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Ear, nose, and throat service during the COVID-19 pandemic: a cross-sectional study

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ABSTRACT

Objective: This study aimed to provide objective data on the impact of the COVID-19 pandemic on our ear, nose, and throat (ENT) practice.

Methods: A total of 572 consecutive patients presenting to the ENT clinic and ENT operating theatre, from March 16, 2020 to May 3, 2020, were prospectively included. Demographic and clinical data, admission time, paraclinic testing, management, outcome, and follow-up data were recorded. A retrospective analysis for comparison of findings with the previous year over the same period was conducted.

Results: The COVID-19 pandemic and the implementation of strict lockdown guidelines led to a drastic disruption of the ENT service. A decrease in overall practice of 91.1% was observed; compared with the 6,454 patients who had been treated in 2019 over the same period, appointments and medical procedures were restricted to 572 patients in 2020. Mortality rates increased from 0.82% to 4.55%. Certain patients with valid medical issues could not be catered to, while a few patients sought medical services without a valid reason. More than a quarter of admissions (n=157, 27.6%) did not require specific ENT treatment. Patient selection improved when patients presented with a recent ENT problem (odds ratio [OR] 2.39 [1.50–3.81], p=0.0003) or were referred by a physician (OR 5.30 [3.69–7.61], p<0.0001).

Conclusion: Our data indicated disruption in the provision of healthcare services for all ENT patients; hence, patients without COVID-19-associated otolaryngology issues should be examined with higher preference compared to those without such issues.

Keywords: COVID-19, emergency, healthcare delivery, lockdown, surgery

Introduction

In December 2019, a new coronavirus was isolated from a cluster of pneumonia patients in Wuhan (1). The World Health Organization subsequently named this new outbreak as coronavirus disease 2019 (COVID-19) and declared it a pandemic on March 11, 2020 (2). Many European countries have imposed lockdown to combat the spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) to curb infection and death rates and protect health services. In Belgium, the lockdown was declared on March 13, 2020, at midnight and was gradually lifted from May 4, 2020. As a public safety measure, hospital appointments and procedures were restricted. Although lifesaving and emergency surgeries were continued, hospitals were instructed to cancel outpatient appointments and elective surgeries. However, there were exceptions for certain patients for whom medical procedures were necessary. Elective operating lists have been curtailed and restricted to cancer cases and tracheotomies for long-term ventilation. Outpatient appointments were conducted after careful consideration of the circumstances to prioritize the patients to be treated. These measures have generated profound changes in our ear, nose, and throat (ENT) practice, restricting our activity to necessary cases and emergencies. This study aimed to provide objective data on the impact of the COVID-19 pandemic on our ENT practice over the lockdown period.

Methods

Settings and participants

All consecutive patients presenting to our ENT Department, from March 16, 2020 to May 3, 2020 (that is, during the 7 weeks of lockdown), were prospectively included. A retrospective analysis of patient admissions between March 18, 2020 and May 5, 2019 was conducted for comparison of findings with the previous year over the same period. This study was approved by our institutional review board (reference 2020/192). A waiver of informed consent was obtained for anonymized data abstracted from medical records.

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Outcomes

Data regarding age, sex, origin, referring physician, time of arrival, diagnosis, management, and patient outcome were collected. Diagnosis characteristics included complaint duration, location, history of ENT issues in the past 30 days, and ENT cancer history. Paraclinical test results were recorded (nasendoscopy, audiometry, swab, biopsy, blood test, and medical imaging). Management was divided into 5 categories: discharge without ENT treatment, medical ambulatory treatment, medical inpatient treatment, minor ENT procedure (ENT procedure directly performed in the emergency room), and surgical treatment. Consultation with a senior ENT surgeon or referral to another physician were recorded. Patient outcomes were registered as discharge, ENT follow-up, referral to GP or another specialist, and admission to the ward. Cases of emergency re-admission and/or death in the subsequent 30 days were recorded.

Statistical analysis

Data distribution was evaluated using a graphical method. Quantitative variables were summarized using median and interquartile range (P25-P75) and qualitative variables using frequency and percentage. Odds ratios (OR) and 95% confidence intervals were calculated to evaluate the risk for a specific outcome. Outcomes were categorized as follows: 1) no ENT treatment or ambulatory treatment; and 2) specific ENT management (minor procedure, inpatient treatment, or surgical procedure).

Statistical analysis was performed using the free software R (https://www.r-project.org) with RCmdr.

Results

A total of 572 consecutive subjects were prospectively included between March 16, 2020 and May 3, 2020.

Outpatient activity

Overall, 568 patients were catered to in our clinic over the 7-week period of lockdown (Table 1). An average of 49 patients were admitted per day. Most (n=529, 93.3%) patients were ambulatory and resided in the neighborhood. More than half (n=306, 53.9%) of the patients had no recent history of ENT issues. Certain patients (n=126, 22%) were diagnosed with head and neck cancer before lockdown. The majority of patients were catered to within normal working hours (n=55, 98.2%), with Wednesday being the busiest day of the week with the maximum number of patients recorded. One-third of patients visited the clinic without appointment (n=206, 36.3%), and two-thirds were referred by an ENT surgeon (either an ENT surgeon from another hospital or a surgeon in private practice) or as part of the follow-up conducted by our ENT team. Approximately, 40% patients (n=225, 39.6%) underwent a minor ENT procedure, mainly postoperative care, however; ear suction, epistaxis management, immunotherapy, foreign body removal, biopsy, abscess puncture, tracheostomy care, nasogastric tube insertion, and Semont maneuver for paroxysmal positional vertigo were also performed. More than a quarter of admissions (n=157, 27.6%) required no specific ENT treatment. One-fifth of patients (n=117, 20.6%) required ambulatory treatment; 7 (1.2%) patients required admission to the ward, mostly for intravenous antibiotics; and 62 (10.9%) patients required surgical treatment, mainly for head and neck cancer.

Main Points:

- Prospective evaluation of ENT coverage under lockdown guidelines showed a drastic disruption of the ENT service, including outpatient, inpatient, and surgical activities.
- Comparison with last year's activity showed not only a decline in outpatient clinic and elective interventions, which was expected, but also a decline in emergency cases by 31.56%.
- Although the overall number of ENT patients decreased, a significant proportion of patients (27.6%) did not require specific ENT care, which raised concerns about patient selection.
- Our data might suggest an increase in the all-cause death rate. When best practice recommendations for ENT surgery amid COVID-19 are implemented, patients without COVID-19 should be examined with increased emphasis.

Surgical activity

A total of 66 surgical interventions were conducted between March 16, 2020 and May 3, 2020 (Table 2). Most patients were catered to in the outpatient clinic before surgery (n=43, 65.15%); however, cases of 9 (13.64%) patients could not be examined. A total of 40 (60.61%) patients had a previous history of head and neck cancer before their preoperative assessment; 2 (3.03%) patients were hospitalized in the month before surgery, and 12 (18.18%) were already subjected to operation once in the month before (revision) surgery. Only 1 patient (1.52%) was subjected to operation outside normal working hours (bleeding after tonsillectomy). The main surgery type was head and neck surgery (n=63, 95.45%). A total of 7 tracheostomies were performed for prolonged mechanical ventilation in patients who were COVID-19-positive; and 3 patients (4.55%) underwent nose surgery (2 nose fracture mobilizations and 1 foreign body removal). No otological surgery was performed during the study period. A total of 3 patients died within a month following their surgical intervention (mortality rate: 4.55%), among which, 2 patients had recurrent head and neck cancer with heart and renal failure, respectively, and a 64-year-old lady died from multiple organ failure related to COVID-19 within a month following tracheostomy.

Factors in the prediction of a specific ENT management

Patients were significantly more likely to require specific ENT intervention when referred by a physician than patients presenting spontaneously (OR=2.39 [1.50–3.81], p=0.0003). This selection was better when the referring doctor was an ENT surgeon who had physically examined the patient (OR=3.26 [2.02–5.29], p<0.0001).

Management did not differ significantly between admission occurring outside normal working hours (out-of-hours admission) or during business hours (OR=1.41 [0.39–5.04], p=0.6005). Head and neck cancer history did not help predict a specific ENT management (OR=0.93 [0.63–1.38], p=0.7188). Conversely, the presence of any ENT issue history within a month increased the likelihood of a specific ENT intervention (OR=5.30 [3.69–7.61], p<0.0001), especially if such an ENT history included a surgery (OR=29.23 [12.37–69.09],

Table 1. Outpatient activity	
Demographics	**568**
Total no. of patients	
Sex	
Female n (%)	260 (45.77)
Male	308 (54.23)
Age, median (P25–P75), years	52 (32–65)
Outpatients (ambulatory), n (%)	529 (93.30)
Distance to the hospital, median (P25–P75), km	17 (11–31) km
Inpatients, n (%)	34 (6.00)
Inpatients from another hospital, n (%)	1 (0.18)
Inpatients from nursing home, n (%)	3 (0.53)
96 (16.90)	
30-day ENT history	
None	306 (53.87)
ENT outpatient clinic	165 (29.05)
ENT inpatient treatment	2 (0.35)
ENT surgical treatment	95 (16.73)
ENT cancer history	126 (22.18)
Admissions and referrals, n (%)	
Normal working hours (weekdays, 8:00–18:00)	558 (98.24)
Outside business hours	
Nighttime on weekdays	1 (0.18)
Daytime on weekend	6 (1.06)
Nighttime on weekend	3 (0.53)
Monday	126 (22.18)
Tuesday	108 (19.01)
Wednesday	154 (27.11)
Thursday	80 (14.08)
Friday	91 (16.02)
Saturday	3 (0.53)
Sunday	6 (1.06)
Without appointment (emergency)	206 (36.33)
With appointment	
Postoperative	128 (22.57)
Cancer case follow-up	50 (8.82)
Others	184 (32.39)
Self-referred patients, n (%)	91 (16.73)
Referred patients	
By general practitioners	29 (5.33)
By emergency physician	38 (6.99)
By ENT specialist	340 (62.50)
By another physician	46 (8.46)
Referral methods	
Remotely (by phone/telemedicine)	110 (20.22)
After physical exam by the referring physician	434 (79.78)
Laryngeal or head & neck complaint, n (%)	230 (40.49)
Otological or neurovestibular complaint, n (%)	240 (42.25)
Nose or sinus complaint	91 (16.02)
Other complaint	7 (1.23)
Complaint duration prior admission,	
Median [P25-P75], days	27 (10–69) days
Need for ENT adjunctive tests	379 (66.73)
Need for other adjunctive tests	181 (31.87)
Calling an ENT colleague	57 (10.04)
Calling another specialist colleague	53 (9.33)
Management, n (%)	
No specific ENT treatment	157 (27.64)
Ambulatory treatment	117 (20.60)
Minor ENT procedure	225 (39.61)
Inpatient treatment, n (%)	7 (1.23)
Surgical management, n (%)	62 (10.92)
30-day outcome, n (%)	
ENT outpatient follow-up	390 (68.66)
Referral to another physician	78 (13.73)
Lost to follow-up/telemedicine/discharge	96 (16.90)
Death	4 (0.70)

ENT: Ear, nose, throat

p<0.0001). Nose complaints were more likely to be subjected to technical or surgical management than ear or throat complaints (OR=2.71 [1.66–4.42], p=0.0001). Most frequent nose presentations included epistaxis and postoperative care. The likelihood of requiring a specific ENT treatment is summarized in Table 3.

Comparison with activities recorded in 2019

A retrospective analysis of patient admissions retrieved 6454 subjects between March 18, 2019 and May 5, 2019 (Table 4). There was, therefore, a decline in overall activity by 91.1%. The investigation of emergency patients revealed that 301 patients visited ENT clinic over the same period. The decline in emergency activity was 31.56%, and the decline in surgical activity was 81.92 % in 2020. The surgical mortality rate was 0.82% in 2019 for the same period and was 1.58% when restricted to emergency cases and head and neck cancer cases (4.55% during the 2020 lockdown).

Discussion

The COVID-19 pandemic led to a drastic disruption of service provided by our ENT department. Strict lockdown guidelines were overall well respected; however, although crowd management on our premises was achieved, it could be possible that patients might not have received the necessary care. To

Table 2. Surgical activity

Demographics	
Total no. of patients	66
Sex, n (%)	20 (30.3)
Female	46 (69.7)
Male	61 (50.5-67)
Age, median (P25-P75), years	
Patient's origin, n (%)	
From home	54 (81.82)
From hospital	12 (18.18)
Working hours, n (%)	
Normal working hours	65 (98.48)
Outside business hours	1 (1.52)
Nighttime on weekdays	1 (1.52)
Daytime on weekend	0 (0.00)
Nighttime on weekend	0 (0.00)
Days of the week	
Monday	2 (3.03)
Tuesday	25 (37.88)
Wednesday	12 (18.18)
Thursday	18 (27.27)
Friday	9 (13.64)
Surgery type, n (%)	
Laryngeal or head & neck surgery	63 (95.45)
Nose or sinus Surgery	3 (4.55)
Otological or neurovestibular surgery	0 (0.00)
30-day outcome, n (%)	
Lost to follow-up/discharge	7 (10.61)
ENT outpatient follow-up	45 (68.18)
Referral to another physician	11 (16.67)
Death	3 (4.55)

ENT: Ear, nose, throat

the best of our knowledge, this is the first study to prospectively assess real-life ENT coverage under lockdown guidelines.

Our study findings are similar to those reported by previous audits of the workload in ENT emergencies across Europe (3, 4). COVID-19 lockdown was associated with a change in presentation of patients with ENT problems (5). A wide variation was observed in the gradual return to ENT clinic activity (6). Along with the interruption of healthcare services, medical residents witnessed a marked decrease in training opportunities. This decrease may partly explain the occurrence of anxiety and impaired mental well-being shown in previous studies by medical residents over the same period (7-9).

In our study, emergency admissions declined by 31.56%. We assumed that the occurrence of accidents was less frequent with the general confinement of the population and/or restrictions in commute/transport facilities. However, not all ENT emergencies were traumatic. Another possible explanation could be that patients wished to avoid the inherent risks associated with the pandemic by restricting their visit to the clinic. Communication with reassurance from the healthcare workers may, therefore, facilitate the provision of care to patients even if they do not exhibit a pathology linked to COVID-19.

Furthermore, patient selection has room for improvement. In our study, treatment was not necessary for more than a quarter of admissions. This had already been observed in patients visiting ENT emergency departments before the lockdown (10).

Table 4. Comparison with the activity recorded in 2019

	03/16 to 03/05 2020	03/18 to 05/05 2019	% difference
Total no. of patients	572	6454	– 91.14
Outpatient clinic	568	6132	– 90.74
With appointment	362	5831	– 93.79
Without appointment (emergency)	206	301	– 31.56
Operating theatre	66	365	– 81.92

Table 3. Odds ratios for subjection to a specific ENT management (minor ENT procedure, inpatient treatment, and surgical procedure)

	Odds ratio (95% confidence interval)	p
Odds ratios for subjection to a specific ENT management (minor ENT procedure, inpatient treatment, and surgical procedure)		
Referral by a physician	2.3892 (1.4989–3.8083)	0.0003
Out-of-hours admission	1.4063 (0.3925–5.0377)	0.6005
Cancer history	0.9297 (0.6254–1.3822)	0.7188
ENT history	5.3019 (3.6947–7.6083)	<0.0001
Nose complaint	2.7074 (1.6603–4.4150)	0.0001
Ear complaint	0.8353 (0.5985–1.1658)	0.2901
Throat complaint	0.7901 (0.5648–1.1052)	0.1688

Entries in bold were considered significant at the uncertainty level of 5 % ($p < 0.05$).
ENT: Ear, nose, throat

The major factors of a better patient selection included referral by a doctor and a recent history of ENT problems. Epistaxis was one of the main ENT emergencies, and the incidence of epistaxis could have been increased by the generalization of nasopharyngeal PCR testing. However, epistaxis was considered the most frequent ENT emergency referral long before SARS-CoV-2 testing (4, 10).

Our study was not designed to study mortality rate and owing to the small sample size, no definitive conclusions could be deduced. However, our data might suggest an increase in the all-cause death rate. Possible explanations might be the patient's fear of presenting to the hospital, work overload in primary care, and overwhelmed teams in the ICU.

The COVID-19 pandemic, owing to the nature of dissemination and duration, renders unique impact compared to any crisis encountered by our specialty thus far. Although best-practice recommendations for ENT surgery amid COVID-19 restrictions are being implemented (11-14), patients without COVID-19 should be examined with increased preference. Otolaryngology service should be actively functional, albeit adaptation to the existing conditions, in association with primary care.

Ethics Committee Approval: This study was approved by the local Ethics Committee (Comité d'éthique Hospitalo-Facultaire Universitaire de Liège, Approval No: 2020/192).

Informed Consent: A waiver of informed consent was obtained for anonymized data abstracted from medical records.

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