

Recommendations from the Italian Society of Otolaryngology for clinical management during the SARS-CoV-2 pandemic

Raccomandazioni della Società Italiana di Otorinolaringoiatria per la gestione delle attività cliniche durante la pandemia da SARS CoV-2

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SUMMARY

The coronavirus disease (COVID-19) pandemic has deeply impacted health, and affects many different medical specialties. Head and neck surgeons, in particular, have been recognised as one of the professionals at the highest risk of infection through aerosol-generating procedures as part of their usual job. The aim of this document is to review the current literature on the topic, to provide useful recommendations to avoid both healthcare staff exposure to contagion and the delay in the diagnosis and treatment of Head and Neck diseases, in this new phase of COVID-19 pandemic.

KEY WORDS: recommendations, COVID-19, PPE, surgery, head and neck, otolaryngology

RIASSUNTO

La pandemia di COVID-19 ha avuto un profondo impatto sulla salute delle persone, e colpisce molte diverse specialità mediche. I chirurghi della testa e del collo, in particolare, sono stati riconosciuti come i professionisti a più alto rischio di infezione, attraverso le procedure diagnostico-terapeutiche generatrici di aerosol come parte del loro lavoro. Lo scopo di questo documento è quello di rivedere la letteratura attuale sull'argomento, per fornire raccomandazioni utili al fine di evitare sia l'esposizione al contagio dei sanitari che il ritardo nella diagnosi e nel trattamento delle malattie della testa e del collo, in questa nuova fase della pandemia COVID-19.

PAROLE CHIAVE: raccomandazioni, COVID-19, PPI, chirurgia, testa e collo, otorinolaringoiatria

Introduction

COVID-19 pandemic is an ongoing global pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes a wide range from mild to severe symptoms and is mainly transmitted from person to person via respiratory droplets ¹.

During the early phase of the pandemic, considering the high risk of contagion and the need to treat COVID-19 patients, in many hospitals elective surgical and non-urgent procedures had to be postponed to conserve resources and limit exposure. As a consequence, the pandemic has deeply impacted people's health, as it has affected many different medical specialties. Head and neck surgeons, in particular, have been recognised as one of the professionals at the highest risk

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of infection through aerosol-generating procedure as part of their usual job. In this context, in the early phase of pandemic, clinical and surgical procedures were restricted to procedures that could impact disease prognosis if delayed. In the last year, instead, thanks to COVID-19 containment measures adopted by world governments and large-scale deployment of vaccines, there has been a gradually return to the routine pre-COVID-19 era.

The aim of this document is to provide useful recommendations in order to avoid delay in the diagnosis and treatment of head and neck diseases in this new phase of the COVID-19 pandemic.

Standard precautions during patient care

To minimise the risk of infection transmission in clinical practice, healthcare workers and patients must follow hand hygiene, physical distancing and wear personal protective equipment (PPE).

*Hand hygiene*²

Hand hygiene should be performed at 5 specific moments:

- before touching a patient;
- before a procedure;
- after procedure or body fluid exposure risk;
- after touching patient;
- after touching a patient's surroundings.

Personal protection equipment (PPE)

- Latex, nitrile or vinyl gloves are recommended during all medical procedures; double gloving is recommended as a protective measure during surgical practice.
- Sanitary staff, to protect the mucus membrane of the eye, nose and mouth during procedure that may generate splashes or sprays of blood, body fluids, excretions and secretions should wear goggles and face shields. Personal eyeglasses and contact lenses are not considered adequate eye protection.
- During all medical procedures healthcare workers must wear facial mask (FFP2); during aerosol-generating procedures* FFP3 must be worn³.
- Medical scrubs or company uniforms are recommended; machine wash workwear immediately after daily use.
- It is recommended to avoid jewellery while working, as they can be virus reservoir⁴.

* Ear, Nose and Throat (ENT) procedures that generate aerosols are: intubation-extubation, oropharyngoscopy and manoeuvres on the oral cavity/oropharynx, nasal and laryngeal endoscopy, gastrointestinal endoscopy, drainage of peritonsillar abscess, nasal tamponade, removal of foreign bodies from the airways, tracheostomy, change of cannula and management of the tracheostomy, use of motorised instruments in head and neck surgery (bur, microdebrider, etc).

Outpatient clinic

Before patient visit

The waiting room and public areas must have measures in place to implement social distancing and all the non-essential objects should be removed from them. In order to minimise the number of patients in the waiting room and to maintain the strictest hygiene regime, appointments should be scheduled every 20-30 min. Patients must have and show their COVID-19 green certificate in order to access to the consultation room. With the last Italian regulations, the COVID-19 green certificate is a free document in digital and printable format which attests to one of the following criteria: vaccination against COVID-19, a negative antigenic or molecular swab taken within the last 48 hours, or recovery from infection.

In case of lack of the COVID-19 certification, patients are requested to fill out a COVID-19 self-declaration form and will have to present a negative molecular swab performed within 48 hours or rapid antigenic test within 24 h.

The waiting room must provide areas of 4 square metres (2 m x 2 m) for each patient and any accompanying person, marked on the floor with stencils or stickers; there must be a minimum distance of 1 metre between each area. Physical distancing is to be maintained between staff and patients and between staff and staff. Staff and patients must remain at least 1.5 metres apart with the exception of clinical examinations and procedures. Unnecessary items must be removed from the clinic, in order to facilitate transit, order and subsequent cleaning and disinfection.

Patients should come alone or bring only one accompanying person if essential (e.g. children, pregnant woman, patients with disabilities or in case of language barriers) who must have and show a COVID-19 green certificate. In case of lack of COVID-19 certification, each caregiver must fill out a COVID-19 self-declaration form (Tab. I) and undergo a molecular test by swab with negative result 48 hours prior to entering to the hospital. Non-touch temperature check is mandatory for entry in the building. Both healthcare workers, patients and their relatives should wear adequate PPE.

Table I. S-declaration form. Last 14 days.

Fever (> 37.4°)	Yes	No
Cough or respiratory signs	Yes	No
Dysgeusia, anosmia	Yes	No
Fatigue or malaise	Yes	No
Diarrhoea or digestive discomfort	Yes	No
COVID-19 contact (suspected or confirmed)	Yes	No

Frequent opening of doors or windows can increase ventilation in indoor settings and reduce COVID-19 transmission.

It is recommended to clean all surfaces frequently and to remove all unnecessary items from waiting rooms. This includes toys, magazines, books and brochures etc.

Patient visit

EXAM ROOM CONSIDERATION

Patients should be unaccompanied unless absolutely necessary if they require a caregiver or translator. To minimise environmental contamination, we recommend decluttering the exam room space by removing hand-outs, models and exposed equipment. All paper materials and unnecessary items must be removed as much as possible. The microscope used during otologic examination should be routinely covered with a sterile, clear drape and frequent sanitization of the instrument is recommended. Ensure the exam room doors are closed, and only essential staff should be in the examination room. Whenever possible, disposable instruments must be used. Containers must be used for infected and sharp disposable instruments. Single-use instruments should preferably be used and placed in special containers for disposal after use. We do not recommend the use of a mobile phone in the examination room, but should it for any reason be carried inside, it is recommended to cover it with plastic protection. Adequate ventilation of the room is also recommended.

ENT EXAMINATION

Airway endoscopies

During the pandemic, it is useful to assess in advance whether endoscopic examination is necessary or whether it can be delayed.

As endoscopic procedures can easily aerosolise SARS-CoV-2, ENT specialists should be equipped with adequate PPE (fluid-resistant FFP3/N95 mask, double-gloving, full face shield, head and shoe covers). The patients should only partially lower their mask during the exam to minimise droplet production and transmission, and endoscopy should be carried out by video monitoring in order to increase physical distance from patient's face⁵; ensuring adequate local anaesthesia to reduce cough and sneezing reflexes⁶. High-level disinfection should be used for cleaning rooms and instruments; if available use disposable nasopharyngoscopy equipment, including the nasoendoscope itself or sterile covers.

Microscope

If possible, use disposable items for each patient. After examination, sanitise the areas close to or in contact with the patient, the lens and the binocular area.

Audiology testing

As a closed space, the audiometry booth is considered to be high risk of accumulation of viral load, and difficult to disinfect. For these reasons, different precautions should be taken during the audiometry tests. Patients must wear face masks during tests, sanitise their hands before entering the booth and should sit in the chair without touching anything. It is advisable to use a recording, and never a live voice, during vocal tests and to use protective individual earphone covers (separate covers for each earphone that must be replaced after each test). Allow enough time between patients for full booth air exchange and to clean and disinfect the test booth equipment after each test⁷.

In case of newborn hearing screening programme:

- the newborn must be accompanied by only one parent;
- the parent must be screened at triage and use both a mask and gloves;
- the PC keyboard and cables must be covered with transparent film or properly disinfected after each performance;
- it is preferable to use inserts and in the case of use of headphones, these are coated with disposable material;
- it is necessary to cover the stroller with disposable material;
- it is necessary to place a disposable towel on the stroller;
- it is necessary to allow for a longer time to carry out the exam;
- it is recommended to maintain traceability of children who have not been screened because of the COVID-19 emergency and specify that they must be rescheduled.

Patients with tracheostomy

Patients with tracheostomy with positive or unknown status of COVID-19 should always be examined using enhanced PPE. Cases with confirmed negativity for COVID-19 may be cautiously evaluated using standard PPE. If a patient requires an in-office visit, it is important that the tracheostomy is equipped with adhesive baseplates and a heat moisture exchanger that filters viral or bacterial particles. The tracheostomy must additionally be covered by a surgical mask.

It is recommended to change the tracheostomy tube in an outpatient setting, if possible/available, and to use a converted room with negative pressure or with frequent air changes. The foresight to cover the area of the stoma with a cloth (preferably transparent) and perform the cannula change under a covered sky is demonstrated to be of practical use. For this procedure, it is recommended to use enhanced PPE.

Post-visit

- Disposable instruments are placed in special containers after use.
- A thorough cleaning and disinfection of all surfaces and areas in contact with the patient should be carried out with a disposable cloth, leaving the product to act for at least 2 minutes. The usual cleaning and disinfection products are effective against coronavirus (0.1% sodium hypochlorite solution; 30 ml common bleach per litre of water).
- High-level disinfection procedures must be performed for equipment such as rigid and flexible endoscopes. Disinfection will follow the usual clinical routine with phenolic compounds, peracetic acid and 10% sodium hypochlorite. Alternatively, protective sheaths may be used.
- Rooms must be ventilated.
- It may be considered useful to cover the computer keyboard with plastic wrap. The mouse needs to be sanitised with particular care.

Priority visit

In relation to the need to prioritise patients at risk for head and neck neoplasms, it may be useful to implement programs such as the Head and Neck Cancer Risk calculator (available at <http://orlhealth.com/risk-calculator-2.html>).

Tele-health

The implementation of Telehealth systems will help to reduce access to ENT visits for patients with deferrable pathologies.

Operating setting*Elective surgical procedure: preoperative diagnostic assessment*

Before surgery, a nasopharyngeal swab for real-time Polymerase Chain Reaction (RT-PCR) testing should be performed 48 h prior to surgery; strict quarantine awaiting test results is recommended. On the day of admission, the patient needs to be screened to COVID-19 symptoms/signs and must undergo a rapid antigen test or PCR test ⁸. If a patient tests positive for SARS-CoV-2, non-emergency surgical procedures should be delayed until the patient is no longer infectious.

Urgent surgical procedure

All surgical patients who are waiting for hospital admission and urgent surgery must undergo RT-PCR nasopharyngeal swab test at the emergency department. If the COVID-19

screening is not available, the patient should be treated as potentially positive and PPE (N95/FFP2 and N99/FFP3 masks, goggles, face-shields, full-body covering gowns) must be kept ready to use ⁹.

Head and neck oncology management

As mandated by the COVID-19 context, social contacts must be limited to minimise viral transmission. Therefore, the reorganisation of the management of oncologic patients is needed.

The stage of the head and neck cancer defines the extent of the tumour and is also determined by complete physical examination of head and neck district.

Our society recommends the use of telemedicine for tumour boards and for multidisciplinary oncological evaluation. Malignant tumours of any site, with clinical lymph node involvement, amenable to surgical treatment, have the highest priority ¹⁰.

Malignant tumours of any site without clinical lymph node involvement and amenable to surgical treatment, have priority proportional to the T value of the TNM 8th classification, considering the possible evolution of the disease towards unresectable.

With the same T of the malignant lesion, tumours of the oral cavity/oropharynx should be given priority, followed by cancers of the hypopharynx/larynx, salivary glands and paranasal sinuses. However, clinical (symptomatology) and histological (grading and malignancy of the histotype) factors must be taken into consideration.

Thyroid carcinomas must have priority over those of other districts only in case of locally advanced or symptomatic T4 lesions (tracheal compression).

Computerised tomography (CT) scan of the chest is always recommended to assess lung metastases in clinical staging of the tumour.

Preoperative CT imaging should be also considered to identify suspected active SARS-CoV-2.

Molecular tests and serological tests must always be performed even in asymptomatic patients ¹⁰.

SURGICAL ONCOLOGY SETTING

Our society recommends to establish COVID-19-dedicated operating room(s) with independent ventilation and negative pressure systems separate from those of the other operating rooms.

Twenty-five air changes per hour may be the minimum required.

Endotracheal intubation must be performed in order to avoid cuff leaks: this is a fundamental point in laryngeal surgery which often involves the use of small diameter tubes to facilitate exposure of the surgical field.

It is important to limit the use of powered electrical instruments for shedding viral particles from blood and to use as little as possible suction and electrocautery that are also considered aerosol-generating instruments.

If the patient has negative COVID-19 status, we recommend the use of two surgical caps, two pairs of surgical gloves, a surgical mask and eye protection.

In case of suspected COVID-19 infection or positive PCR, the surgical team must wear two surgical caps, two pairs of surgical gloves, a suit and surgical gown or two water-resistant surgical gowns, surgical shoes with disposable covers, FFP2/3 and surgical mask and eye protection.

POSTOPERATIVE PERIOD

Communication between hospital staff and family members should preferably be done electronically.

After surgery, patients are transferred to the recovery room, where anesthesiologist consultation is immediately available ¹⁰.

It is recommended to adopt maximum safety measures up to the swab test result during wound dressings.

Patients with head and neck tumours are frequently affected by various comorbidities, such as chronic obstructive pulmonary disease (COPD), arterial hypertension, type 2 diabetes, heart failure (NYHA class II-III), chronic renal failure and gastro-oesophageal reflux disease.

In these cases, the postoperative course may lead to difficulties in the differential diagnosis between a complication related to surgery and SARS-CoV-2 infection.

A systematic postoperative management protocol is characterised by:

- time-temperature curve;
- SpO₂ monitoring in patients with active COPD, especially if undergoing tracheostomy;
- markers of inflammation and tissue damage (C-reactive protein, procalcitonin, erythrocyte sedimentation rate, lactate dehydrogenase, complete blood count, D-dimer, leukocyte count).

In case of dyspnoea and desaturation, it is recommended to contact an infectious disease specialist and evaluate the need for an emergency chest CT. In case of suspected infection, after transfer to an area dedicated to COVID-19 patients, it is recommended to perform nasal and oropharyngeal swabs, repeated at 24 hours.

It is recommended to adopt maximum safety measures up to the swab test result during wound dressings.

In case of negative swab test, a pneumological evaluation SpO₂ and arterial blood gas (ABG) should be monitored for 24 hours. This assessment must be repeated before discharge to assess the possible need for home oxygen therapy.

Tracheostomy care

Staff caring for patients should be properly educated on COVID-19 airway management (such as using closed suctioning, cannula care) as these are high-risk (to staff) scenarios, because of the direct communication with the respiratory tract.

Bronchial tree toilets including suctioning must be performed using enhanced PPE.

It is important to educate the patient as early as possible to be autonomous in the management of the tracheostomy. ENT specialists should educate patients not to touch their tracheostomy, and to wash their hands every time they have contact with the stoma.

Follow-up

Telehealth consultations should play a central role also in the follow-up of head and neck cancer patients.

In the outpatient clinic visit, the ENT staff must pay attention to the management of the tracheostomy if still present and of the related implanted devices (e.g., voice prostheses).

If not strictly necessary, it is advisable to postpone the start of the speech therapy (in hospital).

In case of use of a heat moisture exchanger, we recommend the use of a “hands-free” tracheostoma valve.

OTOLOGY AND OTONEUROLOGICAL SURGERY

The exposure risk during otologic procedures is unclear, but it stands to reason that virus aerosolisation can also occur during middle ear procedures because of the continuity with the nasopharynx ^{8,11}.

Mastoidectomy with bone drilling can generate high volumes of aerosolised particulate and is considered a high-risk procedure. Emergent and urgent ear surgeries are relatively uncommon compared to many other otolaryngologic procedures ¹².

Given the risk of exposure to potentially infectious aerosols with the use of high-speed drills in patients with COVID-19, patients with unknown status of COVID-19 should always be approached using enhanced PPE.

Cases with confirmed negativity for COVID-19 may be cautiously evaluated using standard PPE.

To minimise the operating time, the team must consist of expert surgeons.

Only essential staff should be in the operating room.

We recommend inducing controlled hypotension to decrease intraoperative blood loss and to improve operating conditions.

The operative microscope does not offer protection for the eyes in practice (we recommend the surgical team to use and maintain PPE correctly).

TRACHEOTOMY IN COVID-19 PATIENTS

As an aerosol-generating procedure, tracheostomy is as-

sociated with high droplet and particle generation, placing healthcare providers at increased risk for transmission of respiratory viral infections.

We have based our guidelines upon consensus from the currently available literature to form a pragmatic and safe approach¹³⁻¹⁶.

Tracheostomy is a common procedure in critically-ill patients who require an extended period on mechanical ventilation.

The advantages in COVID-19 patients can include offering a closed system for respiratory support. This may be preferable to primary extubation with a high risk of failure, a requirement for high-flow oxygen or non-invasive ventilation.

Tracheostomy also allows a lower requirement for sedation and facilitates less invasive nursing care.

We suggest creating an “airway management team” with representation from anaesthesiologists and otolaryngologists, which forms a cross-specialty working group to design the tracheostomy team using shared expertise.

Early planning and staff training is essential and can ensure adequate expertise minimising exposure risk for healthcare personnel.

Tracheotomy in COVID-19 patients

PPE: We recommend full PPE for all aerosol-generating procedures including:

FFP3 mask;
eye protection;
head and face shield;

fluid-repellent disposable surgical gown with long sleeves;
two pairs of surgical gloves;
surgical shoes with disposable covers;
two surgical caps.

PLACE: operating theatre. If it is not possible, it should be performed at bedside in the intensive care unit (with closed doors during the procedure).

PATIENT: the team must review indications for tracheostomy; specifically, timing and prognosis.

EQUIPMENT: pre-prepared tracheostomy sets (only use cuffed, non-fenestrated tracheostomy tube) and ensure there is an adequate supply in various sizes. Establish a system to record what has been used and what needs restocking.

COVID Airway Team: designate staff to form a core COVID-19 Airway Team.

The suggested team makes up of at least two ENTs and one anaesthetist experienced in head & neck surgery. Run simulation training with all key staff on location.

WHEN: semi-elective procedure.

Surgical intervention steps

Before tracheal incision

- Expose the trachea.
- Inform the anaesthetist of readiness to open the trachea.
- Confirm paralysis.
- Pre-oxygenate with PEEP then stop ventilation and turn off flows.
- Allow time for passive expiration.
- Push the tube beyond the point of the tracheal incision.
- Hyperinflate cuff and re-establish oxygenation with PEEP.
- When adequately oxygenated, communicate clearly and stop ventilation prior to opening the trachea.

Tracheal incision

- Create tracheal window taking care to avoid the endotracheal tube cuff.
- Prepare the tracheal window preferring Metzemaum scissors over surgical blade # 11.
- Ensure the window is of sufficient size to allow easy insertion of the tracheostomy tube without breaking the cuff.
- Create the stoma with numerous detached stitches with braided thread, non-absorbable, and needle with a small curvature (to limit the risk of damaging the tube).
- Stop flows, allow passive expiration, consider clamping the endotracheal tube.
- Deflate the endotracheal tube cuff and drawback proximal to the tracheal window under direct vision.
- Insert a cuffed, non-fenestrated tracheal tube.
- Immediately inflate the tracheostomy tube cuff.
- Replace the introducer with a non-fenestrated inner tube and heat moisture exchanger.
- Fast attachment of circuit.
- Resume ventilation.
- Confirm the position of the tube in a 30° head-up position.
- Confirm position with end-tidal CO₂ only (avoid contamination of stethoscope by auscultation).
- Withdraw clamped endotracheal tube carefully.
- Secure tube with sutures and tracheostomy tapes and use appropriate dressing.
- Doffing of PPE in the appropriate area.

Post-procedure

NURSING CARE

- Use only in-line closed suction circuits at all times.
- Periodically check cuff pressures (the cuff should not be deflated without considering risks to the patient, staff and environment).

- Do not change dressings unless there are signs of infection.

FIRST TUBE CHANGE

- Delay first tube change to 7-10 days.
- Use full PPE.
- Perform the same sequence of pause in ventilation with flows off before deflating the cuff and insert new tube with immediately re-inflation of cuff and reconnection of circuit.

INTENSIVE CARE UNIT DISCHARGE

- Ideally to a dedicated COVID-19 tracheostomy ward with trained nursing staff.
- Cuffed non-fenestrated tube to be used until the patient confirmed COVID-19 negative.
- Subsequent planned tube changes at 30 day intervals.

DECANNULATION

- If the patient is confirmed COVID-19 negative and is to be moved to a COVID-19 negative ward, consider trials of cuff deflation.
- Readiness for decannulation should be made after verifying that the patient is able to return to normal breathing.

Urgent tracheostomy

If COVID-19 status cannot be determined, patients should be considered as positive and the surgery should take place in full COVID-19 precautions and in a dedicated operating room.

Insufficient precaution in managing a false-negative COVID-19 patient could cause contagion to surgical staff and negative patients.

Endoscopic sinonasal and skull base surgery

The sinonasal cavity has consistently reported high viral loads.

Endoscopic sinonasal and skull base surgery necessitates extensive manipulations within the nose/paranasal sinuses. Elective cases should be deferred and emergent/urgent cases should be treated as high risk for COVID-19 exposure¹⁷⁻¹⁹.

Our society recommends:

- the execution of two nasopharyngeal swabs, distanced by at least 24 hours, to improve the sensitivity of the method;
- surgery to be performed in dedicated negative-pressure operating theatre with high frequency (25/h) of air exchanges;
- minimise the number of staff in the operating room. The team should consist of expert surgeons. Observers must be excluded from operating sessions;

- using instrumentation that limits the risk of aerosolisation or vaporisation of micro-fragments of tissue contaminated with the virus. Drilling and use of a microdebrider should be avoided;
- it is advisable to apply disinfectant solutions to the nasal cavities and the oral cavity/oropharynx.

For COVID-19 positive patients, procedures should be postponed until after swab test is negative, when feasible. In urgent cases, recommendations in managing patients with positive COVID-19 status are to wear appropriate PPE, including:

- two surgical caps;
- two pairs of surgical gloves;
- surgical shoes with disposable covers;
- FFP3 mask;
- eye protection;
- fluid-repellent disposable surgical gown;
- helmet;
- goggles.

In case of unknown COVID-19 status, we recommend:

- two surgical caps;
- two pairs of surgical gloves;
- surgical shoes with disposable covers;
- FFP2 or FFP3 mask + surgical mask;
- eye protection;
- fluid-repellent disposable surgical gown;
- helmet;
- goggles.

In case of negative COVID-19 status, we recommend:

- one surgical cap;
- one pair of surgical gloves;
- surgical shoes with disposable covers;
- surgical mask;
- eye protection;
- fluid-repellent disposable surgical gown.

Adequate advice should be provided to COVID-19 negative patients who undergo surgery to adhere to proper hygiene-behavioural rules during the post-operative period, such as wearing an FFP2 + surgical mask. We also recommend limiting postoperative endonasal dressings and prescribing therapy to reduce sneezing and aerosol generation.

Paediatric ENT clinical and surgical management

ENT specialists caring for paediatric patients must adapt to changes of the COVID-19 era and reconsider many routine management strategies^{20,21}:

- transmission: as in the adult population, the primary mode of transmission of the infection appears to be via respiratory droplets and aerosols, although faecal-oral

transmission may also occur. It is important to effectively sanitise surfaces that may have been exposed to children;

- *clinic*: COVID-19 symptoms seem to be less severe in children than in adults and include fever, dry cough, headache, myalgia, gastrointestinal disorders, anosmia and dysgeusia. Children often can be asymptomatic carriers. Acute breathing difficulties are rare.
- *general considerations*: telephonic triaging should be used to identify patients and their family members with COVID-19 symptoms. Temperature screening must be carried out both on the patient and on the child's caregiver upon access to the clinic.

Outpatient clinic children management

As expected for adults, for all procedures the healthcare worker must use personal protective equipment which includes: FFP2 or FFP3 mask and surgical mask, protective goggles, gloves and disposable gown.

Gloves must be changed after each visit/exam. It is important to provide for the use of PPEt for the patient and for a single caregiver who must still be present during the visit.

OTOLARYNGOLOGICAL VISIT

Treatment of the paediatric patient must be limited to urgent cases or with a pathology that requires short-term visits and indispensable postoperative care. The child must be examined in a dedicated space using disposable material as much as possible, using PPE and with adequate ventilation of the rooms and sterilisation of surfaces between visits.

NASAL ENDOSCOPY

Upper respiratory tract endoscopy should be limited to restricted indications because of a high risk of viral spread in the air. The precautions to be taken in case of endoscopy are the same as for adults. We recommend the use of small calibre optics and the use of a monitor to avoid close contact with the small patient and, if possible, the use of disposable sheaths for the fibroscope associated with lubricating gel with an anaesthetic effect.

Hospitalization

Determining which surgical procedures are elective depends on many unique patient factors. Elective surgery, typically non-emergency and scheduled in advance, should be considered upon assessment of all available medical and logistical information.

TONSILLECTOMY AND ADENOIDECTOMY

The residual indications for this intervention are major adenoid-tonsillar hypertrophy with severe obstructive sleep apnoea syndrome (OSAS).

RHINOSURGERY

For semielective and semiurgent procedures (e.g., bilateral choanal atresia repair) surgery must not be postponed. As in adults, to minimise the dissemination of aerosolised viral particles in patients with unknown, suspected, or positive COVID-19 status, surgical indications should be limited.

OTOLOGICAL SURGERY

Surgery is necessary in life-threatening complications such as acute mastoiditis or sinusitis with complications.

CERVICAL SURGERY

Surgery of neoplastic neck masses and abscesses should be ensured.

Management of paediatric emergencies

In order to avoid overload of the healthcare system, emergency management in children must be aimed at simultaneously minimising hospitalisation and the risk of complications.

Emergency management is at a high risk of transmission of the infection due to the close contact between patient and operator and the agitation of the small patient. The PPE and assessment procedures for SARS-CoV-2 infection before and during hospitalisation are comparable to those indicated in the guidelines for adults.

FOREIGN BODIES

Foreign bodies in the upper respiratory tract and ear must be removed on an outpatient basis if clearly visible and easily accessible. In case of difficulty in removing it in an outpatient clinic or in the emergency room, it is advisable to hospitalise the patient to carry out the procedure under sedation or general anaesthesia. As for the inhalation of foreign bodies, certain or suspected, it is one of the urgent needs that cannot be deferred under general anaesthesia.

EPISTAXIS

Epistaxis must be considered a condition with a high risk of transmitting the infection. Epistaxis management must be performed by anterior tamponade on an outpatient basis or in the emergency room, minimising cases of hospitalisation and invasive treatment. A different approach should be reserved for the patient with a haematological pathology.

FRACTURE OF NASAL BONES

In the absence of a nasal septal haematoma or aesthetic nasal deformity, it is recommended to not perform reduction of nasal fracture.

COMPLICATED ACUTE RHINOSINUSITIS WITH ORBITAL OR INTRACRANIAL EXTENSION

Prior to considering surgical therapy, children who require hospital admission for complicated acute rhinosinusitis with orbital extension but without vision or globe compromise should be trialed on a course of medical treatment.

ABSCESS

Incision and drainage of the abscess have been suggested in the case with no improvement or failure to respond to appropriate medical treatment. Tonsillar and parapharyngeal abscesses require hospitalisation to initiate intravenous antibiotic therapy.

ACUTE MASTOIDITIS

Initial medical/non-surgical management is suggested. Acute mastoiditis with convalescence, complicated mastoiditis and complicated acute otitis media require prompt surgical treatment within 24 to 48 hours.

Tracheostomy

Elective tracheostomy should be postponed pending control of the COVID-19 pandemic.

Tracheostomy that cannot be postponed must be performed using cuffed tracheotomy tube in a dedicated environment. Tracheotomy tube changes must be limited to a minimum and preferably carried out at home.

Discussion

General considerations

GENERAL CARE OF ENT PATIENTS

During the COVID-19 pandemic, effective biosafety precautions have been implemented in all clinics and hospitals because most infected patients are not symptomatic and may have been examined only with inadequate protection¹⁻⁴. Otolaryngologist examination can produce aerosols. Even patients examined later in the same room are at elevated risk. Consequently, healthcare professionals are at high risk of contamination. Structured telephone triaging can be used to separate low-risk from high-risk patients, with the latter cohort being seen sooner. Such patients can be reassessed at a later time when the acute pandemic associated issues are resolved. This approach has been supported by ENT-UK, the British Association of Otolaryngology - Head and Neck Surgery²².

Outpatient exams

NASOPHARYNGOLARYNGOSCOPY/RIGID NASAL ENDOSCOPY

During the pandemic, all guidelines agree in considering

it prudent to determine if endoscopic examination is necessary or if it can be delayed²³⁻²⁷. Powered application of aerosol anaesthetics and decongestants are discouraged in favour of hand-held spray or lidocaine/decongestants pledget. Another option is to ask patients to prespray decongestants into the nasal cavity prior to visit.

AUDIOLOGY ASSESSMENT

It is always recommended that staff adhere to patient screening, hand hygiene, social distancing and mask wearing precautions (audiologist and patient)²⁸.

HEAD AND NECK ONCOLOGY/HEAD AND NECK CANCER (HNC) SURGERY

First consultation for new referrals should be managed by videoconference or telephone to assess the necessity of urgency to evaluate the patients in person. All patients should have a phone screening to detect symptoms of COVID-19 and for contact with positive cases prior to visiting.

New patients with high suspicion for malignancy require face-to-face visits, telemedicine consultation or appointment deferral²⁹. According to the Irish Head and Neck Society³⁰, patients at risk of suffering from complications of COVID-19 should be prioritised to minimise the time in hospital when phone consultation is not an option.

Patients with aggressive cancers still need to be operated on quickly despite the pandemic. It is our responsibility to make sure that these patients are operated on within the expected time. The results of research conducted on HNC management in South Tyrol showed, in fact, a statistically significant difference in the number of diagnoses before and after lockdown, accompanied by a worsening of clinical T-stage at diagnosis, with a significant delay in the diagnosis of early cT-staged HNCs³¹.

According to French consensus³², the waiting time recommended for oncological surgeries is divided into three groups:

1. Patients requiring emergency surgeries, which typically include cancers with airway compromise or with haemorrhage.
2. Surgeries that should not be rescheduled for more than 4 to 6 weeks, such as high stage squamous cell cancers of the aerodigestive tract (oral cavity, oropharynx, larynx, hypopharynx and nasopharynx), cancers with impending airway compromise, high grade or progressive salivary gland cancers, T3 or T4 melanoma, skin cancers with regional disease or with progression, thyroid cancers with aerodigestive invasion or with locoregional metastasis or with progression, anaplastic thyroid cancers and recurrent or persistent cancers which require salvage surgery.
3. Surgeries that can be postponed for more than 6 weeks,

such as low-grade squamous cell cancers of the upper aerodigestive tract, low-grade and non-progressive salivary gland cancers, non-progressive and non-metastatic skin cancers, well-differentiated thyroid cancers (papillary and follicular thyroid cancers), medullary thyroid cancers and superficial lesions of the vocal cord.

According to all the other guidelines we considered, the surgery must be performed in a designated operating room with negative pressure and only essential staff should be inside.

The level of PPE required depends on the patient's COVID-19 status: our society recommends performing two nasal swabs (using PCR-RT) at 4 days and 2 days prior to admission and the use of antibody testing (IgM + IgG) if available. Other societies recommend a single test 24 h prior to surgery.

Although head and neck oncologic patients require chest CT to complete cancer staging, the guidelines from France recommend chest CT 24 h before surgery¹⁰.

According to the American Academy of Otolaryngology, cold dissection should be practiced³³.

Transoral robotic surgeries (TORS) are not recommended in guidelines elaborated in Quebec, Canada even though they play a significant role in the management of head and neck cancers³⁴.

In order to limit transmission of the SARS-CoV-2 virus, the pandemic guidelines suggest that medical treatments (radiotherapy, chemotherapy, etc.) should be favoured over surgical treatments when a patient's outcome is not different with either modality¹⁰.

TRACHEOSTOMY

The American Academy of Otolaryngology-Head and Neck Surgery issued a position statement on March 27, 2020 (revised April 2)³⁵, recommending to perform a tracheostomy in positive COVID-19 patients no earlier than 2 weeks after intubation. Recommendations of the ENT-UK and British Laryngological Association suggest waiting for 14 days of intubation to allow prognostic information to become clear and for viral load to potentially decrease³⁶. Other authors have proposed a timing of 7 days^{37,38}. One of the first case series of 32 patients from Italy reported a mean intubation period of 15 days (range, 9-21 days) before performing tracheotomy³⁹.

The selection of the appropriate tracheotomy technique (percutaneous dilatational tracheotomy vs open surgical technique) should be established in a team including surgeons and critical care professionals⁴⁰.

Both the AAO-HNS and ENT-UK recommend no change of the tracheostomy tube until COVID-19 testing is negative and review with an infectious disease specialist. Other authors recommend that the first tracheostomy change can

be done after 7-10 days and subsequent change can be delayed 30 days after⁴¹.

Cuffed tracheostomy tubes are recommended for COVID-19 positive individuals¹⁶.

OTOLOGIC CLINIC AND SURGERY

Otoscopy, binocular microscopy, cerumen debridement (requiring examination within 3 feet) on suspected or known COVID-19 patient encounters should proceed only with enhanced PPE. It is recommended to use curettage instead of drilling to limit aerosolisation during mastoidectomy, regardless of COVID-19 status. If drilling is required, it is recommended to use a slow drilling speed, reduce irrigation volume and use effective suction to reduce aerosolization⁸. All the guidelines considered agree that necessary otologic procedures on positive, suspected, or unknown COVID-19 status patients should be performed using enhanced PPE including eye protection. It is also recommended to use PAPR if high-speed drills are required^{8,11-13}.

Myringotomy and ventilation tube placement for unilateral persistent effusion should be performed in a contained environment: it is considered purely elective and should be postponed⁴². According to Saadi et al.⁸, tympanostomy tube insertion should be performed with endotracheal intubation to decrease the risk of aerosolisation.

Bilateral otitis media with effusion and hearing loss should be prioritised for operative intervention, given the risk for speech delay after 3 months. However, even cases of bilateral otitis media may be considered elective, and individualised considerations should be taken based on the availability of PPE and COVID-19 testing. Ear canal foreign bodies may require emergent or urgent intervention in the setting of retained button batteries or obstructive otitis externa⁴³.

Cochlear implant in children with hearing loss following meningitis (high risk of cochlear ossification) is classified as a semi-urgent procedure²¹.

ENT-UK recommended against the use of high dose oral steroids for Meniere's disease or sudden sensorineural hearing loss. Instead, therapy based on intratympanic steroid injection should be preferred in managing these diseases⁴⁴.

RHINOLOGY CLINIC AND SURGERY/SKULL BASE SURGERY

Nasal surgical interventions, including endoscopic or open sinus and skull base surgery, carry an extremely high-risk COVID-19 infection for ENT specialists and should be postponed in all non-acute cases¹¹.

COVID-19 virus has a natural affinity for nasopharyngeal mucosa and the theoretical possibility of the risk that a viral load may be directly inserted into the central nervous system during surgical manipulations has been hypothesized¹⁸.

All the guidelines considered recommend for negative COVID-19 patients the use of appropriate PPE for aerosol exposure.

The use of anaesthetic sprays must be limited in the clinic and it is instead recommended to apply anaesthetic and decongestants via thin tampons for nasal endoscopy⁴⁵.

Some suggest favouring alternatives to an endonasal approach when possible to avoid the use of a microdebrider: external paracanthal approach, paralateronasal approach, sublabial approach⁴⁶.

A position statement from European Academy of Allergy and Clinical Immunology and Allergic Rhinitis and its impact on asthma recommended that COVID-19 positive patients with allergic rhinitis should continue therapy based on intranasal corticosteroids (including sprays) at the previous dose: topical corticosteroid-induced suppression of the immune system in these patients has not been reported⁴⁷.

OROPHARYNGEAL SURGERY

No data are currently available concerning the tropism of COVID-19 for tonsils, or on the specific risks of contamination linked to different surgical techniques (total or partial tonsillectomy) or instruments (electrocoagulation, radiofrequency, coblation, etc.)¹³. According to Chorney et al.⁴⁸, continuous positive airway pressure (CPAP) may be an alternative for surgery during the pandemic, and surgery considered only if the child does not tolerate CPAP. Another guideline mentioned the preference of surgery over non-invasive ventilation, the latter being at high risk for viral dissemination in ambient air⁴⁸.

Conclusions

Based on our experience and a thorough reading of literature on the various guidelines for ENTs worldwide, we can state that any ENT procedure which is non-urgent must be postponed to a later date, making triage of procedures the first and most important step towards the ideal clinical and surgical management of an ENT patient. Following the decision to carry out a procedure, it is important to have a detailed knowledge of the precautions to be followed. We consider it imperative to follow these measures to ensure the safety of both the patient and healthcare workers, while dealing with the COVID-19 pandemic. Mutual support as well as global sharing of information can be considered essential to get through these difficult times.

Conflict of interest statement

The authors declare no conflict of interest.

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Authors' contributions

All authors contributed equally to the ideation, writing and editing of the study.

Ethical consideration

The research was conducted ethically, with all study procedures being performed in accordance with the requirements of the World Medical Association's Declaration of Helsinki.

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