ORIGINAL ARTICLE

Workload changes during the COVID-19 pandemic and effects on the flow of cancer patients in the Maxillofacial Surgery Department

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ABSTRACT

Aim A SARS Coronavirus 2 (COVID-19) pandemic drastically changed the way the health system works. In Croatia, lockdown measures to curb virus spread lasted from March to May 2020, and all non-essential medical procedures and patients' visits have been cancelled. The study aimed to compare patients' flow and interventions in the surgical department before, during and after the lockdown period.

Methods This cross-sectional study analysed the workload at the Maxillofacial and Oral Surgery Department (Department), Osijek University Hospital, during the COVID-19 pandemic (March-May 2020) and four subsequent months. The same period of 2019 was compared as a control. The data were subtracted from hospitals' electronic database.

Results During COVID-19 lockdown from March to May 2020 the number of hospitalizations (306 vs. 138), surgical procedures (306 vs. 157), and scheduled outpatient visits (2009 vs. 804), dropped significantly as compared to 2019. The number of skin tumour removals was halved (from 155 in 2019 to 58 in 2019) ($p<0.001$), and the number of emergency patients was unchanged in the 3-month period. A significant decrease in outpatient visits and hospital admissions continued after the lockdown ($p<0.001$).

Conclusion A decrease in the number of outpatient visits, hospitalizations, and tumour removals may result in larger proportions of patients with advanced cancers in the future. The second wave of COVID-19 pandemic is ongoing, and special effort must be paid to reduce the number of cancer patients receiving suboptimal treatment.

Key words: head and neck neoplasms, time-to-treatment, workflow

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INTRODUCTION

In December 2019 a novel strain of SARS Coronavirus 2 (COVID-19) swept across China and quickly spread to all corners of the world. The WHO declared a pandemic on 11 March 2020 (1). Most people infected with the virus are asymptomatic or present with mild respiratory symptoms, but older population and patients with comorbidities could develop severe respiratory syndrome - SARS-CoV 2 (2). This puts maxillofacial and oral surgeons in an especially precarious situation due to the anatomical region of their interest and performed procedures (3). By dealing with facial trauma, correction of congenital defects in maxilla and mandible, oncologic and plastic surgery in the face and neck area, medical personnel are exposed to respiratory aerosols and potential infection (4). In addition, numerous procedures in the maxillofacial surgery practice pose a great risk to health and facilitate personnel-to-patient infection (5). Some patients have recognized such risk and delayed their treatment themselves (6).

Due to possibility of viral transmission, some countries delayed elective interventions reducing their numbers significantly. The number of procedures was also reduced due to difficulties in accessing the health services and tertiary surgical centres during the pandemic (6).

The aim of this research was to explore workload change in the Department of Maxillofacial and Oral surgery during the COVID-19 pandemic in 2020 year and especially during the lock-down measures from March-May 2020.

PATIENTS AND METHODS

Patients and study design

This study was a retrospective analysis comparing the types of surgical procedures in the Department of Maxillofacial and Oral Surgery, University Hospital Osijek, Croatia, from March-May 2019 and 2020 year. The same period one year before the pandemic, March, April, and May 2019 was analysed as a control. Additionally, patient flow through the Department was compared between March-September 2020 with the same period in 2019. These months were chosen because of the Coronavirus pandemic in Croatia that began lockdown measures to curb the virus spread on 18 March 2020, which lasted over a month with restrictive measures gradually weakened in May. During the lockdown, all non-essential health care appointments and procedures were postponed or cancelled (7). After the lockdown, according to the hospital recommendations, all patients must have a SARS-CoV 2 test negative before hospital admission.

This study was approved by the Ethics Committee of the Osijek University Hospital.

Methods

The data were subtracted from the hospitals' informatics system (BIS). All data were blinded, and identities of patients were not recorded. The data on the number of patients in different policlinics of the department, the number of hospitalized patients, and the number of outpatient/inpatient surgical procedures were registered. Registered outpatient procedures included small skin resections and reconstruction in local anaesthesia (LA), as well as management of smaller injuries to the face in ambulatory patients.

Types of inpatient procedures were noted and divided into the following groups: surgery of tumours (including resections of skin neoplasms, oral, oropharyngeal, salivary gland, and bone tumours as well as biopsies under general anaesthesia (GA)), plastic surgery procedures (including rhino septoplasty, blepharoplasty, etc.), oral surgery procedures (including planned procedures such as radicular cysts, retained and impacted teeth and emergency procedures such as odontogenic abscesses, oroantral fistulas, etc.), trauma (including soft tissue defects and fractures of facial bones), surgery of salivary glands (including non-neoplastic resections and extraction of calculi due to sialolithiasis), and other procedures (including secondary reconstructions of defects and scars, tracheotomies and closure of tracheostomies, revisions of postoperative bleeding or necrosis, etc.)

Statistical analysis

Statistical difference between two periods was analysed using the Pearson Chi^2 test. All statistical tests that were used in calculations were two-sided. The level of significance was defined as $p<0.05$.

RESULTS

The number of patient visits to the Department was significantly reduced during the COVID-19 lockdown. The number of emergency visits also fell in March and April, but their overall percentage rose to reach as much as 60.24% of all visits in April (Figure 1). The ratio between emergency and outpatient visits in 2019 and 2020 for March did not change significantly (20.5% vs. 26.8%; p=0.23). Emergency outpatient visits grew from 17.9% and 18.3% to 60.2% and accounted for 35.5% of all outpatient examinations during April and May 2020. During the lockdown period the number of outpatient appointments and hospitalizations decreased significantly compared to the same interval in 2019 (p<0.001 for both) (Figure 1).

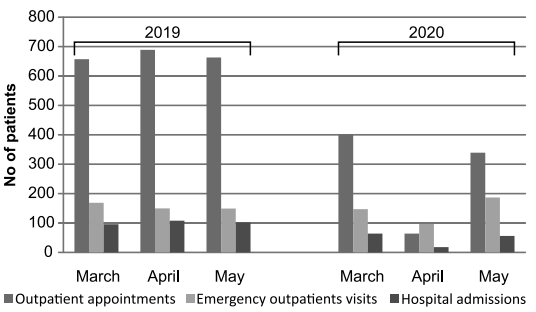

Figure 1. Comparison of outpatient appointments, emergency outpatient visits to the maxillofacial policlinic, and the number of hospital admissions to the Department of Maxillofacial Surgery in 2019 and 2020

The total number of surgical procedures performed in GA and LA decreased significantly in the observed period (p<0.001 for both GA and LA). During March, April, and May of 2019, there were almost twice as many surgical procedures as in the same period of 2020 (306 vs. 157), with April having the biggest difference (116 vs. 29). The number of surgical procedures further decreased in the period from June to September 2020 (Figure 2).

The bulk of surgeries performed at the Department were excisions of neoplasms. During COVID lockdown their number dropped significantly compared with the last year (p=0.005) (Figure 3). The most common type of tumour resections were resection of skin tumours, basal cell carcinomas, squamous cell carcinomas, and melanomas - which fell from 109 in 2019 to 36 in 2020 (p<0.001). The surgical procedures for facial trauma increased from 8.5% to 14.6% overall (p> 0.43). A slight increase in the surgical site complications was observed in March-May

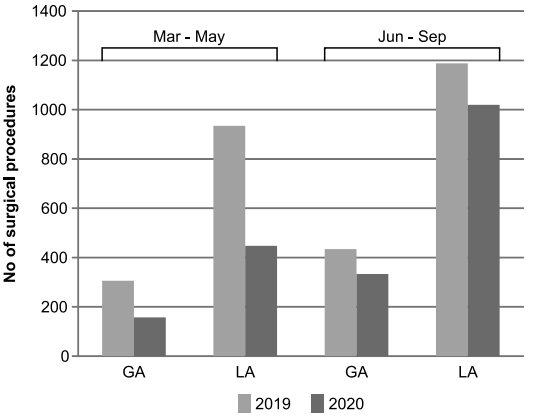

Figure 2. Comparison of the surgical procedures in general and local anaesthesia at the Department of Maxillofacial Surgery during the lockdown and four months later in 2019 and 2020
GA, general anaesthesia; LA, local anaesthesia;

2020, with two patients in need of revisions for postoperative bleeding and flap necroses. There were two surgical tracheostomies performed for COVID-19 positive patients (Figure 3).

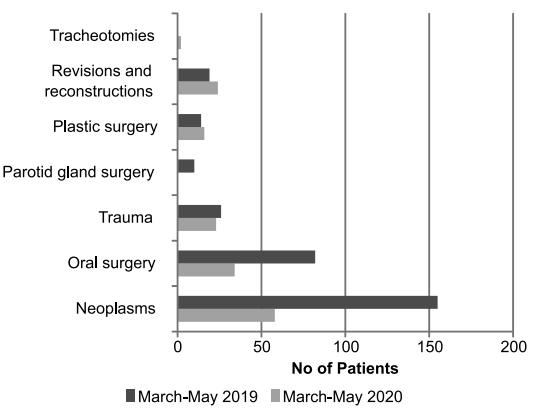

Figure 3. Comparison of inpatient surgical procedures performed during the three-month period in 2019 and 2020

DISCUSSION

There has been no global medical emergency like COVID-19 since the Spanish flu of 1918. This novel disease poses many challenges to doctors and nurses worldwide: how to treat this virus, how to spot it, how to stop its spread. In the meantime, it became a challenge to continue practicing medicine in the COVID-19 setting while treating other diseases.

This study has confirmed significant differences in the workload and patients' flow at the Department of Maxillofacial and Oral surgery during the COVID-19 lockdown period and subsequent months in 2020 compared to 2019. The first COVID-19 positive cases in Croatia were reported on 26 Fe-

bruary 2020 and peaked around the end of March (7). All non-essential medical visits and consultations, as well as elective surgeries, were postponed. Therefore, it is not surprising that the Department had its workload diminished by more than two thirds. Interference and reduction of work were reported by other authors as well (4,6).

The greatest change in the work practice in our institution found in our study was a lower number of hospitalizations and non-emergency visits; we expected to find an increase of emergency visits. If patients can not seek timely medical assistance during scheduled visits, they were expected to seek it in emergency rooms, but this was not the case. Instead we found a drop in emergency visits. Similar trends were also reported in the USA (8,9), Austria (10), Italy (11). The number of facial traumas noticed in our study requiring emergency surgery did not change significantly, suggesting that trauma cases were not affected by stay-at-home measures and a prohibition of intercity transit and public transport. However, the number of emergency visits increased in May 2020, when the lockdown measures ceased. A phenomenon of using emergency visits for non-urgent examinations has been widely reported, with one review article stating that non-urgent visits make up to 37% of all emergency visits across the literature (12).

A recent COVID Surg Collaborative study that also involved Croatian surgical patients predicted that the overall 12-week cancellation rate worldwide would be 72.3%; if countries increased their normal surgical volume after that 3-month period by 20%, the authors estimated that it would take a median of 45 weeks to clear the backlog of operations resulting from COVID-19 disruption (13). In our institution, due to heightened safety measures (such as negative COVID-19 test not older than 2 days and negative epidemiologic anamnesis before hospital admissions and surgical procedures) and fear of infection, patient flow was reduced even for four months after the lockdown. Our number of surgical procedures is still continuously lower than in 2019. This means that our backlog is continuously rising.

The type and proportions of surgical procedures performed in our institution during the COVID-19 pandemic had also changed. The number of tumour removals has decreased, and unfavourable outcomes of these patients may be one of the unwanted consequences of the COVID-19 crisis. The bulk of our postponed tumour removals were premalignant or lesions of low malignant potential such as basocellular carcinoma, and a delay in their treatment for a few months may not have serious consequences *quod vitam*. However, there is a subgroup of patients suffering from lesions that will have an unfavourable cosmetic outcome with delayed treatment, and a subgroup with more aggressive tumours, i.e. melanomas, that may easily spread and metastasize (14). Once admitted to the hospital in advanced stage of their disease, these patients may be given suboptimal medical care with the greater cost of treatment. These tumours must not be neglected in the COVID-19 pandemic (15).

Maxillofacial surgery is a specialty that is particularly vulnerable in the setting of respiratory transmitted virus (16). Due to the nature of physicians' work every examination and procedure performed at the patients' side present a risk for viral transmission (16,17). Specific airway procedures, such as surgical tracheostomies in COVID-19 positive patients, pose a significant risk to all medical staff involved in the treatment due to the aerosol dispersion (5). Operating in COVID-19 operating rooms poses several challenges, with low mobility, impaired communication, and poor visibility for the personnel wearing glasses. Shortages of PPE as well as injuries due to PPE are another risk to the health care professionals (15, 18-20)

To avoid endangering either patients or personnel it was necessary to think outside the box when working in the pandemic setting. Zimmerman and Nkenke proposed dividing the workload between overlapping specialties (oral surgery/dentistry and ENT) and concentrating on oncologic surgery and trauma (3). The applicability of these recommendations depended heavily on the organization in each health care system.

A weak point of this study is its retrospective character. Reasons for treatment postponement and cancellations of hospital admissions were not registered. These reasons could be a key factor in reducing waiting lists and resolving healthcare problems that will deteriorate after prolonged delays.

In conclusion, this analysis of workload during March, April, and May 2020 and four subsequent months confirmed a significant decrease in the

number of patients treated at the Department of Maxillofacial and Oral Surgery of our institution. A decrease in the number of outpatient visits, hospitalizations, and tumour removals registered will inevitably result in an increase of patients presenting with advanced cancers. Since the second wave of SARS Coronavirus 2 pandemic is ongoing, special effort must be paid to reduce the number of cancer patients with suboptimal early interventions. All participating professionals, including both maxillofacial surgeons and primary care practitioners, should try to facilitate their timely access to healthcare services while protecting themselves and patients.

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TRANSPARENCY DECLARATION

Conflict of interests: None to declare

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