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ORIGINAL ARTICLE

Impact of COVID-19 on Management and Outcome of Cervicofacial Infections in a Maxillofacial Centre

Impact de COVID-19 sur la Gestion et le Résultat des Infections Cervicofaciales dans un Centre Maxillofacial

[1]*B. Fomete, [2]E. T. Adebayo, [3]R. Agbara, [1]E. A. Ikekhuame, [4]K. U. Omeje, [1]G. Nasir

ABSTRACT

INTRODUCTION: Cervicofacial infections (CFI) are life-threatening and constitute some of the common emergencies seen by the oral and maxillofacial surgeon on a regular basis. The COVID-19 pandemic resulted in reduced human activities for most of 2020 including the first worldwide lockdown. At the height of the pandemic, it was expected that the number of patients presenting with cervicofacial infections would drop as with most health conditions. The purpose of this study was to determine the impact of COVID-19 on the management and outcome of cervicofacial infections in a tertiary maxillofacial institution.

PATIENTS AND METHODS: A retrospective analysis of patients who presented at the Maxillofacial clinic with cervicofacial infections and were subsequently admitted into the ward during the lockdown (2020) was compared with those of the previous year (2019) and the year after (2021).

RESULTS: The total number of patients seen and admitted with cervicofacial infections in 2020 was 39(31.2%) which was lower than that seen the preceding year 48(38.4%) but higher than 38(30.4%) of the year after. 116 patients were treated while nine patients left hospital without treatment. All patients presented with extensive cervicofacial infections, involving more than three fascial spaces and were treated using parenteral antibiotics with surgical incision and drainage under local anesthesia. There were more deaths in 2020 (n=10) than in the preceding year (n=8) and the year after (n=7).

CONCLUSION: A high percentage of CFI was admitted during COVID-19 period compared to the previous and following years. Involvement of multiple fascial spaces was also noted. **WAJM 2023; 40(2): 143–147.**

Keywords: COVID-19, Cervicofacial infection, Lockdown, Management, Impact.

RÉSUMÉ

INTRODUCTION: Les infections cervico-faciales (ICF) mettent la vie en danger et constituent certaines des urgences les plus courantes que rencontre régulièrement le chirurgien buccal et maxillo-facial. La pandémie de COVID-19 a entraîné une réduction des activités humaines pendant la majeure partie de l'année 2020, y compris le premier verrouillage mondial. Au plus fort de la pandémie, on s'attendait à ce que le nombre de patients présentant des infections cervico-faciales diminue comme pour la plupart des problèmes de santé. Le but de cette étude était de déterminer l'impact de COVID-19 sur la gestion et le résultat des infections cervicofaciales dans une institution tertiaire maxillo-faciale.

PATIENTS ET MÉTHODES: Une analyse rétrospective des patients qui se sont présentés à la clinique maxillo-faciale avec des infections cervico-faciales et ont ensuite été admis dans le service pendant le lockdown (2020) a été comparée à celles de l'année précédente (2019) et de l'année suivante (2021).

RÉSULTATS: Le nombre total de patients vus et admis pour des infections cervico-faciales en 2020 était de 39 (31,2 %), ce qui était inférieur à celui de l'année précédente (48 (38,4 %)) mais supérieur à celui de l'année suivante (38 (30,4 %)). 116 ont été traités tandis que neuf patients ont quitté l'hôpital sans traitement. Tous les patients présentaient des infections cervico-faciales étendues, impliquant plus de trois espaces fasciaux et ont été traités à l'aide d'antibiotiques parentéraux, avec incision chirurgicale et drainage sous anesthésie locale. Il y a eu plus de décès en 2020 (n=10) que l'année précédente (n=8) et l'année suivante (n=7).

CONCLUSION: Bien qu'un pourcentage élevé de FCI ait été admis pendant la période COVI-19 par rapport aux années précédentes et suivantes, l'implication de multiples espaces fasciaux a également été constatée. **WAJM 2023; 40(2): 143–147.**

Mots clés: COVID-19, Infection cervico-faciale, Confinement, Gestion, Impact.

[1]Maxillofacial Surgery, Department Ahmadu Bello University Teaching Hospital, Zaria, Kaduna State, Nigeria. [2]Oral and Maxillofacial Surgery Department, Faculty of Dentistry, University of Medical Sciences, Ondo State, Nigeria. [3]Oral and Maxillofacial Surgery Department, Faculty of Dentistry, University of Jos, Plateau State, Nigeria. [4]Oral and Maxillofacial Surgery Department, Faculty of Dentistry, Bayero University, Kano State, Nigeria.

***Correspondence:* Dr. Fomete Benjamin,** Maxillofacial Surgery Department Ahmadu Bello University Teaching Hospital, Zaria, Kaduna State, Nigeria. Phone: 2348034515494. Email: fomben@gmail.com

INTRODUCTION

Cervicofacial fascial space infections (CFI) are common conditions that present in health facilities. When diagnosis and/or adequate treatment is delayed, they become life-threatening emergencies that present to the maxillofacial surgeon.[1,2] Most occur as sequelae of dental conditions; in poor people who have had prior traditional herbal or antibiotic medications.[2,3] The outbreak of the coronavirus-19 influenza (COVID-19) in Nigeria followed the reports from China and other countries in 2020. The COVID-19 pandemic caused unprecedented changes in socio-economic life with many countries imposing restrictions on movement, social interactions, and economic activities. There were also restrictions in access to health facilities with services such as dental care being allowed only for emergencies. In Nigeria, amongst other measures, a nationwide lockdown was imposed on 30th March 2020 to control the spread of the virus. It was hypothesized that the general restrictions would directly reflect on the presentation and treatment outcome of CFI of odontogenic origin, however, evidence of such is lacking. Knowledge of the management and treatment outcome of CFI of dental origin during the COVID-19 pandemic would help in determining factors driving and influencing the condition. These could assist in the design and implementation of measures to prevent the condition and improve outcome of patients. Hence, the aim of this study is to report on the management and treatment outcome of CFI of dental origin seen at the Oral and Maxillofacial Surgery clinic of a tertiary care institution in the year before (2019), at the height of the pandemic (2020) and the year after (2021) with a view to making recommendations.

METHODS AND PATIENTS

A retrospective cross-sectional analysis of patients who presented at the Maxillofacial clinic with CFI of odontogenic origin and were subsequently admitted into the ward in 2020 was compared with those of the previous year and the year after. These patients were selected from the total number of patients admitted during the period under review. The information collected for the three years (2019, 2020 and 2021) were: biodata, duration of symptoms, tooth/teeth involved, type of treatment, and length of stay (LoS). Data were entered into a Microsoft Excel spreadsheet and analyzed using SPSS version 22. Values are presented as rates and proportions. Continuous variables of the three years were tested for statistical significance using t-test while categorical variables were tested using chi-square test. Statistical significance was determined as $p \leq 0.05$.

Ethical approval (ABUTH/HRE/W35/2020) to conduct the study was obtained from Ahmadu Bello University Zaria health research and ethics committee.

RESULTS

A total of 125 patients with CFI of dental origin were seen between 2019 and 2021, distributed as follows: 2019 (48, 38.4%), 2020 (39, 31.2%) and 2021 (38, 30.4%). Patients' ages within the period were 9 to 70 years, mean 30.0±11.5years for 2020; 0.5 to 85years, mean 36.8±18.2years for 2019 and 0.4 to 85years, mean 38.2±20.2years for 2021. Analysis of variance (ANOVA) test for difference in mean ages was not significantly different (p=0.51). Table 1 showing demographic characteristic of patients seen revealed that there were more males than females in all the 3 years. The average time between onset of swelling and presentation in days was 9 (5 to 12 days as range) days for 2020 compared to 4 (2 to 7 days) and 4.5 (2 to 7 days) days for 2019 and 2021 respectively.

All patients admitted with CFI of dental origin during the study period were admitted into the wards, had routine investigations done including full blood count and differentials, electrolyte, urea and creatinine and random blood glucose. There were more than three fascial spaces of the head and neck involved in CFI of all patients with the lower molars responsible for 82.6% of cases. Patients were monitored using a pulse oximeter and administered empirical parenteral antibiotics which was given for 48 to 96 hours before surgical intervention by incision and drainage under local anesthesia. Pulse oximeter monitoring continued for 24hours after the surgical procedure. There was no requirement for general anesthesia or tracheostomy. Postoperative antibiotic prescription depended on the initial response to the empirical antibiotics and the financial status of the patient. Table 2 presents the characteristics of CFI. Associated comorbidities were diabetes mellitus in 5 patients and hypertension in one patient (See Table 2). The causes of death for the patients were respiratory obstruction (7), septic shock (8), overwhelming sepsis (4), anemic heart failure (3), and undocumented (3).

DISCUSSION

This study hypothesized that the nationwide lockdown in response to the COVID-19 pandemic would decrease the number of patients presenting with CFI in Nigeria. Our results showed that fewer patients presented in 2020 (n=39) and 2021 (n=38) as compared to the period immediately preceding the pandemic when 48 patients were seen in 2019. This agrees with the findings of other workers[3,4] indicating that reduced socio-economic activities occasioned by the lockdown directly affected patients' presentation at the hospitals with CFI.

Table1: Demographics of Patients Admitted with Cervicofacial Infections

	2019	2020	2021
Total Number Patients Admitted	287	146	146
Number of Patients with Cervicofacial Infection	48	39	38
Age Range (Years)	9–70	0.5–85	0.4–85
Mean Age (Years)	30.0±11.5	36.8±18.2	38.2±20.1
Gender, n (%)			
Male	36(75.0)	29(74)	24(63)
Female	12(25.0)	10(26)	14(37)

This is further borne out by the fact that there was more mortality from CFI in 2020 than the other years.

This study also evaluated how the COVID-19 pandemic affected the presentation and treatment outcome of CFI of dental origin. Our results in table 1 showed that patients who presented with CFI during the period before and after the nationwide lockdown had no significant difference in mean ages and gender distribution, even though overall there were more males than females, with a male to female ratio of 2.5:1. In an earlier study from the same centre, females made up 36% of patients with CFI.[2] Other studies on the impact of COVID-19 on CFI of dental origin found no significant differences in the ages and gender of affected patients.[3,4] From a previous study from the same centre, the majority of patients with CFI were above 40years.[2] Puglia *et al.,*[5] 2021 found out that mean age of patients during the pandemic year was 37.3(17.4%) years which was slightly higher than the 36.8(18.2%) years of this study. Generally, despite the COVID-19 pandemic, CFI remains a condition predominantly affecting middle-aged males.

In Table 3, there was no significant difference in the number of fascial spaces involved in the various age groups analyzed in 2019 and 2021. In the year of the lockdown 2020, most patients had 2–3 fascial spaces involved with significant difference (p=0.03) between the various age groups. Dawood *et al.*[6] also found a significant difference in the number of spaces involved during the COVID-19 year.

The lower molars were the culprit in about 82.6% of cases which is comparable to other studies.[3,4] Puglia *et al.,*[5] 2021 also found the lower molars to be involved in majority of cases during the pandemic year. This study also noticed that multiple extractions were carried out in all the years but they were more in 2020. Previous reports had scant documentation of specific involvement of fascial spaces in CFI during the pandemic as compared to other years. When compared to the years 2019 and 2021, Table 2 showed only hemifacial involvement in CFI, which occurred more in 2020. There was more involvement of

Table 2: Characteristics of CFI in a Nigerian Population

Characteristics	2019	2020	2021
Spaces Involved			
Hemifacial	3	7	4
Ludwig's angina	13	8	5
Anterior chest wall	9	9	3
Parapharyngeal	3	2	0
Submasseteric	1	3	0
More than 5 fascial spaces	2.2	19	14
Comorbidities			
Diabetes Mellitus	2	2	1
Hypertension	0	0	1
LoS			
Range(days)	1–52	1–46	2–35
Mean(days)	17.6(11.5)	13.2(10.8)	15.5(8.9)
Eventful Outcome	4	3	2
Died during Treatment	8	10	7

Table 3: Association between Number of Involved Fascial Spaces and Age Group

Year	Number of Fascial Spaces			Total, n(%)	χ^2	P
	2–3 n(%)	4–5 n(%)	>5 n(%)			
2019	**Age Group (Years)**					
	0 – 16	1(33.3)	1(33.3)	1(33.3)	3 (6.3)	6.042	0.403
	17 – 34	15(50.0)	6 (20.0)	9 (30.0)	30 (62.5)		
	35 – 64	10(71.4)	2(14.3)	2(14.3)	14 (29.2)		
	≥ 65	0(0.0)	1 (100.0)	0(0.0)	1(2.0)		
	Total	**26 (54.2)**	**10 (20.8)**	**12 (25.0)**	**48(100.0)**		
2020	0 – 16	1(50.0)	0(0.0)	1(50.0)	2 (5.1)	12.653	0.039
	17 – 34	6(35.3)	7 (41.2)	4 (23.5)	17 (43.6)		
	35 – 64	7(43.8)	1(6.2)	8 (50.0)	16 (41.0)		
	≥ 65	4 (100.0)	0(0.0)	0(0.0)	4 (10.3)		
	Total	**18 (46.2)**	**8 (20.5)**	**13 (33.3)**	**39 (100.0)**		
2021	0 – 16	3(42.8)	2(28.6)	2(28.6)	7 (18.4)	3.788	0.782
	17 – 34	6 (75.0)	2 (25.0)	0(0.0)	8 (21.1)		
	35 – 64	12 (66.6)	3(16.7)	3(16.7)	18 (47.4)		
	≥ 65	3(60.0)	1(20.0)	1(20.0)	5(13.1)		
	Total	**24 (63.2)**	**8 (21.0)**	**6 (15.8)**	**38 (100.0)**		

Table 4: Association between Treatment Outcome and Year of Care

	Treatment Outcome			Total	χ^2	P
	Successful n(%)	Died n(%)	Indeterminate n(%)			
Year						
2019	36(75.0)	8(16.7)	4(8.3)	48(38.4)	4.828	0.305
2020	26(66.7)	10(25.6)	3(7.7)	39(31.2)		
2021	29(76.3)	7(18.4)	2(5.3)	38(30.4)		
Total	**91(72.8)**	**25(20.0)**	**9(7.2)**	**125(100.0)**		

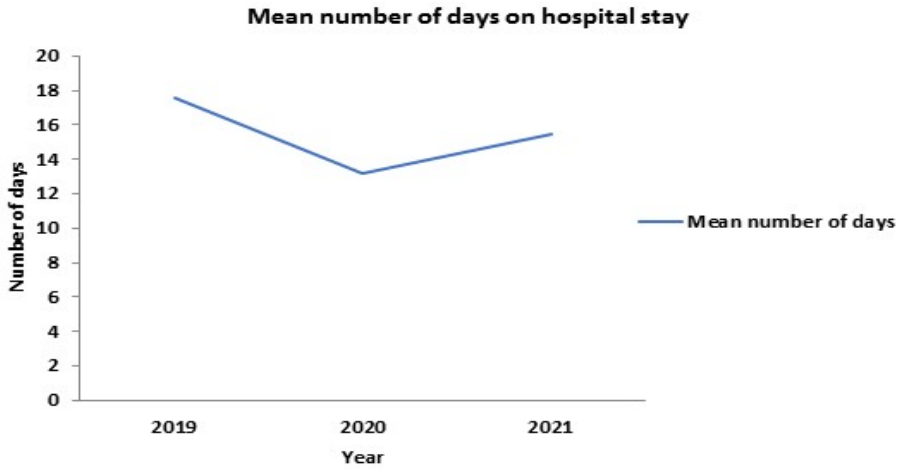

Fig.1: Mean Length of Stay (LoS).

the other specific fascial spaces before and after the COVID-19 lockdown period. The mainstay of surgical drainage for CFI at our centre was extraoral drainage, from previous reports.[2,7] All patients seen in this study, including at the height of the COVID-19 pandemic, had extraoral surgical drainage. Puglia *et al.*[5] and Dawood and co-workers,[6] utilized extraoral drainage for some patients during the COVID-19 period.

The predominant comorbid condition was diabetes mellitus in the previous year and the lockdown year as observed by Dawood and co-workers.[6]

The LoS in 2020 was lower than the previous year but was slightly higher than the following year (Figure 1). Politi *et al.,*[3] made the same observation in the UK with respect to the previous year. A previous study from our centre had reported high LoS as common.[2] Nabil[4] found no difference in LoS during the COVID-19 period while Dawood and co-workers,[6] and Samara *et al.,*[8] observed longer hospital stay during the covid-19 period.

More patients (25.6%) admitted with CFI died in 2020 than the previous (2019) or subsequent year (2021). This could be because the restrictions limited access to treatment and these patients sought specialised hospital treatment later in the course of the infection than in other years. Changes in severity and virulence of the infecting organism(s) cannot be ruled out as microbiological studies were not performed. Other authors[3,4,6] did not record any death in their studies. Dawood *et al.,*[6] 2021, stated that quarantine without primary healthcare was the cause of delayed presentation. Uittamo *et al.,*[9] noted that patients who presented late were bound to have a deterioration of their situation. Altintas E,[10] 2022 recorded severe cases of CFI during the pandemic which were not previously documented. Puglia *et al.,*[5] 2021 however did not record any death during the period of COVID-19.

Teledentistry, within the sub-contexts of teleconsultation (most common form of teledentistry), teletriage, telediagnosis and telemonitoring, have been stated as possible keys for the practice of Dentistry during periods of reduced or inadequate access for physical consultation such as the COVID-19 pandemic.[11] It is unfor-tunately not popularized in our environment and would have been a tool to reduce the severity and mortality related to CFI. Its acceptance by Dental practitioners may also be a challenge and the quality of network in remote areas of Nigeria, due to low penetrance of telecommunication services. Tele-dentistry as part of telemedicine and telehealth,[11,12] which has advantages such as patients meeting with the specialist, low cost and reduced time off work, was popularized before covid-19 pandemic. But it also presents the following limitations; such as screening, consulta-tion and history taking, lack of experience in healthcare providers with the software and technology used, and the necessity for patients to have a discourse with different people every time due to the virtual setting.[13]

CONCLUSION

From the study, there was a decrease in the number of admissions from cervicofacial infections compared to the previous year but not so compared to the following year, though a high percentage was admitted compared to the previous and following years. There were more multiple extractions and more fascial space involvements during the lockdown when compared to other years. The proportion of death among admitted CFI patients was higher with respect to the other years of comparison but the average LoS was lower. Teledentistry as a tool for improved patient access to specialized care in areas of inadequate access could assist some patients and lower-level care providers to facilitate early, lifesaving treatment but such services are still hard to find in many low- and middle-income countries like Nigeria.

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Nil.

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