

# Challenges in pediatric otolaryngology in the COVID-19 pandemic: insights from current protocols and management strategies

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## ABSTRACT

The incidence of COVID-19 infection in infants and children is low and most cases have only few (rhinitis, fever) or no symptoms. However, a high viral load may be present in the upper and lower airways thus imposing specific precautions for ENT surgeons taking care of children. In the next paragraphs, we will discuss some situations upon a background of available guidelines for outpatient and in-patient management.

**Keywords:** COVID-19, newborns, pediatric otolaryngology

The World Health Organization has announced the COVID-19 outbreak a pandemic since March 11, 2020. Today, over 2 million confirmed cases and over 160.000 confirmed deaths have been reported (1). In children, the incidence of COVID-19 is lower than in adults. In published reports from China, Korea, Italy and the United States, percentages of patients under 19 amongst COVID-19 confirmed cases were 2%, 4,8%, 1,2% and 1,7%, respectively (2, 3). Furthermore, children with COVID-19 generally have a milder clinical course compared to adults and relatively few pediatric COVID-19 patients require hospitalization.

COVID-19 spreads primarily through the respiratory tract by virus particles in aerosols and secretions. Since procedures and examinations involving the upper aerodigestive tract have a high probability to generate aerosols, ENT-surgeons are at particularly high risk for transmission. Preventive measures should be taken to minimize this risk (4). Therefore, hospitals and physicians were obliged to adjust their routine working regimes. Various publications, statements and protocols, are being published from different centers worldwide aiming to share knowledge and experience with various clinical scenarios. The aim of this document is to discuss several specific topics relevant for pediatric otorhinolaryngological care.

The viewpoints discussed below must be read as a dynamic view on an unprecedented situation, which is continuously changing and calling for a continued update of management strategies.

## Outpatient department (OPD)

Several factors must be considered when adjusting regional and institutional clinical practice to the current situation. In many pediatric hospitals, the capacity for pediatric patients has diminished to answer the increased demand for care of adult COVID-19 patients. Also, the staff should wear appropriate PPE (personal protective equipment) as outlined by the WHO for all aerosol generating procedures (AGP's). Furthermore, modifications to the room and equipment are essential. Altogether, these measures will significantly reduce the number of children allowed to be seen in the OPD. International reports therefore agree that, at the time of writing, medical activities should be confined to urgent and time sensitive care only (3, 5).

For the OPD, careful patient selection is required. Caregivers of children should be contacted on an individual base and

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screened to determine if it is necessary for the child to be examined in person or if the visit can be rescheduled. Only in case of urgent clinical issues or when physical examination is necessary (e.g. suspicion of an acute infection), the patients will come to the outpatient clinic. Some cases might be suitable for a telephone visit and managed in this way. A good example here is the follow-up of allergic rhinitis. By calling caregivers, the clinician has an opportunity to encourage contacting the department in case of urgent complaints or unclear diagnosis and to explain that ENT surgeons will always be available for the necessary care.

### Specific consideration applies to particular subgroups.

#### 1. Newborns failing the neonatal hearing screening.

Neonatal hearing screening is considered as preventive health care similar to childhood vaccinations. Depending on the local situation and taking into account regional differences, the authors believe it is preferable that these services continue despite the COVID-19 pandemic, except for newborns from suspected or COVID-19 positive mothers who will undergo the neonatal hearing screening once the mother has tested negative for COVID-19. This requires reorganization of the screening procedures in order to minimize infection risk. Newborns failing the neonatal screening, are referred to tertiary care reference centers for confirmatory hearing test. In Belgium, reference centers have expressed their commitment to continued care for neonates with permanent hearing loss in order to minimize the delay of hearing rehabilitation.

#### 2. Children with sudden or progressive worsening inspiratory stridor and breathing difficulties.

Children presenting with sudden onset or progressively worsening inspiratory stridor or signs of respiratory compromise should be seen in the Emergency Department in full PPE without delay. The attending physician will then estimate the severity of the condition based upon history and physical signs. Depending on the individual case and severity of respiratory compromise, airway endoscopy is preferentially avoided in the OPD or Emergency Department and scheduled under general

anesthesia at the Operating Theatre with a PICU bed available for appropriate postoperative monitoring.

### Surgical procedures

#### Perioperative considerations

Pre-operative screening, by means of a nasopharyngeal swab with reverse-transcriptase-polymerase-chain-reaction (RT-PCR) assay, is desirable in all cases within 48 hours preoperatively and should be implemented whenever possible. However, urgent procedures must not be delayed because test results are not available yet. In this situation, children are treated as if COVID-19 positive during the procedure. If pre-operative screening could not be performed, PCR testing may be considered at the end of the procedure as the results will guide management during the postoperative period.

- In case a CT-scan is ordered for the clinical case (e.g. infection, foreign body), one should consider also requesting a scan of the chest for radiologic signs of COVID-19 infection. In other cases, the use of thoracic CT-scan as a screening tool, must be discussed on a case-by-case basis according to age and symptoms (3).
- The use of povidone iodine solution for disinfection of the nasal and oral cavity has been advocated. In-vitro studies have shown that Povidone Iodine has rapid virucidal efficacy. It is therefore assumed that nasal and/or oral wash with Iodine solution before the procedure can significantly reduce the viral load (6-8).
- Procedures should be performed by an experienced senior surgeon.
- Specific precautions during procedures involving the airway (endoscopy, endonasal surgery, adenotonsillectomy and by extension also middle ear surgery) are recommended (3).

Many countries and institutions have established a guidance for prioritizing surgical procedures (9, 10). This is relevant for the current situation in which only urgent surgeries can take place, but this will also be very relevant when normal activities will be resumed. In order to prevent children from being harmed by postponing interventions for too long, critical consideration will have to be given to rescheduling care which interventions should be given priority. It will ultimately be the responsibility of the surgeon to assess the priority for each patient. In the next paragraphs, we will discuss some situations specific for pediatric ENT.

#### Adenotonsillectomy

Adenotonsillectomy (ATE) is a non-urgent procedure for the indication of recurrent infections and mild obstructive sleep apnea syndrome (OSA). For children with mild OSA, medical treatment should be considered and may be continued for 3 up to 6 months. However, for children with severe OSA, adenotonsillectomy could be the only treatment option. The decision to proceed with ATE on a semi-urgent basis should be limited to cases with severe OSA confirmed by polysomnography, not suitable for or compliant with continuous positive airway pressure (CPAP) and discussed in a multidisciplinary team, also taking into account parental preferences. ATE should be preferred to CPAP, which is at high risk of viral dissemination in the ambient air (3). The role of DISE in these cases is unclear. According to the guidelines of the French ENT society, DISE should be avoided in adults with high likelihood of clinical im-

#### Main Points:

- Examining and treating children with ENT problems involves a high risk of aerosol generation, and protective measurements should be taken accordingly.
- The COVID-19 pandemic has led to a reduced capacity for regular care of children with ENT problems, and careful patient selection is required. Urgent cases, as well as cases where delay can cause collateral damage, should be selected.
- Examples include newborns failing the neonatal hearing screening, children with progressively worsening stridor and children with severe obstructive sleep apnea.
- In cases where the need for urgent or semi-urgent management is unclear, multidisciplinary discussion with all disciplines involved is highly recommended.
- Perioperative considerations to limit the risk of transmission of COVID-19, in addition to the general WHO recommendations, include disinfection of the nose and oral cavity with Iodine solution, the use of transparent drapes for airway endoscopies, and limiting the use of coblation/coagulation techniques.

provement after tonsillectomy (11). Children with severe OSA are at increased risk for respiratory compromise following adenotonsillectomy, this may prolong the hospital stay or require more closed monitoring in the postoperative period. In addition, asymptomatic patients may become symptomatic after general anesthesia.

The risk of aerosolization may differ between different methods to perform tonsillectomy (e.g. cold steel and ties technique or coagulation/coblation techniques and tonsillotomy versus tonsillectomy). At the time of writing and in the absence of data on this subject, no particular technique is to be preferred but it should be clear that coagulation, coblation and also radiofrequency techniques might cause more aerosol compared to cold steel only techniques (3).

### **Tympanic ventilation tubes**

Placement of ventilation tubes is considered as a non-urgent procedure. When daily practice can gradually be resumed, children at risk should be prioritized when procedures are rescheduled. For example, children with serous otitis media and single-sided deafness or children with developmental delay. Also, it should be considered to see all children planned for placement of ventilation tubes for a visit at the Outpatients' clinic before rescheduling, because the glue-ears might have resolved spontaneously with time (spring season and less exposure because of school and day-care closures).

### **Cochlear implantation**

Cochlear implantation for children with bilateral pre-lingual severe to profound sensorineural hearing loss, may be considered as time sensitive care. Whenever possible, delays in implantation should not exceed 12 weeks and children should continue receiving their first implant before the age of 1 year whenever possible. Bilaterally deaf children due to bacterial meningitis must be implanted without delay.

### **Children with retraction pockets and (suspected) cholesteatoma**

Indications should be discussed on a case-by-case basis depending on the extension and risks of complications, such as labyrinthine fistula, meningeal herniation or facial paralysis.

### **Endonasal surgery**

Indications should be limited to life threatening conditions such as bilateral choanal atresia, taking into account the high risk of dissemination of viral particles during the procedure.

### **Airway endoscopy**

In children with acute or progressive worsening inspiratory stridor, extubation failure, an airway endoscopy could be mandatory for diagnosis and further management. In these scenarios, the indication and timing of an airway endoscopy should be discussed within a multidisciplinary airway team. Guidelines are available from different societies regarding optimal personal protection in the OR during airway procedures, and also for cases with suspicion of foreign body aspiration (12). For airway endoscopies, the use of transparent drapes has been advised by many societies in order to minimize aerosols in the operation room (13).

### **Tracheostomy**

In general, in the current COVID-19 era, elective tracheostomy should be deferred. Indications should be restricted to cases with no other therapeutic solution considering the high risk of dissemination of viral particles during the procedure and during the postoperative care and tracheostomy tube changes. It will be necessary as time moves on and we enter the intermediate phase of this pandemic to consider elective tracheostomies in children. This should be a multidisciplinary decision and the child should be COVID-19 tested pre-operatively. Consideration should not only be given to the surgery but also to the post-operative care and management (13, 14, 15).

### **Future perspectives**

Since the COVID-19 pandemic, a tremendous change in our approach to management of pediatric ENT cases took place, both in the outpatient department and in the OR. Many of the precautions implemented will remain necessary for the coming months up to the moment that a very sensitive screening and/or vaccine becomes available. This will require again a large amount of flexibility, losing "old principles" and exploring new opportunities to create a safe and patient-friendly environment that enables high quality care for children with ENT problems.

### **Updates**

Regular updates of scientific information and guidelines regarding the management of pediatric ENT case may be found at: <https://www.espo.eu.com>

### **Conclusion**

In conclusion, adjusting the "normal" clinical practice to the COVID-19 pandemic situation requires an enormous flexibility from the team. The local situations and worldwide insights change rapidly, and we will have to adapt our practice according to these evolving situations. We must ensure that children, for whom the coronavirus itself does not appear to be a major hazard, will not suffer collateral damage from delaying care. Since we also see that caregivers avoid the hospital in fear for the virus, it is our job to convince them to keep visiting the clinic if necessary. As a transitional solution, tele- and video conferencing could help to keep in touch with our patients and their parents. In cases where the need for urgent or semi-urgent management is unclear, multidisciplinary discussion with all disciplines involved is highly recommended. When preparing "exit" strategies, the safety-first principle will remain key both for clinicians and their patients/caregivers.

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