

Increase in Odontogenic Cervicofacial Infection Requiring Hospitalization in Children During COVID-19 Quarantine

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Abstract

The aim of this study was to evaluate the effect of Coronavirus disease-2019 (COVID-19) quarantines on children hospitalized for odontogenic cervicofacial infection. The data of patients aged 1 month-18 years, who were followed up with the diagnosis of odontogenic cervicofacial infection in Çanakkale Onsekiz Mart University Hospital between January 2019 and June 2021 was examined, retrospectively. Thirteen patients with a mean age of 8.5±3.8, 7 of whom were male were included in the study. Three of the patients were diagnosed in the pre-COVID-19 period and 10 of them were diagnosed in the second year of COVID-19. Five patients had a known history of dental caries. On physical examination, it was determined that all patients had dental caries in the area corresponding to the infection site. Four patients required abscess drainage, all of whom were presenting in the second year of COVID-19, we isolated *Eikenella corrodens*, *Streptococcus anginosus* and *Streptococcus intermedius* microorganisms in 3 patients. The mean duration of hospitalization was 5.3±3 days. In conclusion, COVID-19 quarantine causes an increase in odontogenic cervicofacial infection requiring intravenous antibiotics and abscess drainage.

Keywords: Child, COVID-19, quarantine, dental caries, hospitalization

Introduction

Since the first case reported from Wuhan, China in December 2019, the Coronavirus disease-2019 (COVID-19) pandemic has resulted in approximately 586 million infections and 6.5 million deaths worldwide as of August 2022.¹ In order to combat the spread of the pandemic in Turkey, curfews and social restrictions were put in place in March 2020. These scope of these restrictions were expanded gradually to include children, as well.^{2,3} Turkish Dental Association

has advised dental healthcare professionals to post-pone all non emergent interventions and to minimize potential exposure due to airborne water droplets and close contact.⁴ Especially in the early phase of the COVID-19 pandemic, dentists and otolaryngologists tended to delay non-acute cases due to their close proximity to the patient's oral and nasal cavity during clinical examination and surgical procedures.⁵ Unfortunately, reduced access to primary health care services can inevitably lead to delays in treatment



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and worse outcomes.⁶ Odontogenic cervicofacial infections are a known complication of untreated dental infections.^{6,7} Thus, it is predicted that there may be a potential increase in the prevalence of cervicofacial region infection and morbidity of patients during the COVID-19 period.⁸ Our study focused on determining whether there is an increase in the number of children hospitalized for odontogenic cervicofacial infection during the COVID-19 period compared to previous periods. The aim of this study is to analyze the children we follow with odontogenic cervicofacial infection in our clinic located in a tertiary health center and to share our experiences.

Material and Method

Study Design and Participants

The data of patients aged 1 month-18 years, who were followed up with the diagnosis of odontogenic cervicofacial infection in Çanakkale Onsekiz Mart University Hospital between January 2019 and June 2021 was examined, retrospectively. Socio-demographic variables as well as clinical features such as presenting symptom, abscess drainage, length of hospital stay (≥ 24 hours) and laboratory parameters including complete blood count parameters (white blood cell & neutrophil), C-reactive protein and culture results were evaluated from medical records. The study was conducted according to the principles of the Declaration of Helsinki and was approved by the Çanakkale Onsekiz Mart University Clinical Research Ethics Committee (2021/07-12). Written consent was obtained from the parent of the case whose image was used.

Statistical Analysis

The collected data from all groups were imported to Statistical Package for Social Sciences (SPSS) for Windows software, version 23.0 (SPSS Inc., Chicago, USA). Descriptive statistics such as mean \pm standard deviation for continuous variables and frequency (n) and percentage (%) for categorical variables were used to summarize participant baseline characteristics.

Results

Seven of the 13 patients followed in our clinic with the diagnosis of odontogenic cervicofacial infection were male. Of the patients, 3 (23.1%) were diagnosed in the pre-COVID-19 period, and 10 (76.9%) patients were diagnosed in the second year of COVID-19 (Figure 1). No patients were diagnosed nor admitted in 2020. The ages of the patients were between 3 and 15, with a mean of 8.6 ± 3.8 years. The most common symptom at admission was swelling of the neck and/or face. Five patients had a known history of dental caries. On physical examination, it was determined that all patients had dental caries in the area corresponding to the infection site. The lesion area of eleven patients was evaluated by ultrasonography, and six patients underwent tomography for suspected complications (abscess, etc.). The tomography images of

cases number four and twelve are shown in Figure 2. In the treatment, cefotaxime plus clindamycin was preferred in 8, ampicillin/sulbactam in 3 and clindamycin in 2 patients. Four patients required abscess drainage, all of whom were presenting in the second year of COVID-19, we isolated *Eikenella corrodens*, *Streptococcus anginosus* and *Streptococcus intermedius* microorganisms in 3 patients. No modification to antibiotherapy was required after the antibiogram of the isolated microorganisms (Table 1). The mean duration of hospitalization was 5.3 ± 3 days.

Discussion

The main finding of this study, which included 13 patients, was that rates of odontogenic cervicofacial infections requiring intravenous (IV) antibiotics and abscess drainage in children increased significantly in the second year of the COVID-19 pandemic. Dental caries may be the most common chronic disease. The disease is caused by the fermentation of carbohydrates into organic acids by microorganisms in the plaque on the dental surface. Plaque on uncleaned dental surfaces is a biofilm and 70% consists of microorganisms (100 million organisms/mg plaque). In time, the organic acids which are the by-products of the said microorganisms, reduce the pH of the microenvironment below the level at which the enamel will dissolve and demineralise the dentin and enamel. Brushing with fluoride reinforced toothpaste at least twice a day and regular visits to a dentist is deemed necessary.^{9,10} It can be predicted that these will be ignored during quarantine periods. Periapical infections of the tooth, an outcome of poor dental hygiene, is shown to be the most attributed cause of cervicofacial infections of odontogenic origin.^{5,11} Severe infections of the neck and facial region often require IV antibiotic therapy, surgical interventions and extended hospital stay. Studies have shown that during the COVID-19 quarantine where primary care dentistry practices are disrupted, less patients had presented with dental infections but among those

Highlights
<ul style="list-style-type: none"> • Inadequate dental hygiene is the most important cause of cervicofacial infections. • Preventive dental health practices have been disrupted in the COVID-19 quarantine. • The COVID-19 quarantine has increased serious cervicofacial infections.

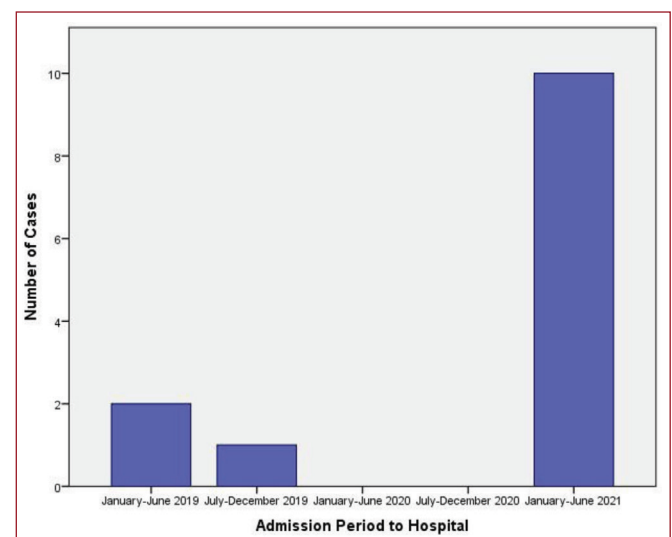


Figure 1. Number of cases in six-month periods before and after COVID-19. COVID-19: Coronavirus disease-2019

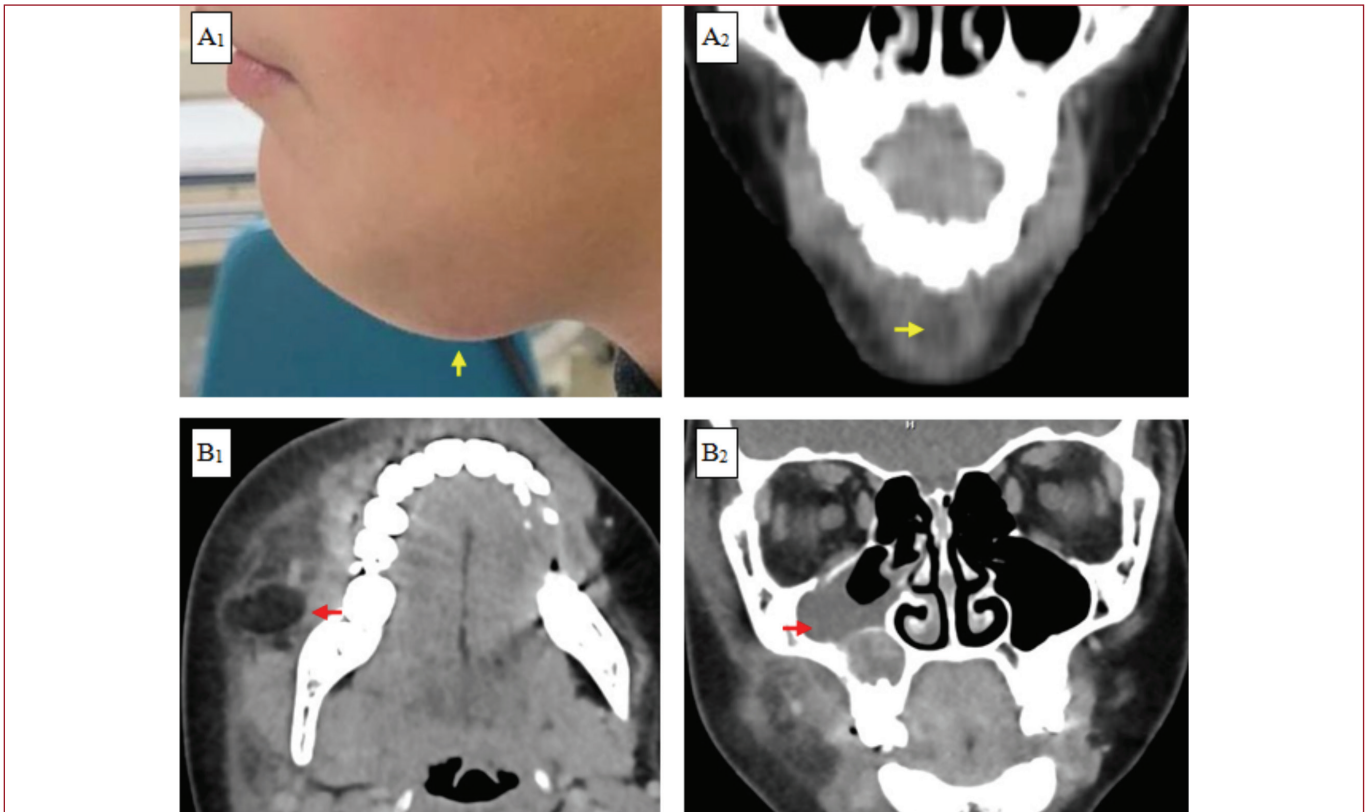


Figure 2. A) In case number four, swelling, redness, warmth and tenderness in the affected area, and a 4x3 cm fluid collection on tomography are shown with yellow arrows. B) In case number twelve, a 2x2 cm lobulated contour cystic lesion around the right upper premolar tooth root and tomography image showing odontogenic sinusitis in the right maxillary sinus are shown with red arrows.

Table 1.

Characteristics of children followed up with cervicofacial infection of odontogenic origin before and after COVID-19 quarantine

Case	Gender	Age (year)	Admission time	Admission symptom	History of dental disease	WBC (mm ³)	Neutrophile (mm ³)	CRP (mg/dL)	Abscess drainage and culture	Duration of hospitalization (day)
1	Male	14	April 2019	Swelling of the face	-	9.300	8.440	6.4	-	3
2	Female	2.5	April 2019	Swelling of the neck	-	20.100	14.400	2.6	-	3
3	Female	12	December 2019	Swelling of the neck	Dental caries	7.300	4.900	0.6	-	8
4	Male	6	March 2021	Swelling of the neck	Dental caries	17.440	12.900	3.7	+, <i>E.corrodens</i>	9
5	Male	8	March 2021	Swelling of the neck	-	13.840	12.240	21.1	-	4
6	Female	6	March 2021	Swelling of the face	-	8.140	3.270	2.7	-	4
7	Female	9	March 2021	Dental pain and swelling of the face	Dental caries	21.700	17.800	1.1	+, no isolated	4
8	Male	6	March 2021	Swelling of the neck	-	5.480	2.260	4.2	-	2
9	Female	8	March 2021	Swelling of the face	Dental caries	11.130	6.610	0.8	-	2
10	Male	15	March 2021	Swelling of the neck	-	7.310	3.930	0.1	-	4
11	Female	4	April 2021	Swelling of the face	-	15.220	9.870	25.1	-	11
12	Female	10	May 2021	Swelling under the jaw	Dental caries	17.950	14.540	6.2	+, <i>S.anginosus</i>	10
13	Male	9	June 2021	Swelling of the neck	-	20.520	17.770	7.3	+, <i>S.intermedius</i> and <i>S.anginosus</i>	6

WBC; White blood cell, CRP; C-reaktif protein, COVID-19; Coronavirus disease-2019

who presented, the percentage of patients requiring IV antibiotic therapy and extended hospitalization had increased.^{6,11-14} This has been attributed to the hesitancy of caretakers to potential exposure to COVID-19, limited access to primary dental health care facilities, increased willingness to self-medicate as conservative treatment with analgesic agents and only presenting to a healthcare facility when the pathology becomes unbearable.^{6,8,14} It is vital to provide these patients with access to first-line treatment that will allow early intervention in the restrictions to be applied in the possible future waves of COVID-19.⁶ In our study, we think that the more frequent cases in the second year of the pandemic are due to the prolongation of the quarantine, neglect of personal oral care practices, the formation/progression of dental caries over time and the disruption of dentist visits.

This study has some potential limitations. Firstly, as it is conducted in a single healthcare centre, the number of cases is low. Secondly, we do not know the impact of the restrictions in the early period of the pandemic, as our hospital only served COVID-19 patients until September 2020.

Conclusion

Disruption of preventive or early intervention oral and dental health practices in children due to the COVID-19 quarantine increases the incidence of dental caries, leading to an increase in the number of odontogenic cervicofacial infections that require IV antibiotics and abscess drainage.

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Conflict of Interest: There are no conflicts of interest in connection with this paper, and the material described is not under publication or consideration for publication elsewhere.

Ethical Approval: The study was conducted according to the principles of the Declaration of Helsinki and was approved by the Çanakkale Onsekiz Mart University Clinical Research Ethics Committee (approval date: 20/10/21, approval number: 2021-07).

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Informed Consent: Written consent was obtained from the parent of the case whose image was used.

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