



Treatment of patients with voice, speech, and swallowing disorders during COVID-19 pandemic

Obravnavanje bolnikov z motnjami glasu, govora in požiranja v času pandemije covid-19

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Abstract

Voice, speech and swallowing disorders are not uncommon. Professional voice users, children and adults with congenital anomalies or neurological disorders, and patients after treatment of head and neck cancer are affected the most by these problems. Phoniatician is an otorhinolaryngologist who treats these disorders. The fundamental phoniatic examinations are endoscopic examinations of the larynx and flexible endoscopic analysis of swallowing. The surgical endoscopic laryngeal procedures are performed under general or local anaesthesia. During the COVID-19 pandemic, due to the high-risk aerosol production interventions, the work of the phoniatician is adapted to the situation. The present recommendations on the manner and necessity of performing phoniatic diagnostic and therapeutic procedures are derived from review articles and the position paper of the Union of the European Phoniaticians (UEP). Consistent use of personal protective equipment, consideration of cleaning and room ventilation, and the associated sufficient time for the treatment of an individual patient are essential. It is necessary to decide individually for each patient whether the examination should be performed or would rather be replaced by another examination that does not pose such a danger to the attending health-care professionals.

Izveček

Motnje glasu, govora in požiranja niso redke, najbolj pa prizadenejo profesionalne uporabnike glasu, otroke in odrasle s prirojenimi anomalijami ali nevrološkimi motnjami ter bolnike po zdravljenju raka glave in vratu. Foniater je otorinolaringolog, ki obravnava te motnje. Osnovne preiskave foniatra so endoskopske preiskave grla ter fleksibilna endoskopska analiza požiranja. Kirurški posegi se izvajajo v grlu v splošni ali lokalni anesteziji. V času pandemije covid-19 se je zaradi teh visoko tveganih posegov z nastajanjem aerosola delo foniatra prilagodilo situaciji. Iz preglednih člankov in po staljših Združenja evropskih foniatrov (*angl.* Union of the European Phoniaticians, UEP) so povzeta priporočila o načinu in potrebnosti izvajanja diagnostičnih in terapevtskih postopkov. Bistvenega pomena je dosledna uporaba osebne zaščitne

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opreme, upoštevanje čiščenja in zračenja prostorov ter s tem povezana razpoložljivost zadostnega časa za obravnavo posameznega bolnika. Za vsakega bolnika je potrebna individualna odločitev, ali se preiskava izpelje, ali pa jo je možno vsaj delno nadomestiti z drugo preiskavo, ki ne predstavlja take nevarnosti za prisotne zdravstvene delavce.

1 The prevalence of voice, speech, and swallowing disorders

Voice disorders occur in 1% and up to nearly 29% of all adults (1,2). In persons whose profession includes major voice stress, the prevalence can be even higher. Studies report voice disorders among teachers in 19–89% of cases (3-5), among professional singers in 46% (6), and among actors in 16% of cases (7). In children, a hoarse voice is detected in 4–44% (8-10) of cases, depending on the age, sex, environment, season and other factors. Speech disorders also include a broad range of disorders, from developmental speech disorders to disorders in voice resonance and articulation. Causes include congenital malformations, injuries, inflammations or tumours in the speech apparatus, the central or peripheral nervous system, which handles speech comprehension and production (11). Swallowing disorders can also be the result of issues in organs that form the upper respiratory system and the digestive tract, or the central and peripheral nervous system that monitors this function (12). Swallowing disorders most often occur after a stroke in 28–65% (13,14), among patients with Parkinson's disease in more than 80% (15), and among children with cerebral palsy in 44–80% (16).

2 Diagnostic procedures and treatment of persons with voice, speech and swallowing disorders

Diagnostics and treatment of persons with voice, speech and swallowing disorders in Europe is the task of phoniaticians, i.e. otorhinolaryngologists who are specialized in this area. The treatment of this group of patients often also includes speech therapists and, in some cases, also psychologists (11,17). This article will focus on phoniatician's work and the special circumstances of their work during the pandemic, especially relating to the dangers of infection with the novel coronavirus. A registered nurse is a phoniatician's close collaborator, and is exposed to the same risk of infection as the phoniatician during their work in the doctor's office as well as in the operating room.

A phoniatician's basic diagnostic procedures include a detailed otorhinolaryngological examination, as well

as a videostroboscopy examination of the larynx during phonation at different pitch and volume, during breathing and coughing, a detailed assessment of the motor capabilities and sensibility of the upper respiratory system and the digestive system, including an assessment of the function of articulation organs and the velopharyngeal closure. A phoniatician must also check all the reflexes of the upper respiratory system and the digestive system that are important for correct phonation, voice formation into speech and for safe and successful swallowing. A hearing examination is also essential (17). Essential diagnostic procedures in speech and voice disorders include rigid indirect laryngoscopy and flexible nasolaryngoscopy, which is also the basis for the flexible swallowing assessment and testing the sensibility of the larynx and the pharynx, and an examination of the upper respiratory system when suspecting an airway stenosis (12,17).

A phoniatician's surgical procedures include basic microlaryngoscopy for a detailed examination of the larynx, the oral cavity, the oropharynx and the laryngopharynx, excision of pathological aberrations, injection various substances into the larynx or the pharynx (e.g. own fat, fascia or hydroxyapatite or injecting botulinum into muscles). Different microsurgical instruments, various lasers and the microdebrider are used. The procedures on the laryngeal framework with an external approach in patients under general or local anaesthesia are also possible (17).

In Europe and globally, there is a trend towards office-based certain laryngeal or pharyngeal surgical procedures (18). In most cases, botulinum injections into the muscles of the larynx, pharynx, oral cavity, tongue, the masseters, neck muscles and the parotid glands are performed office-based (19). Some phoniaticians also perform oesophagoscopies and gastroscopies with a flexible instrument (20).

3 The potential for infection with the novel coronavirus

Otorhinolaryngologists are among those specialists

who are the most in danger of becoming infected and developing the COVID-19 disease (21). The most dangerous procedures include those in which aerosol is formed from excretions of the nasopharynx, the oropharynx, the nose, and the larynx, or blood during the electrocauterization of a bleeding vein or during cutting or vaporizing tissue or grinding it with a microdebrider. Virus is present in the aerosol, and if it reaches the mucosa of the nose, mouth or the conjunctiva of the eye of a medical worker together with aerosol droplets, it can infect them (22). Besides the direct viral transfer with aerosol droplets, virus can also be transmitted indirectly for several hours or days after the procedure through infected surfaces in the office or operating room on which aerosol droplets fell during the examination or procedure (23,24). Aerosol-forming procedures include tracheotomy and tracheostomy, intubation and extubation, aspiration, some forms of general anaesthesia (e.g. with so-called jet ventilation or high-flow nasal oxygen ventilation), bronchoscopy, rigid or flexible examinations of the oral cavity, pharynx and larynx, removal of foreign bodies from the upper respiratory and digestive system, injection through the nose and the mouth or other procedures in the larynx, stopping nasal bleeding, draining abscesses from the oral cavity or the pharynx, esophagoscopy and nasal or regular gastroscopy. The biggest viral load is in the patient's nose and the nasopharynx. Therefore, all procedures in which an instrument reaches these two areas are especially dangerous for infection of a medical worker (24-26).

The first death case from COVID-19 among doctors in Wuhan, where the pandemic started, was an otorhinolaryngologist (27). A phoniatician is exposed to aerosol in every single clinical examination, as videostroboscopy with a rigid or flexible laryngoscope is their primary diagnostic procedure (17,28). Examining children, people with mental disorders or those with a strong pharyngeal reflex presents a special case because of the lower level of their cooperation in the examination, because of sneezing, coughing, gagging, and the resulting increased danger of aerosol formation. A phoniatician and the nurse are also exposed to aerosol during surgical procedures under general anaesthesia, with an even higher level of danger during procedures performed under local anaesthesia in their offices (23,24,28-30). We should also keep in mind that a significant share of the infected population exhibits no symptoms or signs of infection (24). Based on an extensive study done in Germany, there is a chance that the population has 5-times as many infections as are identified through testing, because at least 22% of them do not exhibit any symptoms (31).

4 Recommendations for phoniaticians during the pandemic

Since the pandemic was declared, the Union of European Phoniaticians (UEP) has monitored the epidemiological situation across the globe, collecting expert reports and data (e.g., reports on the positions of their American colleagues – 31), and has issued recommendations regarding the treatment of phoniatic patients as they develop. These are available on the UEP website, and are sent to all UEP members every month by email. The latest recommendation was sent on 25 May 2020, and it was accepted for publication in the *Journal of Laryngology and Otology* (28). They also held a webinar on this topic. Its recording will also be available to non-UEP members. The following recommendations are summarized from the latest UEP recommendation from May 2020 (28). This is an expert opinion of a group of the best European phoniaticians; however, it is not also necessarily the practice in hospitals or other institutions where they work.

4.1 Examinations at the doctor's office

In general, only those with no symptoms characteristic for COVID-19 are examined and operated on. Considering that we can expect outbreaks of infections into the coming months, it should be considered that, in spite of the fact that a patient exhibits no symptoms or signs of an active disease, nor have they been in contact with a COVID-19 patient during the past 14 days, the phoniaticians may still face an infected person. They must use protective equipment (an FFP3 mask, protective goggles or visor, a water resistant surgical gown, cap and gloves). It is essential to disinfect all surfaces that could become infected through aerosol during the examination or procedure and to ventilate the room after the examination, before receiving the next patient. Direct examination with a flexible endoscope, during which the phoniatician's eye is in direct proximity to the patient, should be avoided, with the physician instead opting for a video system and recording the examination, then reviewing the video of the examination. When using a rigid or flexible laryngoscope connected to a video system, the phoniatician should stand as far away as possible, and, if possible, at the patient's side, instead of directly in front of them. If the patient coughs or chokes during the examination with a rigid laryngoscope or a flexible nasolaryngoscope, or during a flexible endoscopic evaluation of swallowing, the physician should take a 30-minute break before the next examination or procedure in order

to ventilate the room. This necessarily extends the time of examination and reduces the number of possible daily examinations. It is also essential to clean the instruments properly in order to prevent transmitting the infection to another patient. It is recommended that single-use instruments or equipment be used, where possible.

A child should be accompanied to the examination by a single healthy adult who had not been in contact with any person who could have been infected with COVID-19 over the past 14 days.

4.2 Endoscopic evaluation of swallowing

When performing this examination, the medical personnel in the office must wear full personal protection equipment, including an FFP3 mask. A flexible nasolaryngoscope is used for the endoscopic evaluation of swallowing, which is introduced through the nose, the nasal and oral cavities, above the larynx by a phoniatrician. Using different amounts of coloured food or liquids of different consistencies can lead to food entering the laryngeal entrance or even to aspiration of the food below the vocal-cord level, which can trigger aerosol-forming severe cough in patients with preserved laryngeal and tracheal sensibility. Therefore, when making the decision whether a percutaneous endoscopic gastrostomy is necessary in order to ensure safe and sufficient feeding, it is still recommended to perform a modified barium swallow imaging instead of an endoscopic evaluation of swallowing. The patient should wear a surgical mask over their mouth for most of the examination.

Evaluation of swallowing and a rehabilitation of swallowing disorders for those who have been proven to have been infected with COVID-19 should be performed with a distant approach, where possible. For emergency examinations, the properly protected examiner should be located at least 2 m away from the patient, and only step closer when examining the oral cavity and soft palate, and if possible, they should stand at the patient's side, not directly in front of him. A decision on whether to perform this swallowing evaluation depends on the patient's medical condition, their issues and needs and their social environment.

4.3 Procedures at the physician's office in local anaesthesia

The patient should be tested for the novel coronavirus two to three days before any phoniatriatric procedure at the physician's office or an operating room, and then remain quarantined until the procedure. Anaesthesia

drugs in spray form should be replaced by ribbons or gauze doused in the drug.

Botulin injection in the larynx or pharynx or an EMG of the laryngeal muscles should be performed with an external approach through the cricothyroid membrane in symptom-free patients who need to be wearing surgical masks during the procedure. All medical personnel must wear full personal protection equipment, including an FFP3 mask. Approaches using a flexible nasolaryngoscope through the nose, nasopharynx and larynx, and injection through the trachea or through the lumen of the larynx should only be used in patient with a reliable negative PCR result because of the possibility of coughing which results in additional aerosol formation.

4.4 Procedures under general anaesthesia

Emergency procedures, procedures in cancer patients or those with suspected cancer represent priorities. All these patients must be tested and then quarantined, as described above. Elective surgery is only available to patients with no COVID-19 infection. If a patient is proven to be infected, a special approach is required, described in a different article.

Using so-called jet ventilation or high-flow nasal oxygen ventilation, microdebrider, laser and a combination of aspiration and cauterisation increases the risk of infection for all those present in the operating room. The operating room should have negative pressure for reducing the possibility of virus transmission. Aspiration systems must be equipped with filters that reliably block all sub-0.1 µm particles.

4.5 Telemedicine

Treating patients on-line is an option for the first contact with the patient with a voice or swallowing disorder, especially with speech and language disorders. The UEP even recommends it for the treatment of the patients with these disorders. This position should also be adopted by the national healthcare policy with an appropriate financial refoundation of such phoniatriatric, logopaedic and psychological services.

5 Conclusion

Due to the nature of their work, a phoniatriicians and their nurses are severely at risk of infection with the novel coronavirus during routine office and operating work. They must consistently adhere to safety and hygiene measures and wear the required personal

protective equipment. Only patients with no symptoms or signs of infection with COVID-19 may be treated electively. Some of the riskiest examinations should be replaced by those less risky for transmitting infection. Using additional single-use materials and extra time for treating an individual patient significantly increases the cost of every examination and procedure, which

healthcare policy will also have to take into account, as the presence of a COVID-19 infection should remain the normal state of affairs in society for quite a few months.

Conflict of interest

None declared.

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