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Impact of Coronavirus 19 (COVID-19) Disease Pandemic on Surgical Dental Emergencies and Related Surgical Interventions in Albania

SUMMARY

Background/Aim: Dentists are considered particularly at risk of disease transmission due to aerosol generation during manipulations, patient proximity, and operating environment. To prevent the diffusion of the virus all dental clinics in Albania were closed by the order of the Ministry of Health during the lockdown period. The University Dental Clinic (UDC) was reorganized from a more academic to a dental emergency institution. This study aimed to analyze the impact of the COVID-19 pandemic on the pattern of presentation and management of surgical dental emergencies in UDC. Material and Methods: A retrospective analysis of all consecutive patients with surgical dental emergencies and urgencies presenting in our surgical service of University Dental Clinic in Tirana during COVID-19 lockdown 2020 (9th of March to 17th of May) in Albania and used as a control period the same weeks in 2019. Results: During the 10-week COVID-19 period we observed a 5.2-fold increase in the incidence of emergency presentations (181 patients in 2020 versus 35 patients in 2019 with a significant increase in mean event incidence difference (MID) 14.6 (95%CI 10.59 - 18.61); p<0.0001. For dental abscess was observed a 4.4-fold increase during COVID-19 compared to the control period with a significant increase of MID 5.8 (4.32 - 7.28); p<0.0001. Compared to 2019, during the COVID-19 period were also observed a 7.1-fold increase in reacutization of chronic periodontitis. Compared to 2019 we observe a 3.5fold increase in overall surgical treatments during the COVID-19 pandemic with a significant increase of MID 6.40 (4.83 - 7.97); p<0.0001. For dental Extractions was observed a 2.85 fold increase with a significant increase of MID 3.70 (2.61 - 4.79); p < 0.0001. And also compared to 2019 we observed a 10-fold increase in conservative strategy during the COVID-19 period. Conclusions: During the COVID-19 pandemic outbreak, a significant increase in surgical emergencies/urgencies and related interventions was observed in our center. The main possible reason is the restricted activity of all other dental clinics in Albania and eventually because of the later stage disease presentation during the COVID-19 pandemic outbreak.

Key words: Covid-19 pandemic, Surgical Dental Emergencies, Abscess, Dental Extraction

Eriselda Simoni¹, Merita Bardhoshi²

- ¹ Dental Surgery Service, University Dental Clinic, Tirana, Albania
- ² Faculty of Dental Medicine, University of Medicine, Tirana, Albania

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Introduction

The coronavirus 19 disease (COVID-19) pandemic changed seriously the way medical healthcare personnel worked and managed health problems. In December 2019,

in Wuhan city¹ was detected the first case of unknown pneumonia. Researchers discovered and isolated a novel coronavirus responsible for this pneumonia (2019-nC0V)² which rapidly spread all over the world. Dentists are considered particularly at risk of disease transmission

due to aerosol generation during manipulations, patient proximity, and operating environment³. The common transmission routes of 2019 nCoV include droplets (particles diameter ≥5 microns) inhalation generated from coughs and sneezes of infected patients, as well as direct contact with oral, nasal, and eye mucous membranes⁴.

To prevent the diffusion of the virus different measures were taken from the countries affecting dental services. In many countries, a quasi-total closure was put in order, meanwhile in others the dental clinics operated under strict measures mainly the most urgent cases⁵⁻⁶.

The first case of COVID 19 disease in Albania was declared on 8th of March 2020⁷, following by a gradual national lockdown gradually from 9th of March with school and universities to 16th of March where the total national lockdown measures were put in order⁸⁻⁹. During all the lockdown period the population was called to physical distancing, self-isolation and strict movement measures were put in order. The relaxation measures begun and continued throughout May and the restriction measures were released almost completely on June¹⁰.

To prevent the diffusion of the virus all dental clinics in Albania were closed by the order of the Ministry of Health¹¹ during lockdown from 12th of March 2020 until 17th of May according to scaled reopening process under strict security protocols¹². The University Dental Clinic (UDC) was reorganized from a more academic to a dental emergency institution treating all dental outpatient surgical and nonsurgical emergencies respectively in oral surgery service and endodontic service. All dental outpatient emergencies were performed by the specialized dental professionals of this clinic. All patients who required in-patient admission were referred to the maxillofacial surgery service of University Hospital Center "Mother Teresa" in Tirana.

This study aimed to investigate the impact of the COVID-19 pandemic on surgical dental emergencies and urgencies admissions and related surgical interventions.

Materials and Methods

Data Sources and definitions

A retrospective study of all consecutive patients with surgical dental emergencies and urgencies presenting in second surgical service of UDC during COVID-19 lockdown 2020 (9th of March to 17th of May) in Albania and using as control period the same weeks in 2019. All data including demographics, previous comorbidities, dental pathologies, and surgical treatment procedures were collected.

Surgical oral emergencies and urgencies in our center were defined according to American Dental Association (ADA) report¹³ as following:

Category 1: Dental emergencies that are potentially life-threatening that require immediate treatment (within 1 h) including uncontrolled bleeding and diffused soft tissue infection with intra-oral or extra-oral swelling that potentially compromise the patient's airway.

Category 2: Urgent dental care (within the 24 h), conditions that require immediate attention to relieve severe pain and risk of infection and to alleviate the burden in hospital emergency departments including pericoronaritis or third molar pain; surgical post-operative osteitis; abscess, or localized bacterial infection; tooth fracture resulting in pain or causing soft tissue trauma; dental trauma with avulsion/luxation; biopsy of abnormal tissue; and

Category 3: Undeferrable treatments (more than 24h) including suture removal.

There were a total of 211 patients who presented in our 2nd surgery service during 30 of them need only a face-to-face consult or were considered not emergent cases and 181 patients were considered and admitted as surgical emergencies/urgencies. 35 patients considered emergencies/urgencies were admitted during the control period (2019)

During the COVID-19 period, all clinicians who undertook manipulations used the appropriate surgical wearing PPE including the FFP3 masks. A COVID formulary and a thermometer were used to detect possible COVID patients. None of our patients were diagnosed or suspected with COVID-19 at the time of their presentation probably because at that time of pandemic outbreak a low diffusion of the virus was noted in Albania.

Oral surgical emergency/urgency admission, surgical and conservative treatment outcomes

All surgical procedures in both periods including dental extraction, abscess drainage, root canal therapy orientation, post-operative osteitis treatment, laser, and others were analyzed. The primary outcome of this analysis was the overall rate and weekly incidence of oral surgical emergency/urgency and each pathology admissions during the study and control period. Other outcomes analyzed and compared between the two study periods were: overall emergency/urgency admissions, proportions of patients undergoing surgical procedures, and receiving conservative treatment.

Changes in the rate of emergency/urgency admissions, related surgical procedures, and conservative treatment were calculated by comparing the total admission/procedure number for the period 9th of March to 17 May 2020 with the number during 2019 and expressed as a percentage. Percentage changes in weekly emergency/urgency admission and related procedures were calculated similarly by comparing the admission/procedure number of each week (starting with the first week from 9th of March and following 9 other weeks until 18th of May 2020) with the weekly number during 2019.

The differences in the incidence of emergency/ urgency admissions during the study period and the control period are shown as weekly mean incidence difference (MID) which was calculated by comparing the weekly mean of emergency/urgency admissions during the 10 week study period with the mean admission during 2019. Mean incidence differences are presented with 95CIs. Mean incidence difference of abscess admissions, related surgical procedures, and conservative treatment were calculated similarly.

Statistical Analyses

Demographic characteristics, pathological and procedural related variables were summarized using mean \pm SD for continuous variables compared using t-tests and frequency and percentage for categorical variables compared using chi-squared ($\chi 2$) tests. Was used t-test for Equality of Means to calculate the weekly mean event incidence (including, emergency/urgency admissions, including each pathology, surgical and conservative treatments) differences (MID) between 10 weeks (9th March to 17^{th} May study and control periods for all-emergencies/urgencies, abscess, surgical procedures,

dental extraction, and conservative (antibiotic therapy and antianalgesics) treatment. Mean differences among groups and subgroups are presented with 95%CI. The statistical analysis was performed using the Statistical Package IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0 Armonk, NY: IBM Corp. A two-sided P value of <0.05 is considered to indicate statistical significance.

Results

Emergency admissions and population Characteristics

During the 10-week COVID-19 period a 5.2 fold (520%) increase of the incidence of oral surgical emergency/urgency presentations (181 patients in 2020 compared with 35 patients in 2019) and with a MID 14.6, 95% confidence interval [CI] 10.59 - 18.6, P<0.0001was observed. Baseline data are shown in Table 1 and mean incidence differences in Table 2.

Table 1. Baseline demographic, clinical, and surgical characteristics of patients admitted with surgical emergencies/urgencies during COVID-19 period and control period

	Study period 181 pts, n (%)	Control period 35 pts, n (%)	P value*
Age m (SD)	42.64±18.44	39.75±20.12	0.340
Male	101 (55.8%)	14 (40.0%)	0.126
Hypertension	38 (21.0%)	2 (5.7%)	0.048
Haematologic pathologies	8 (4.4%)	1 (2.9%)	0.672
Diabetes Mellitus	6 (3.3%)	1 (2.9%09	0.700
Abscess	75 (41.4%)	17 (48.6%)	0.550
Re-acutisation of chronic periodontitis	64 (35.4%)	9 (25.7%)	0.360
Localized bacterial infection	13 (7.2%)	3 (8.6%)	0.750
Dental trauma	15 (8.3%)	0 (0.0%)	0.160
Uncontrolled bleeding	4 (2.2%)	0 (0.0%)	n.a
Biopsy of abnormal tissue	4 (2.2%)	0(0.0%)	n.a
Pericoronaritis or third-molar pain	4 (2.2%)	2 (5.7%)	0.550
Soft tissue trauma	5 (2.8%)	1 (2.9%)	0.900
Surgical post-operative osteitis	2 (1.1%)	4 (11.4%)	0.004
Sinusitis	2 (1.1%)	0 (0.0%)	n.a
Temporomandibular disorders	3 (1.7%)	0 (0.0%)	n.a
All-surgical interventions	90 (49.7%)	26 (74.3%)	0.005
Dental extraction	57 (31.5%)	20 (57.1%)	0.007
Abscess drainage	12 (7%)	2 (5.7%)	0.700
Emergencies of root canal therapy orientation	5 (2.8%)	0 (0.0%)	n.a
Uncontrolled bleeding treatment	5 (2.8%)	0 (0.0%)	n.a
Laser	4 (2.2%)	0 (0.0%)	n.a
Soft tissue trauma management	5 (2.8%)	1 (2.9%)	0.990
Surgical post-operative osteitis treatment	1 (0.6%)	3 (8.6%)	0.010
Conservative treatment (antibiotics, etc)	91(50.3%)	9 (25.7%)	0.190

^{*}To determine statistical significance for the comparison regarding each one of demographic characteristics, angiographic and procedure related variables was summarized using mean \pm SD for continuous variables compared using t-tests and frequency and percentage for categorical variables compared using chi-squared (χ 2) tests.

Dental Extraction (% urg)

Conservative (antibiotics, etc) n (% urg)

Weekly Mean Difference Admission diagnosis and procedures COVID-19 Control P-value* (95% CI)† < 0.0001 All urgencies 181 35 14.60 (10.59 - 18.61) Abscess n (%urg) 75 (41.4%) 17 (48.6%) 5.8 (4.32 - 7.28) < 0.0001 All surgical procedures n (% urg) 90 (49.7%) 26 (74.3%) 6.40 (4.83 - 7.97) <.00010

20 (57.1%)

9 (25.7%)

Table 2. Admissions presentation, surgical and conservative treatments and correspondent weekly mean incidence difference comparing COVID-19 and control period.

†Weekly mean incidence difference for all urgencies and abscess, all surgical procedures, dental extraction, and conservative treatment obtained from the analyses of 10 weeks in COVID-19 and control period is expressed in mean and 95%CI.

57 (31.5%)

91 (50.3%)

There were no differences in mean age and gender between periods. Compared to control, during COVID 19 period a significant increase in the presence of Arterial Hypertension (21% vs 5.7% p=0.048) in outpatients treated was observed (Table 1).

Oral Pathologies admissions

During both periods the greatest proportion of patients presented were with dental abscess respectively 41.4% and 48.6%, but in absolute number, we observed a 4.4 fold increase (75 vs 17 patients) during COVID-

19 compared to the control period with a MID 5.8 [4.32 - 7.28]; P <0.0001. Compared to 2019, during COVID 19 period were also observed a 7.1 fold increase of re-acutization of chronic periodontitis), an increase in dental traumas with an incidence of 1.5/week.

3.70(2.61 - 4.79)

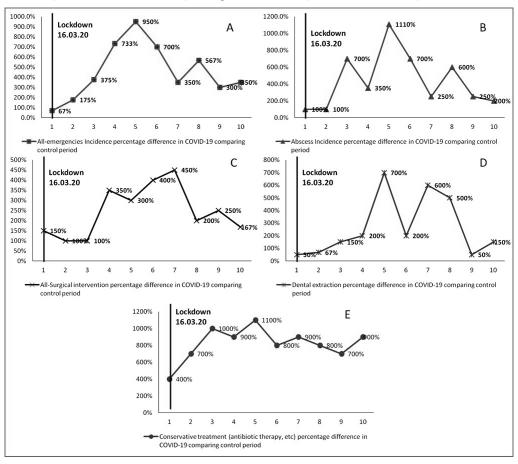
8.20 (6.95 - 9.45)

< 0.0001

< 0.0001

The greatest increase in emergency/urgency admissions (increase by 773%-950%) was observed during the fourth and fifth week of the pandemic outbreak. Weekly percentage changes in overall oral surgical emergency/urgency and abscesses are shown in Figure 1.

Figure 1. The weekly difference percentage (percentage change in COVID-19 compared to control period) assessed for A) all-emergencies admissions, B) dental abscess admissions, C) all-surgical intervention, D) dental extraction, and E) conservative treatment



^{*}To determine statistical significance for the comparison regarding urgencies, surgical procedures, and conservative treatment, the t-test for Equality of Means was used.

Oral Surgical and Conservative treatments

Compared to 2019 a 3.46 fold increase of over-all surgical treatments during COVID-19 pandemic with a significant increase of MID 6.40 [4.83 - 7.97]; p<0.0001]; dental extractions a 2.85 fold increase with a MID 3.70 [2.61 - 4.79] ;p<0.0001] were observed as presented in table 1 and 2. An increase was also observed in other procedures used. Compared to 2019 a 10 fold increase of conservative strategy during the COVID-19 period was observed.

On the other side, we noted changes in the treatment profile during the COVID-19 pandemic. During the COVID-19 pandemic, a greater proportion of patients had only conservative treatment including antibiotic therapy and antianalgesics (50.3%vs 25.7%), differently from the control period in which surgical treatment and particularly the dental extraction (35.1% vs 57.1%) presented the main strategy used. The greatest increase in surgical intervention admissions (increase by 350%-450%) was observed during the fourth and seventh week of the pandemic outbreak. Weekly percentage changes in overall oral surgical intervention, dental extraction, and conservative treatment are shown in Figure 1.

Figure 1. A, B. The weekly incidence difference percentage (percentage change in COVID-19 compared to control period) assessed for all-emergency/urgency, abscesses, showing an important incidence increase of all emergencies from the 4d week of the study compared to the control period. C, D, E The weekly treatment difference percentage (percentage change in COVID-19 compared to control period) assessed for all-surgical intervention, dental extractions, and conservative treatment (antibiotic therapy, etc), showing an important increase for all surgical interventions from 4th week of the study compared to control period.

Discussion

This study gives valuable insight into the outpatients' surgical dental emergency/urgencies during the COVID-19 pandemic outbreak in Albania. We documented an important increase of 5.2 fold of patients presenting dental surgical emergencies/urgencies during the pandemic COVID 19 outbreak. The increase was observed in all types of emergency/urgencies, especially for dental abscess, re-acutization of chronic periodontitis, traumas, and localized bacterial infection. Even though there are no significant differences in the proportion of patients presented with all types of emergency/urgencies between periods. The greatest increase of emergency/urgency admissions was observed during the fourth to fifth week (773%-950%) following the pandemic outbreak.

Our results are similar to those observed also in other studies. In Brazil¹⁴, an increase in urgency/ emergency procedures was reported by 44.1% of the dentists, mostly due to the unavailability of routine/ elective dental care and increased patient anxiety and stress. The main causes of urgency/emergency appointments were toothache, dental trauma, and broken restorations, besides the breakage of orthodontic appliances and temporomandibular disorders. In an Italian study¹⁵ the main reason for outpatient admission to the clinic was the removal of nonabsorbable sutures (oral surgery procedures performed before the emergency phase), followed by abscesses, and biopsy of abnormal tissue. The study conducted in Cluj-Napoca Metropolitan Area in Romania¹⁶ which evaluates all dental emergencies (differently to our study that were treated only surgical emergencies) showed an increase of patients that received dental care between April 2020 (COVID-19) and April 2019 (724 patients in 2020 versus only 160 patients were treated in April 2019 in the same facility). The number of patients with acute apical periodontitis, abscess, and acute pulpitis was significantly higher in 2020. Meanwhile in another UK study¹⁷ regarding the impact of COVID-19 in cervicofacial infection of dental etiology (hospital patients) resulted in a reduced number of patients with such infection during the initial 6 weeks lockdown compared with the same period of two previous years. All patients admitted received incision and drainage. An increase in extraoral drainage and an associated reduction in length of stay were observed.

We believe that the increase in the numbers of patients presenting with emergencies/urgencies in our center during the lockdown was mainly because of the closure of all dental clinics due to government lockdown restrictions¹¹ and the reorganization of our center as an emergency center¹¹. Initially were taken also took short point appointments and elective treatment to avoid COVID infection, so this altered the treatment plan, too. We treated the first stage of infection with antibiotics and analgesics (reflecting the increased percentage of conservative treatment), when this treatment failed we managed with longer appointments.

We observed not only a significant increase in the number of patients with a dental surgical emergency but also in a later stage of dental pathologies, leading to changes in treatment strategy. An important factor in presenting in later stage could have been the government guidance to STAY AT HOME, the call for self-isolation which might have led to possible misinterpretation, not seeking or postponing medical care.

The increased number of patients at a later stage of dental pathologies consistently was reflected with an increase in surgical intervention, such as dental extractions, abscess drainage, emergencies of root canal therapy orientation, hemorrhagic management, and management of soft tissue injuries. The greatest increase of all surgical procedures was observed during the fourth to seventh week of the study. The total lockdown began on the second week followed by the greatest increase of all surgical interventions during the fourth to the seventh week. Such increase is possible related also to the absolute increase of patients in our center because of the closure of all dental clinics and another possible reason was the postponement of medical care (later stage pathology) because of fear of COVID infection in medical structures even though Albania during the outbreak of pandemic had a low diffusion of the virus and the COVID patients were treated in dedicated COVID centers. By the end of April, the COVID19 incidence in Albania was 27/100000 and related death 1.08/100000 inhabitats.

We observed also an absolute increase of conservative treatment strategy (antibiotics and analgesics) possibly related to the above mention of initial short point pathologies for first stage pathologies, but also because of an absolute increase of patients admitted to our center.

Many efforts should be made to minimize the consequences of such a situation, addressing the fear of catching the virus by reassuring that all safety measures are taken in dental clinics from the commencing of mitigation of measures and throughout all pandemic time. Remote management should always precede the face-to-face treatments to avoid the increased risk of infection and when it is necessary the population should be encouraged to prompt dental services in optimal conditions.

Our data were obtained from all consecutive patients admitted with oral surgical emergencies/urgencies in University Dental Clinic in Tirana in two different periods providing a full view of the admission situation, pathologies, and surgical intervention during the COVID-19 pandemic. This is a single-center study in Tirana. Our center is the largest public tertiary dental clinic in the country. In our study, there were not included patients diagnosed or suspected with COVID-19. Such patients were treated in special COVID services equipped with dental treatment facilities.

Conclusions

During the COVID-19 pandemic outbreak, a significant increase in surgical emergencies/urgencies and related interventions was observed in our center. The main possible reason is the restricted activity of all other dental clinics in Albania and eventually because of the later stage disease presentation during the COVID-19 pandemic outbreak. The increase of all emergencies/ urgencies during the COVID-19 pandemic outbreak was successfully affronted by the staff of our clinic.

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Correspondence

Eriselda Simoni Dental Surgery Service University Dental Clinic, Tirana, Albania e-mail: eriseldamalushi@yahoo.com