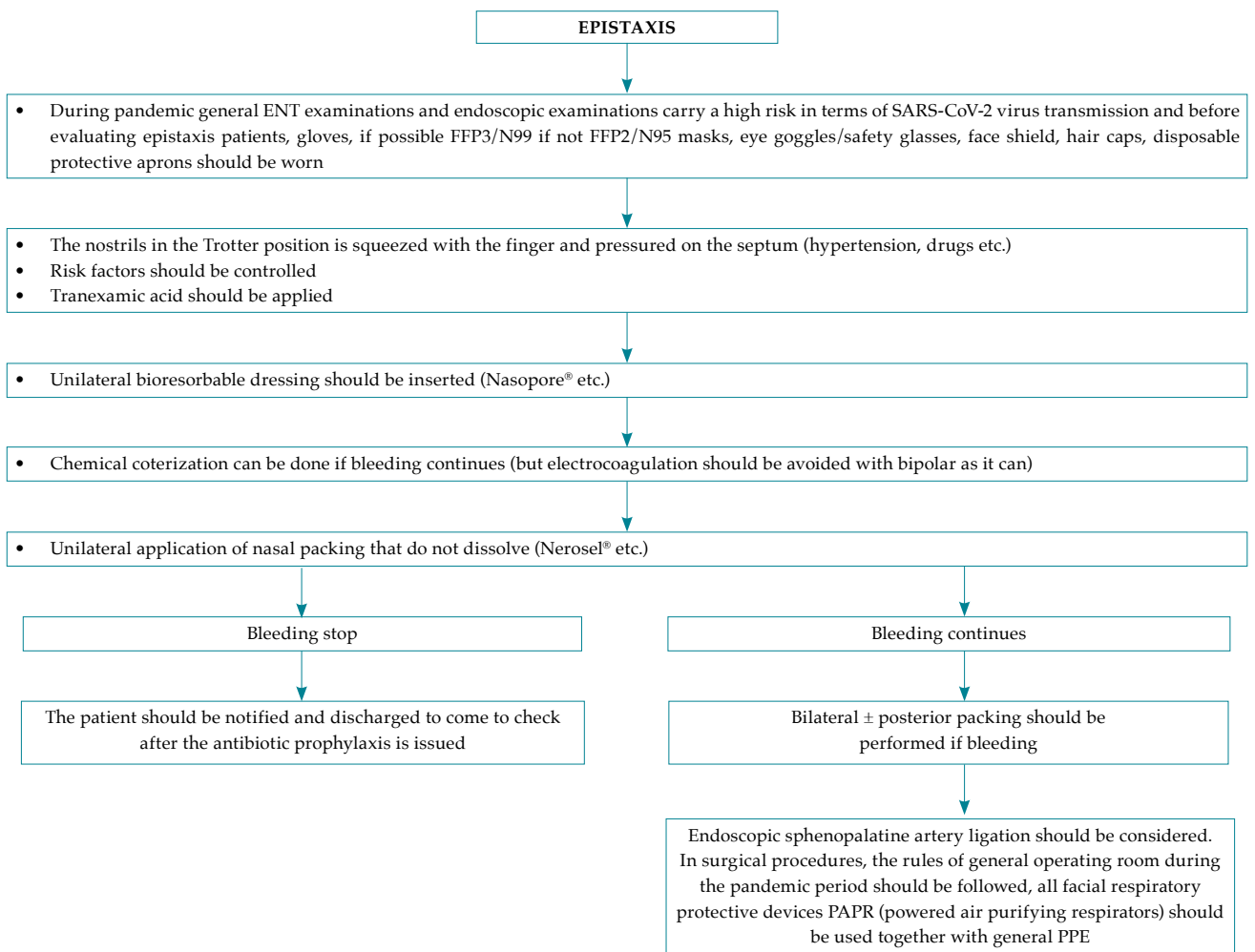


Figure 1. Approach to epistaxis during pandemic.

ENT: Ear, nose, throat; PPE: Personal protective equipment.

and, for patients with COVID-19 PCR negativity should undergo a fast antigen/antibody test on the day of reduction.^[26] Reduction can be performed in the outpatient setting in patients with negative PCR results with suitable appropriate PPE.^[14] In patients with negative PCR results requiring surgery under general anesthesia (i.e., patients with open reduction, or children) reduction should be performed using the general operating room recommendations and appropriate PPE.^[14,27]

In patients with COVID-19 positivity based on the PCR test and without any contraindication, reduction should be performed under local anesthesia. The COVID-19 PCR test-positive pediatric patients or patients who cannot be

tested due to an urgent need of intervention should be reduced under the rules of general operating room during the pandemic with appropriate PPE. Reduction should be done with the lowest possible number of personnel and PAPR should be used, if possible, in addition to the appropriate PPE during the reduction.^[14,27] Routine intranasal splint use may not be used, if there is no widespread mucosal damage or septum fracture, as droplet spread is high during removal post-processing. The nasal fracture approach which we apply in our clinic during the pandemic is presented in Figure 2.

When a septal hematoma/abscess is detected during the examination, the cartilage necrosis can develop within a few days and, therefore,

it should be intervened as soon as possible.^[23] In such cases, the COVID-19 PCR test will not be possible to be employed. If available, rapid antigen/antibody testing can be performed; however, it should be noted that its sensitivity is only 60 to 85%.^[28] The patient should be considered COVID-19-positive and treated accordingly and PAPR should be considered with necessary preparations.^[14] Transseptal dissolving sutures is preferable to intranasal splints to avoid any need for an attempt to re-form aerosol later and to obliterate the potential space and prevent recollection.

INFECTIONS

Head and neck infections may lead to symptoms such as respiratory distress, pain, and fever that may require patients to apply to the doctor immediately, and permanent changes such as facial paralysis, vision loss, and life-threatening conditions such as meningitis and brain abscess may occur. Complications of otitis, complications of rhinosinusitis, peritonsillar abscess, and deep neck infections (DNIs) are mainly infectious emergencies for otolaryngologists.^[29]

Complications of otitis

Middle ear infections out of the middle ear mucosa and temporal bone air activities are called complications.^[30] Complications due to acute otitis media (AOM) are significantly reduced with antibiotics prescribed for the treatment of otitis media, although complications due to chronic otitis media (COM) can be still observed. These complications carry a serious mortality and morbidity risk. Complications related to AOM usually occur in hematogenous ways, while complications associated with COM mainly occur through bone erosion caused by infection. Complications can be classified under two headings as intracranial complications and extracranial complications.^[31] Extracranial complications are mastoiditis, petrositis, subperiosteal abscesses (i.e., postauricular abscess, zygomatic abscess, Bezold's abscess), facial paralysis, and labyrinthitis. Intracranial complications can be classified under meningitis, lateral sinus thrombophlebitis, otitic hydrocephalus, extradural abscess, subdural abscess, and brain abscess subheadings.^[32]

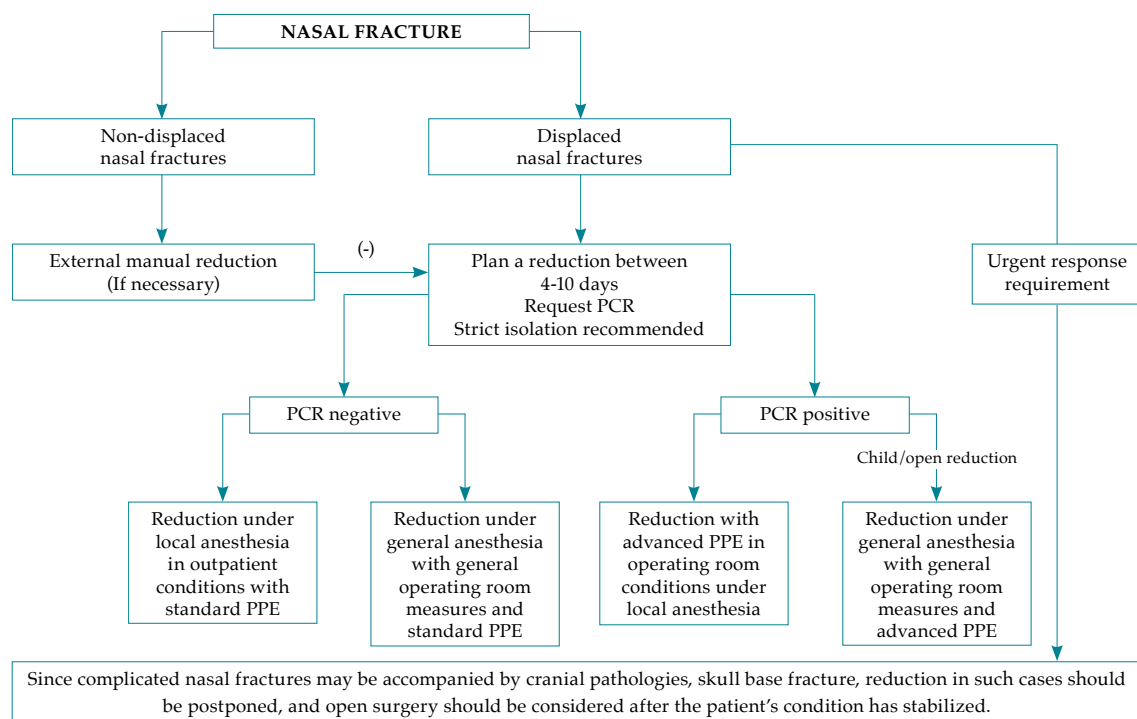


Figure 2. Approach to nasal fractures during pandemic.

PCR: Polymerase chain reaction; PPE: Personal protective equipment.

The diagnosis of otitis media complications is made based on the examination and, if necessary, CT examination.^[33] Parenteral antibiotics are the first option in the treatment of acute mastoiditis and petrositis. In patients who do not respond to antibiotic therapy for three to five days, surgery is recommended in the form of antrostomy in children and mastoidectomy in adults. In subperiosteal abscesses, parenteral antibiotic treatment is given and surgical drainage is performed.^[31] When facial paralysis develops on the background of AOM, besides antibiotic therapy, myringotomy/paracentesis should be performed. Systemic corticosteroids can be given in selected cases.^[34] In facial paralysis developed on the background of COM, mastoidectomy and facial nerve decompression are performed.^[35] In case of labyrinthitis, if developed due to AOM, myringotomy/paracentesis in addition to antibiotic treatment is performed and, if it is caused by COM, mastoidectomy is performed.^[31] While myringotomy/paracentesis is recommended in cases of meningitis due to AOM, mastoidectomy should be performed after correcting the general condition of the patient in meningitis related to COM. In other non-meningitis intracranial complications, the recommendations of the neurosurgery unit should be followed and mastoidectomy should be considered, when the patient's overall condition is improved.^[32]

During the pandemic, when a patient with suspected otitis complications visits the outpatient clinic, examination should be done with PPE after questioning a cough, shortness of breath, or contact history with a COVID-19-positive patient.^[14] Endoscope can be used, as otomicroscopic examination would be difficult with a face shield/goggles.^[36] Patients who are considered to have otitis complications and who are scheduled to undergo temporal high-resolution CT (HRCT) may be also included the thoracic region in terms of possible surgical intervention. In cases of mastoiditis and petrositis that do not respond to treatment, PCR test should be requested for hospitalized patients, and COVID-19 exclusion should be attempted in case of possible surgery.^[36,37] Again, in patients with subperiosteal abscesses and facial paralysis, surgery can be delayed for 48 to 72 hours, and PCR test should be requested and the patient

should be evaluated for the risk of COVID-19. In patients with negative PCR test results, COVID-19 is ruled out and, in addition to standard surgical equipment, surgery must be performed using a face shield/goggles and FFP2 mask.^[36] Since it will be difficult to use a microscope with a face shield and goggles, an endoscope should be used, if possible. It is thought that the use of curette and/or chisel will be more appropriate, since the amount of particles which occur during mastoidectomy drilling is quite high. In addition to the aforementioned suggestions in patients who are positive for COVID-19 PCR test and decided to be operated, a FFP3 mask or PAPR use may be considered, if available.^[36,37]

Complications of sinusitis

Complications of sinusitis occur by spreading the infection in sinuses and nasal cavity to the orbit or intracranial area or deterioration of normal paranasal sinus ventilation. Complications usually develop as a result of acute suppurative sinusitis or during acute episodes in patients with chronic sinusitis, when treatment is started late or remains inadequate.^[38] The orbit is a particular region affected by its close proximity to the ethmoid sinuses.^[39] Orbital complications due to sinusitis are classified according to the severity of the clinic by Chandler^[40] as preseptal cellulitis, orbital cellulitis, subperiosteal abscess, orbital abscess, and cavernous sinus thrombosis. Intracranial complications include meningitis, epidural abscesses, subdural abscesses, and brain abscesses. Mucocele, osteomyelitis, and superior orbital fissure syndrome are also important complications of sinusitis.^[41]

The diagnosis of sinusitis complications is made based on examination and CT examination, if required.^[42] Patients with orbital complications should be hospitalized and intravenous antibiotic treatment should be started without delay. The visual acuity and CT findings are critical in planning treatment. The patient is evaluated from an ophthalmological point of view and, if necessary, vision check is performed per hour. Surgical treatment should be applied to any patient with decreased vision or worsened vision rapidly within 24 hours despite medical treatment, or in whom no improvement is achieved within 48 to 72 hours. While subperiosteal abscess can

be waited up to 72 hours for surgical treatment; orbital abscess requires emergency drainage. Surgical treatment should include the drainage of endoscopically infected sinuses and abscesses.^[43] For intracranial complications, the consultation of neurosurgery should be requested and, when the patient's overall condition is improved, drainage of the infected sinuses should be done endoscopically.^[44] Long-term parenteral antibiotic therapy is required, if osteomyelitis is present. Also, surgery should be planned in patients with mucocele and superior orbital fissure syndrome and the time of surgery should be determined according to the presence of cranial nerve deficits and orbital compression. By its nature, a sphenoid mucocele resulting in optic nerve compression should be operated as urgently as possible.^[45]

During the pandemic, when a patient with suspected sinusitis complications visits the outpatient clinic, examination should be done with PPE after questioning a cough, shortness of breath, or contact history with a COVID-19-positive patient.^[14] In the patient who is considered to have a sinusitis complication, the endoscopic examination step that should be done normally can be skipped. For patients undergoing paranasal sinus CT, thoracic region may be included in the examination to rule out COVID-19 for a possible surgical intervention. In cases of preseptal-orbital cellulitis or subperiosteal abscess, the PCR test is requested in hospitalized patients, and COVID-19 exclusion is attempted in case of possible surgery.^[14] Ophthalmology consultation should be also requested after the PCR result, if possible. In cases where the surgical intervention is required urgently, such as orbital abscesses causing visual loss or sphenoid sinus mucocele with optic nerve compression, rapid antigen/antibody testing should be requested, if available. Patients in whom COVID-19 is ruled out can be operated with standard PPE. A FFP3 mask and PAPR should be used in addition to the standard PPE in patients who are positive for COVID-19 based on the PCR test or undetermined to be operated urgently.^[20] Also, in endoscopic surgeries, creating an opening that only the endoscope can pass with the help of a surgical mask/drape significantly reduces the aerosol scattering in the operating room.^[21]

Deep neck infections

Deep neck infections are infections with a rapid onset, which begin in the potential gaps in the neck and can quickly turn into abscess formation, if left untreated. Lymphadenitis can be seen as cellulite of the neck tissues, as well as in the form of abscess.^[45] Despite increasing importance to oral hygiene, improved diagnostic and treatment methods, and development of antibiotic therapies which have reduced DNI-related morbidity and mortality, particularly in cases of diabetes, chronic disease, and immune deficiency, rapid and fatal course may be observed.^[46] It mostly occurs after odontogenic infections and upper respiratory tract infections such as tonsillitis/pharyngitis. Deep neck infections can be located to peritonsillar, masticator, submandibular, parapharyngeal, and retropharyngeal, parotid and prevertebral region, being most commonly observed in the peritonsillar region.^[45,46]

The diagnosis of DNIs is based on clinical findings and imaging studies. Ultrasonography (USG) or CT is required in most cases.^[45] In the treatment, the location and extent of the infection, the presence of abscess, accompanying diseases, and the age group of the patient should be specifically considered. Patients are usually given parenteral antibiotic therapy. Drainage is required in the presence of abscesses.^[47] Current publications have stated that infections with phlegmon stage, abscesses smaller than 2 cm, and peritonsillar abscesses where breathing is not affected can be followed with a 48-hour antibiotic treatment. Meanwhile, however, patients should be closely observed in terms of progression of infection and complications which may develop.^[48] While abscess drainage is possible through the mouth in peritonsillar and retropharyngeal abscesses, incisions made from the outside to provide access to the area related and the abscess drainage is performed in other situations. For the interventions made through the neck, it is recommended to place the drain and ensure the drainage of the region in the following days. In deep localized abscesses, USG-guided drainage can be applied.^[47]

During the pandemic, fever and general condition disorder, which are also symptoms

of DNIs similar to COVID-19, the latter should be ruled out in patients presenting with these complaints.^[14] In addition, thoracic region should be evaluated for the exclusion of COVID-19 in patients who underwent CT for diagnosis and clinical follow-up. Patients with peritonsillar, retropharyngeal, submandibular, and parapharyngeal abscesses and no respiratory distress or no sepsis can be drained, after they are hospitalized for parenteral treatment and after COVID-19 is ruled out based on CT and PCR test results.^[18] Topical anesthetic spray is suitable for drainage from the oral cavity.^[14,48] In patients in whom COVID-19 is ruled out, a N95 mask and face-protective visor should be fitted in addition to standard surgical equipment during drainage or surgery and PAPR should be used in addition to PPE including a FFP3 mask, if possible, in the treatment of patients who are positive for COVID-19 based on PCR test or undetermined to be operated immediately.^[49]

SUDDEN HEARING LOSS

Sudden hearing loss is hearing loss developing suddenly or progressively within three days. On audiological examination, 30 dB or more sensorineural type hearing loss are defined as at least three consecutive frequencies. Although viral, autoimmune, vascular, cochlear and retrocochlear pathologies are among the factors to be blamed, it is often idiopathic. In addition, sudden hearing loss can be due to many external and middle ear diseases which may cause conductive-type hearing loss such as acute-serous otitis media or eustachian tube dysfunction.^[50] Although effusion in the middle ear is not one of the leading findings in COVID-19 virus infection, effusion may develop in the middle ear due to eustachian tube dysfunction in viral upper respiratory tract infections.^[51] In addition, a case of sensorineural hearing loss with 2019-nCoV has been recently reported.^[52]

When the patient with sudden hearing loss visits the outpatient clinic during the pandemic, his/her fever should be measured and his/her contact history with COVID-19-positive patient should be questioned with cough or shortness of breath. If there is any of these, the patient is referred to the COVID-19 outpatient clinic of the relevant hospital.^[2] Before examining the patient,

the physician must ensure hand hygiene and perform an otoscopic examination and Weber test using the appropriate PPE.^[14] Pure-tone audiometry for the patient can be performed whose medical history and Weber test result are compatible with sudden hearing loss, after the COVID-19 PCR test is requested.

The spontaneous recovery rate of sudden hearing loss ranges between 32 and 65% in the literature. However, high doses of corticosteroid therapy (1 mg/kg) within the first two weeks and intratympanic corticosteroid therapy usually used in rescue treatment within two to six weeks increase these rates.^[53] Intratympanic treatment may be designated as a priority treatment due to the immunosuppressant effects of high-dose corticosteroid use in the treatment of sudden hearing loss during COVID-19 pandemic.^[36] However, it is a major disadvantage that the patient has to visit the hospital every two days for intratympanic treatment. Therefore, this treatment can be bypassed in patients with mild hearing loss to reduce the risk of transmission from the hospital. During intratympanic treatment, the appropriate equipment should be worn, as during examination, and the patient should be advised not to swallow for 20 min to reduce aerosol generation.^[37]

In our daily practice, we perform examination and Weber test using appropriate PPE in patients admitted with the suspicion of sudden hearing loss. If the findings are consistent with sudden hearing loss, we begin intratympanic corticosteroid treatment for a total of five doses. In the meantime, we conduct a COVID-19 PCR test, and once the test yields negative results, we ask for a pure-tone audiometry to confirm the diagnosis before the second dose of intratympanic treatment is applied, and for follow-up at the end of the fifth dose. If there is not enough response, we apply five more doses. In addition, we utilize a contrasted ear magnetic resonance imaging (MRI) containing an internal acoustic channel to eliminate cochlear-retrocochlear pathologies.

As a result, although there is no definitive consensus on the treatment of sudden hearing loss during COVID-19 pandemic, due to possible immunosuppressive effects

of high-dose systemic corticosteroid use, intratympanic treatment can be put to the forefront. Systemic steroids can be added to the treatment by informing the patient about the current risks, if he/she has no additional disease, newly developed severe/profound hearing sensorineural type loss in pure-tone audiometry, under 60 years of age, and negative PCR results for COVID-19.

PERIPHERAL FACIAL PARALYSIS

The cause of facial paralysis is often undetermined and is called idiopathic facial paralysis (Bell's palsy). In order to diagnose Bell's palsy, which accounts for 60 to 70% of facial paralysis cases, other causes including traumas, Herpes Zoster Oticus, neoplasms, surgery, diabetes, immunological diseases, drugs, and otitis media must be excluded.^[54]

Clinical evaluation is done in three stages: (i) determining the affected side; (ii) determining the underlying etiology; and (iii) clinical classification (e.g., House-Brackmann Scale).^[55] Facial paralysis may also present with pain behind the ear, loss of taste, or hyperacusis. It should be questioned whether the disease occurs gradually or abruptly. During inspection, the separation of central/peripheral facial paralysis should be made first. Then, it is important to have a careful ear examination and evaluate the functions of other cranial nerves.^[56] The CT and MR imaging studies are also very useful tools in determining the location and etiology (i.e., temporal bone fracture or edema formation) in cases of trauma and recurrent paralysis. Other tools which can be used in the evaluation are electrophysiological tests.^[57]

Bell paralysis

Bell's palsy is spontaneous, idiopathic, sudden-onset, lower motor neuron type facial palsy or paralysis. Prognosis is usually good and 90% of patients recover. Factors which affect prognosis in the opposite direction are complete paralysis, presence of additional systemic diseases (e.g., DM), over 60 years of age, severe ear pain, loss of tears, and more than 25% decrease in the submandibular gland saliva flow.^[56]

Corticosteroids are most commonly used in the treatment. Previous studies showed that

patients who were given steroid therapy had a higher rate of complete recovery than those who were given a placebo or were not given any treatment.^[57] Although no definitive consensus on the dose and duration of treatment has been provided, the recommended dose is 1 mg/kg/day in adults and 2 mg/kg/day in children.^[58]

Since it is reported that high doses of steroid use may have possible harmful effects due to immunosuppression in COVID-19 infection, the treatment decision should be evaluated on the basis of each individual patient.^[59] Patients should be informed about possible benefits and side effects of the treatment and the treatment decision should be made together with the patient.^[36]

Ramsay-Hunt syndrome

Ramsay-Hunt syndrome is associated with the seventh and eighth cranial nerves and is called VZV-related neuritis, which is present with vesicular rash. Prognosis is worse than Bell's Palsy. In addition to corticosteroids, anti-viral therapy is given in the treatment.^[60]

As stated previously, there is no information on contraindication of the use of anti-viral therapy in COVID-19 treatment. Since it is reported that high doses of steroid use may have possible harmful effects due to immunosuppression in COVID-19 infection, the treatment decision should be evaluated on the basis of each individual patient.^[36]

Temporal bone fracture

One of the most common causes of intratemporal facial nerve damage is temporal bone fractures. Temporal bone trauma can be blunt or penetrating. For temporal bone fractures, the classification is made according to whether the petrous apex is parallel to the long axis of the fracture line and is collected under three headings: longitudinal, transverse, and mixed.^[61] In addition, there are other classifications according to the otic capsule disruption described by Brodie and Thompson^[62] and petrous bone involvement described by Ishman and Friedland.^[63] Sudden onset post-traumatic facial paralysis is associated with a worse prognosis than facial paralysis which occurs over time.^[62]

Patients with delayed-onset facial paralysis are placed on a two-week course of systemic corticosteroids and are followed. Patients with complete facial paralysis with an immediate onset are tested with the nerve stimulator between Days 3 and 7 after the injury. If there is no loss of stimulation, steroid use is recommended for patients for 14 days under follow-up. If the nerve loses its stimulability within one week of the injury, facial nerve exploration is performed.^[64]

If a nerve stimulation test or operation is planned in a patient with facial paralysis, the COVID-19 test should be performed first and, after the test, the patient should remain under strict isolation until the time of the procedure and the patient whose test result is reported as negative should be tested on the day of the procedure, if possible. In patients whose PCR test is negative and COVID is ruled out, clean operating room conditions should be provided. In addition to standard surgical equipment, surgery should be performed using a face shield/goggles and FFP3 mask.^[36] Since it will be difficult to use a microscope with a face shield and goggles, an endoscope should be used, if possible. It is thought that the use of curette will be more appropriate, since the amount of particles which occur during mastoidectomy drilling is quite high. In addition to the aforementioned suggestions in patients who are positive for COVID-19 PCR test and decided to be operated, PAPR use can be considered, if available.^[36,37]

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