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## COVID-19 pandemic – Trends in an emergency department otolaryngology service



The coronavirus 2019 disease (COVID-19) was declared a public health emergency by the WHO in January 2020 and a global pandemic, 3 months later. COVID-19 is caused by severe acute respiratory coronavirus 2 (SARS-CoV-2) and is transmitted mainly by airborne droplets from infected individuals or physical contact. The virus penetrates the body via the nose, mouth, and eyes, damaging the respiratory epithelium and sometimes progressing to lung infection [1,2]. Early in the pandemic, many patients presenting with what would otherwise seem to be common otolaryngologic disorders were ultimately found to be positive for COVID-19. As a result, a disproportionate number of otolaryngology healthcare workers were infected with the virus [3]. The problem was exacerbated by the growing tendency of patients in recent years to seek medical care in emergency departments (EDs) even for nonurgent conditions [4–9] combined with the increasing workload of comprehensive ED services due to an upsurge in consultations in surgical subspecialties (particularly orthopedics, vascular, urological) [10–14]. Spiraling health care costs, limitations on resident working hours, and inadequate documentation have placed a further pressure on EDs and consultation services.

To control the COVID-19 outbreak, the Israeli government, as in countries worldwide, implemented measures of self-containment, and hospitals suspended elective procedures and reallocated resources and medical personnel. From March 2020, when a full lockdown was imposed, to end April 2020, our otolaryngology department conducted only ED consultations and postoperative and oncologic follow-up. During the same time, public access to community clinics was restricted. Some medical care facilities offered telemedicine services partly provided by nurses and assistant physicians.

The aim of this retrospective study was to investigate the patterns and types of consultations performed in a pediatric otolaryngology-head and neck surgery service during the COVID-19 pandemic.

The study was conducted at Schneider Children's Medical Center of Israel, the largest tertiary pediatric care facility in the country, with a catchment area (~700,000) representative of the national pediatric population. The study was approved by the local Institutional Review Board. Schneider Children's Medical Content Explorer was used to identify patients who presented to the ED otolaryngology consultation service from February 1 to April 30, 2020 and the corresponding period in the previous year. Exclusion criteria were incomplete documentation and absence of a corresponding consultation note from the referring or otolaryngology team. The following data were collected from the electronic medical records: patient age and sex, reason for consultation, date of consultation, procedures performed, final diagnosis, and need for admission. Results of vestibular and audiology tests were excluded from

the analysis because they are normally provided by the inpatient audiology team.

Data were analyzed using SPSS version 25 [IBM, Armonk, NY, USA]. Descriptive statistics were performed. Categorical variables were compared between groups with Fisher's s-exact test and continuous variables, with Student's *t*-test. A *P* value <0.05 was considered significant.

A total of 355 otolaryngology consultations were performed in February–April 2020 compared to 352 during the same period in 2019. Males accounted for about half the patients in both periods (49.9%, 51.4%) and mean age was  $5.8 \pm 4.9$  during 2019 and  $5.2 \pm 5.2$  during 2020 ( $p = 0.13$ ). In March 2020, when a complete lockdown was instituted, otolaryngology consultations dropped by 25%, from 151 in March 2019 to 115 ( $P < 0.001$ ). Analyses by primary site affected and type of complaint (Table 1) yielded no statistically significant differences between the two periods. Total hospitalizations decreased from 61 (17.3%) in 2019 to 29 (8.1%) in 2020 ( $P < 0.001$ ).

During the early pandemic period, patients who required emergency and non-emergency care for otolaryngology conditions had almost no alternative except to turn to the ED owing to temporary suspension of otolaryngology outpatient clinics. Nevertheless, we found that there was a very small decrease in the number of ED consultations between February–April 2019 and the same period in 2020, in line with a previous study on outpatient neurosurgery consultations [16]. These results may have been attributable to patient fear of exposure to the virus in hospital leading to their postponing care or self-treating more minor problems. Fear of contamination may also explain the considerably lower rate of hospitalizations in 2020.

Overall, however, we did not observe a significant shift in the pattern of ED admissions during the pandemic. Although schools and daycare facilities were closed, team sports and social activities were prohibited, and personal transportation was restricted, we found no significant decrease in ear, nose, and throat infections or traumatic injuries and no significant increase in cases of foreign body ingestion, total or by subsite/subspecialty. By contrast, for example, studies in the USA of fractures sustained by children during COVID-19 lockdown reported a 250% decrease in volume [17] and a concomitant increase in domestic accidents [18]. It is possible that any changes in the ED burden that may have been expected under lockdown were offset by the reduction in outpatient clinic care and the increased use of telemedicine [19].

This study was limited by the single center setting and retrospective design. Accordingly, the data were based solely on diagnoses made during routine care (ICD codes). Furthermore, the study period was heterogeneous, with a relatively low infection rate with no lockdown in February vs a high infection rate under lockdown in April. Finally, examination of the effects of national directives on ED referrals and services during the pandemic was beyond the scope of this study.

Our findings may have important implications for the management of both potential additional waves of COVID-19 in the future and routine otolaryngology consultations, especially in terms of discouraging referrals of minor cases to the ED for rapid examination by a specialist and

**Table 1**  
Reasons for ENT consultations by site and type in February–April 2020 (COVID-19 pandemic) compared to corresponding period in the previous year

Types/Sites	February–April 2019 (N = 352)	February–April 2020 (N = 355)	P-Value
<b>Ear, n (%)</b>	100 (28.4%)	95 (26.8%)	0.62
Otitis externa, n	6	4	
Otitis media, n	61	55	
Mastoiditis, n	13	13	
Foreign body, n	9	9	
Bullous myringitis, n	2	0	
Dizziness / vertigo, n	4	5	
Cerumen Impaction, n	1	0	
Hearing loss, n	1	0	
Tinnitus, n	1	0	
Facial nerve pathology, n	2	9	
<b>Nose/Sinuses, n (%)</b>	26 (7.4%)	32 (9.0%)	0.43
Periorbital cellulitis, n	4	10	
Foreign body, n	10	9	
Epistaxis, n	3	4	
Sinusitis, n	7	7	
Adenoid pathology, n	2	2	
<b>Oral Cavity, n (%)</b>	35 (10.0%)	27 (7.6%)	0.27
Tonillitis, n	13	12	
Peritonsillar abscess, n	3	4	
Epiglottitis, n	3	0	
Retropharyngeal abscess, n	2	1	
Foreign Body in Pharynx, n	4	4	
Stridor, n	6	2	
Periodontal disease, n	1	2	
Aphto-stomatitis, n	3	2	
<b>Gastrointestinal tract, n (%)</b>	10 (2.8%)	7 (2.0%)	0.454
GERD, n	4	4	
Foreign body, n	1	1	
Constipation, n	3	0	
Stomach problem, n	2	0	
Eating disorder, n	0	2	
<b>Respiratory System, n (%)</b>	13 (3.7%)	12 (3.4%)	0.97
Pneumonia, n	4	7	
Dyspnea, n	7	1	
RTI, n	2	4	
<b>Congenital Malformation, n (%)</b>	1 (0.3%)	3 (0.8%)	1
BCA, n	1	2	
TGDC, n	0	1	
<b>Skull/Face Trauma, n (%)</b>	26 (7.4%)	36 (10.1%)	0.195
Contusion, n	17	25	
Abrasion, n	2	0	
Laceration, n	1	3	
Fracture, n	6	8	
<b>Neurological Complaints, n (%)</b>	12 (3.4%)	12 (3.4%)	0.67
Headache, n	11	9	
Seizure, n	1	3	
<b>Infectious Complications, n (%)</b>	99 (28.1%)	124 (35.0%)	0.434
Ear, n	83	77	
Nose, n (%)	11	17	
Respiratory tract, n (%)	5	10	
<b>Foreign Body, n (%)</b>	27 (7.6%)	27 (7.6%)	0.988
Ear, n	9	9	
Nose, n	10	9	
Oral cavity, n	4	4	
GIT, n	4	4	

Significant values are printed in bold;  $P < 0.05$  is considered significant. GERD, gastroesophageal reflux disease; RTI, respiratory tract infection; BCA, bilateral congenital anorchia; TGDC, thyroglossal duct cyst; GIT, gastrointestinal tract.

readjusting public access to hospital care to avoid abuse and misuse. Practical solutions may be to decrease wait times for outpatient otolaryngology care, improve community medicine, and implement creative means for home care that entail regular outpatient follow up.

Regardless of the COVID-19 outbreak, the current hospital-centric health system could benefit from transformation to an organization focused on the territorial health community, with smooth and effective balance between community and hospital healthcare.

**Funding source**

No funding was secured for this study.

**Financial disclosure statement**

The authors have no financial relationships relevant to this article to disclose.

**Conflict of interest statement**

The authors have no conflicts of interest to disclose.

**References**

- Chilvers MA, McKean M, Rutman A, Myint BS, Silverman M, O’Callaghan C. The effects of coronavirus on human nasal ciliated respiratory epithelium. *Eur Respir J*. 2001;18(6):965–70.
- Setti L, Passarini F, De Gennaro G, Barbieri P, Perrone MG, Borelli M, et al. Airborne transmission route of covid-19: why 2 meters/6 feet of inter-personal distance could not be enough [Internet]. *International Journal of Environmental Research and Public Health*. MDPI AG; 2020 [cited 2020 Sep 15]. Available from: <https://pubmed-ncbi-nlm-nih.gov/beilinson-ez.medlcp.tau.ac.il/32340347/>.
- Lu D, Wang H, Yu R, Yang H, Zhao Y. Integrated infection control strategy to minimize nosocomial infection of coronavirus disease 2019 among ENT healthcare workers. *J Hosp Infect*. 2020;xxxx:2019–20.
- Scangas GA, Ishman SL, Bergmark RW, Cunningham MJ, Sedaghat AR. Emergency department presentation for uncomplicated acute rhinosinusitis is associated with poor access to healthcare. *Laryngoscope*. John Wiley and Sons Inc; 2015. p. 2253–8.
- Kozin ED, Sethi RKV, Remenschneider AK, Kaplan AB, Del Portal DA, Gray ST, et al. Epidemiology of otologic diagnoses in United States emergency departments. *Laryngoscope*. 2015 Aug 1;125(8):1926–33.
- Gaieski DF, Agarwal AK, Mikkelsen ME, Drumheller B, Cham Sante S, Shofer FS, et al. The impact of ED crowding on early interventions and mortality in patients with severe sepsis. *Am J Emerg Med* [Internet]. 2017 Jul 1;35(7):953–60 [cited 2021 Feb 17]. Available from: <https://pubmed-ncbi-nlm-nih.gov/beilinson-ez.medlcp.tau.ac.il/28233644/>.
- Khan Y, Glazier RH, Moineddin R, Schull MJ. A population-based study of the association between socioeconomic status and emergency department utilization in Ontario, Canada [Internet]. *Acad Emerg Med*. 2011;Vol. 18:836–43 [cited 2020 Aug 8]. Available from: <https://pubmed-ncbi-nlm-nih.gov/beilinson-ez.medlcp.tau.ac.il/21843219/>.
- Krebs LD, Kirkland SW, Chetram R, Nikel T, Voaklander B, Davidson A, et al. Low-acuity presentations to the emergency department in Canada: exploring the alternative attempts to avoid presentation. *Emerg Med J* [Internet]. 2017 Apr 1;34(4):249–55 [cited 2021 Feb 17]. Available from: <https://pubmed-ncbi-nlm-nih.gov/beilinson-ez.medlcp.tau.ac.il/27884924/>.
- Pines JM, Iyer S, Disbot M, Hollander JE, Shofer FS, Datner EM. The effect of emergency department crowding on patient satisfaction for admitted patients. *Acad Emerg Med*. 2008 Sep;15(9):825–31.
- Sullivan JF, Forde JC, Creagh TA, Donovan MG, Eng MP, Hickey DP, et al. A review of inpatient urology consultations in an Irish tertiary referral centre. *Surgeon* [Internet]. 2013 Dec;11(6):300–3 [cited 2021 Feb 17]. Available from: <https://pubmed-ncbi-nlm-nih.gov/beilinson-ez.medlcp.tau.ac.il/23877024/>.
- Leithead CC, Matthews TC, Pearce BJ, Novak Z, Patterson M, Passman MA, et al. Analysis of emergency vascular surgery consults within a tertiary health care system. *J Vasc Surg* [Internet] Mosby Inc. 2016:177–81 [cited 2021 Feb 17]. Available from: <https://pubmed-ncbi-nlm-nih.gov/beilinson-ez.medlcp.tau.ac.il/26718823/>.
- Koh CE, Walker SR. Vascular surgery consults: a significant workload. *ANZ J Surg*. 2007 May;77(5):352–4.
- Smith KA, Hinthner AV, Brookes J, Matthews TW, Dort JC. An evaluation of on-call otolaryngology consultations: assessing an increasing workload. *Ann Otol Rhinol Laryngol* [Internet]. 2018 Jul 1;127(7):450–5 [cited 2020 Sep 5]. Available from: <https://pubmed-ncbi-nlm-nih.gov/beilinson-ez.medlcp.tau.ac.il/29852749/>.

- [14] Hemmo-Lotem M, Barnea Y, Jinich-Aronowitz C, Endy-Findling L, Leshem D, Zaretski A, et al. Epidemiology of pediatric bite/sting injuries. One-year study of a pediatric emergency department in Israel. *Sci World J* [Internet]. 2006;6:653–60 [cited 2021 Feb 17]. Available from: <https://pubmed-ncbi-nlm-nih-gov.beilinson-ez.medlcp.tau.ac.il/16832568/>.
- [16] Bram JT, Johnson MA, Magee LC, Mehta NN, Fazal FZ, Baldwin KD, et al. Where have all the fractures gone? The Epidemiology of pediatric fractures during the COVID-19 pandemic. *J Pediatric Orthoped* [Internet]. 2020 May 19 [cited 2020 Jul 16]; Available from: <http://www.ncbi.nlm.nih.gov/pubmed/32433260>.
- [17] Pichard R, Kopel L, Lejeune Q, Masmoudi R, Masmajejean EH. Impact of the COvonaVirus Disease 2019 lockdown on hand and upper limb emergencies: experience of a referred university trauma hand centre in Paris, France centre in Paris, France. *Int Orthopaedics* [Internet]. 2020 [cited 2020 Jul 16].
- [18] Bressan S, Gallo E, Tirelli F, Gregori D, Da Dalt L. Lockdown: More domestic accidents than COVID-19 in children [Internet]. *Archives of Disease in Childhood, BMJ Publishing Group*; 2021 [cited 2021 May 12]. Available from: <https://pubmed-ncbi-nlm-nih-gov.beilinson-ez.medlcp.tau.ac.il/32487724/>.
- [19] Anthony Jnr Bokolo. Use of telemedicine and virtual care for remote treatment in response to COVID-19 pandemic. *J Med Syst* [Internet]. 2020 Jul 1;44(7) [cited 2021 May 12]. Available from: <https://pubmed-ncbi-nlm-nih-gov.beilinson-ez.medlcp.tau.ac.il/32542571/>.

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1 May 2021