

Maxillofacial surgical oncology during Covid-19 phase-1 and phase-2 of Italian lockdown.

Single centre experience



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Maxillofacial surgical oncology during Covid-19 phase-1 and phase-2 of Italian lockdown. Single centre experience.

AIM: The aim of this retrospective study is to analyse the impact of Covid-19 on oncological surgical activity of Oral and Maxillofacial Surgery Unit of Magna Graecia University of Catanzaro, Italy.

MATERIALS OF THE STUDY: This single-centre study includes patients treated for head and neck cancer (HNC) during lockdown months of March, April, May 2020 (Phase-1) and October, November and December 2020 (Phase-2); the data were compared with the same months for the previous two-year period (2018-2019).

RESULTS: 35 oncological surgeries were performed at our Maxillofacial Surgery Unit in 2020. Applying both analysis of t-Student and ANOVA emerged an increase in activity for 2020.

DISCUSSION: The epidemic of the 2019 novel coronavirus infection, declared a global pandemic by WHO on March 2020, has interfered with ordinary medical practice, in particular, with head and neck surgical oncology. Data for all three years (2018-19-20) were normalized for the number of beds available (in 2020, half compared to 2018-19) and were compared.

CONCLUSIONS: The study demonstrates how it is possible, following strict guidelines and standard surgical protocols, to address the growing demand for surgery on cancer patients and to contain the spread of Covid-19 infection.

KEY WORDS: Head and neck cancer, Oral oncology, Covid-19 infection, Maxillofacial surgery, Prevention and control, Telemedicine

Introduction

The past few months have seen Coronavirus-2 (SARS-CoV-2, Severe Acute Respiratory Syndrome Coronavirus-2), a new member of the Coronaviridae family, gaining momentum on the international stage. It quickly caused a pandemic called Coronavirus disease 2019 (Covid-19).

On 20 January 2020, it was declared by the WHO to represent a public health emergency; its rapid spread and related Covid-19 pneumonia still represent a major challenge for health systems around the world today. Infections have predominantly occurred in people between the ages of 30 and 79 ¹; these patients, in most cases, are asymptomatic or have mild symptoms and only in 15% of cases there are severe forms that require hospitalization. Right from the start, it was obvious that healthcare workers are the most affected (about 29% of cases) ². Transmission of the virus appears to occur mainly through respiratory droplets ³⁻⁴, especially in the case of symptomatic patients; however, it has been reported that asymptomatic individuals and those in the incubation period may also be a source of covert transmission ^{1,5-7}. Oral and maxillofacial surgery, such as ENT surgery

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and dentistry, are related to a high risk of transmission of the virus⁸⁻¹⁰. It is necessary to organize the patient's treatment in such a way as to minimize the transmission of infection. At the same time, all treatment options must be available to provide adequate patient care. First of all, it is necessary to plan the interventions according to their priority, not performing any elective surgery¹¹⁻¹³; urgent procedures may be postponed if a Covid-19 patient is expected to recover within a few days. According to the directives issued by the Italian Ministry of Health on March 9, 2020, our Unit only performed emergency procedures. These emergency procedures do not allow any delay, as in case of traumas of the facial massive¹⁴⁻¹⁵ and malignancies of that district¹⁶⁻¹⁸. However, cancer patients have a high risk of death due to access restrictions to hospitals and intensive care units^{7,19,20}. In fact, most Italian hospitals have reduced hospitalizations in periods of peak contagion. Even our hospital, one of few reference hospitals for head and neck oncological surgery in Calabria region, has undergone this reduction. Precisely for these reasons, the management of head and neck malignancies represents a particularly complicated challenge. Telemedicine allows to optimize out-of-hospital management of the patient both in pre-surgical phase and during follow-up. The aim of this retrospective study is to analyse our activity during lockdown phases 1 and 2, comparing it with previous years (Table II), in order to understand the possible influence of the Covid-19 pandemic on the outcomes of head and neck cancer (HNC) surgery.

Materials and Methods

This single-centre retrospective study includes all patients with HNC admitted to Maxillofacial Unit of University "Magna Graecia" of Catanzaro.

The inclusion criteria were: (1) patients surgically treated at the Maxillofacial Surgery Unit, Magna Graecia University of Catanzaro, Italia; (2) in lockdown months of March, April, May, October, November and December; (3) for the years 2018, 2019 and 2020; (4) with definitive histological diagnosis of HNC.

The exclusion criteria were: (1) suspected or confirmed COVID-19 positive patient (patients with claimed symptoms of COVID-19); (2) age under 18 years.

All patients spontaneously joined the study and gave their consent to the data processing. Patients were classified following the NCCN guidelines (2019) or the AJCC staging system (8th edition).

The approach to patient to be staged were the same both before and during the Covid-19 pandemic: the use of first level imaging (100% ultrasound of the lymph node stations) and level examinations (65% MRI and 35% CT). The characteristics of sample, of neoplasms and of the surgical interventions performed are exemplified in (Table I). For the Covid-19 period, the guidelines issued

by the hospital were followed. Prior to hospital admission and outpatient assessment, each patient underwent telephone triage^{13,20,21} and nasopharyngeal swab (NPS) for SARS-CoV-2. SARS-CoV-2 RNA was tested by quantitative reverse transcription polymerase chain reaction (RT-qPCR) performed on the NPS. In case of negative NPS, the patient was admitted to a dedicated area, waiting for a second NPS (performed after 24 hours) to prove negative. Thus, the patient was admitted to the ward, where the patient was instructed to wear a surgical mask, wash their hands frequently and respect the norms of social distancing for the duration of the hospital stay. The patient's vital signs (body temperature, oxygen saturation, heart rate and blood pressure) were checked every 8 hours and any clinical symptoms were monitored constantly. In addition, more frequent cleaning and ventilation of the rooms were carried out. All health personnel followed general measures such as the use of personal protective equipment (PPE: FFP2/3 mask, disposable gown, disposable gloves, face shield or protective goggles).

STATISTICAL ANALYSIS

Both descriptive and regressive statistical analyses were performed on the recorded data. Descriptive statistical analysis was performed using central tendency indices (such as mean and range) and absolute and relative frequencies for categorical data. Regressive statistical analysis was performed using two variable correlation tests, t-Student and analysis of variance (ANOVA). Both were calculated using the GraphPad program (GraphPad Company, San Diego, CA, USA).

Results

The data relating to cancer surgery for the three-year period 2018-2019-2020 are analysed below, paying attention to the months of March, April, May, October, November and December. Clinical features are summarized in (Table I).

RESULTS FOR YEAR 2020

Thirty-five patients underwent surgical procedures under general anaesthesia for HNC during the COVID-19 outbreak, 20 males (57,14%) and 15 females (42,86%), with a mean age of 63,36 (range 25-87). All of these patients underwent surgery during the first and second lockdown phases: precisely 20 patients during the Phase-1 (March, April, May) and 15 patients during the Phase-2 (October, November, December). A total of 28 patients (80%) had primary tumours, 3 patients (8,57%) had non-lymph node metastases, and 4 (11,43%) were

TABLE I - Sample characteristics.

Patient Population	Descriptive Statistics for 2018	Descriptive Statistics for 2019	Descriptive Statistics for 2020
Sample size (n):	30	26	35
Sex:			
Male	14 (46,67%)	13 (50%)	20 (57,14%)
Female	16 (53,33%)	13 (50%)	15 (42,86%)
Age (mean and range):	61,43 (18-88)	70,46 (24-91)	63,36 (25 - 87)
Type:			
Primary	30 (100%)	22 (84,61%)	28 (80%)
Secondary	-	-	3 (8,57%)
Recurrence	-	4 (15,39%)	4 (11,43%)
Diagnosis:			
Oral Squamous Cell Cancer	5 (16,67%)	14 (53,84%)	15 (42,86%)
	T1 (60%)	T1 (42,86%)	T1 (40%)
	T2 (20%)	T2 (21,43%)	T2 (26,67%)
	T3 (20%)	T3 (21,43%)	T3 (20%)
	-	T4 (14,28%)	T4 (13,33%)
Skin Cancer	9 (30%)	6 (23,07%)	9 (25,71%)
	T1 (11,12%)	T1 (16,67%)	T1 (22,22%)
	T2 (22,22%)	T2 (16,67%)	T2 (11,12%)
	T3 (33,33%)	T3 (33,33%)	T3 (22,22%)
	T4 (33,33%)	T4 (33,33%)	T4 (44,44%)
Salivary Gland Cancer	3 (10%)	1 (3,84%)	4 (16%)
	-	-	-
	T2 (100%)	-	T2 (40%)
	-	T3 (100%)	T3 (20%)
	-	-	T4 (40%)
Lymphadenopathy	13 (43,33%)	5 (19,25%)	6 (17,15%)
Treatment:			
Radical Tumorectomy	14 (82,35%)	18 (94,73%)	21 (87,5%)
Total Sialoadenectomy	3 (17,65%)	1 (5,27%)	3 (12,5%)
Neck dissection	2 (6,67%)	7 (4%)	12 (50%)
Electrochemotherapy	-	5 (7,69%)	5 (14,28%)
Biopsy	13 (43,33%)	5 (19,23%)	6 (17,14%)
Reconstruction:			
Primary closure	8 (47,05%)	8 (42,11%)	13 (54,68%)
Locoregional Flap	-	-	4 (16,66%)
Local Flap	9 (52,95%)	11 (57,89%)	7 (29,16%)

suffering from recurrences. A total of 15 cases (42,86%) were diagnosed as oral squamous cell carcinoma (OSCC): 2 staged as T4 (13,33%), 3 as T3 (20%), 4 as T2 (26,67%), 6 as T1 (40%). A total of 9 cases (25,71%) were diagnosed as skin cancer: 4 staged as T4 (44,44%), 2 staged as T3 (22,22%), 1 staged as T2 (11,12%), 2 staged as T1 (22,22%). A total of 5 cases (14,28%; precisely 4 parotid gland tumours and 1 submandibular gland tumour) were diagnosed as salivary gland cancer: 2 staged as T4 (40%), 1 staged as T3 (20%), 2 staged as T2 (40%). Instead, 6 patients were diagnosed as lymphadenopathy (17,15%). Of all 35 patients treated, 24 patients underwent complete tumour removal: 21 radical tumorectomy (87,5%) and 3 total sialoadenectomy (12,5%); 12 neck dissection (50%) were performed. Lastly, in 6 cases biopsies (17,14%) were performed and in 5 cases (14,28%), electrochemotherapy were performed.

Various reconstructive techniques were used: 4 locoregional flaps (16,66%; 1 pectoralis major flap, 1 supraclavicular and 2 paramedian front flaps), 7 local flaps (29,16%; buccal fat pad flap, buccinator myo-mucosal flap), 13 primary closures (54,68%).

Thirteen patients needed Intensive Care Unit (ICU) after surgery for controlled awakening (11 radical tumorectomy and 2 total sialoadenectomy). No complications related to COVID-19 were recognized postoperatively and during hospitalization. They were also interviewed during the first postoperative clinical exam (at 7-10 days) and no one developed symptoms after discharge.

RESULTS FOR YEAR 2019

Twenty-six patients underwent surgical procedures under general anaesthesia for HNC in the months of March,

TABLE II - Statistical analysis of oncological procedures during COVID-19 pandemic and previous two years.

Month	2018	2019	2020
March	6	7	8
April	6	1	6
May	5	4	6
October	3	4	4
November	7	6	7
December	3	4	4
Total	30	26	35
Beds number	6	6	3
	2018 vs 2020 p = 0,0014 (significant)	2019 vs 2010 p = 0,0018 (significant)	

April, May, October, November and December of 2019, 13 males (50%) and 13 females (50%), with a mean age of 70,46 (range 24–91). A total of 22 patients (84,61%) had primary tumours and 4 (15,39%) were suffering from recurrences. A total of 14 cases (53,84%) were diagnosed as OSCC: 2 staged as T4 (14,28%), 3 as T3 (21,43%), 3 as T2 (21,43%), 6 as T1 (42,86%). A total of 6 cases (23,07%) were diagnosed as skin cancer: 2 staged as T4 (33,33%), 2 staged as T3 (33,33%), 1 staged as T2 (16,67%), 1 staged as T1 (16,67%). A total of 1 case (3,84%) were diagnosed as salivary gland cancer staged as T3. Instead, 5 patients were diagnosed as lymphadenopathy (19,25%). In total, 19 patients underwent complete tumour removal, 18 radical tumorectomy (94,73%) and 1 total parotidectomy (5,27%); 7 neck dissection (4%) were performed and in 2 cases, the patient refused this method given the very advanced age. In 5 cases (19,23%), biopsies were performed. Lastly, in 5 cases (7,69%), electrochemotherapy were performed. Various reconstructive techniques were used: 11 local flaps (57,89%; buccal fat pad flap, buccinator myo-mucosal flap), 8 primary closures (42,11%). Eleven patients needed Intensive Care Unit (ICU) after surgery for controlled awakening.

RESULTS FOR YEAR 2018

Thirty patients underwent surgical procedures under general anaesthesia for HNC in the months of March, April, May, October, November and December of 2018, 14 males (46,67%) and 16 females (53,33%), with a mean age of 61,43 (range 18–88). Totally of patients had a primary tumour. A total of 5 cases (16,67%) were diagnosed as OSCC: 3 as T1 (60%), 1 as T2 (20%), 1 as T3 (20%). A total of 9 cases (30%) were diagnosed as skin cancer: 3 staged as T4 (33,33%), 3 staged as T3 (33,33%), 2 staged as T2 (22,22%), 1 staged as T1 (11,12%). A total of 3 cases (10%, two parotid tumours and a tumour of the sub-man) were diagnosed as sali-

vary gland cancer staged as T2. Instead, 13 patients were diagnosed as lymphadenopathy (43,33%). In total, 17 patients underwent complete tumour removal, 14 radical tumorectomy (82,35%) and 3 total parotidectomy (17,65%); 2 neck dissection were performed. Lastly, in 13 cases (43,33%), biopsies were performed. In case of complete tumour removal, the reconstructive techniques used were 8 primary closure (47,05%) and 9 local flaps (52,95%). Only three patients needed Intensive Care Unit (ICU) after surgery for controlled awakening. All data listed above have been normalized for the beds number available to the Unit, six in the two-year period 2018-2019 and half (three) in 2020. Analysis of t-Student was therefore applied for the two-year period 2018- 2020 (p = 0.0014) and 2019-2020 (p = 0.0018). In addition, ANOVA analysis was applied for all three series, showing a statistically significant increase in surgical activity for 2020 (p = 0.0001) (Table II).

Discussion

The new coronavirus pandemic of 2019 (Covid-19) is a highly contagious disease that spreads from human to human via respiratory secretions, so much so that it has been declared a public health emergency by the WHO. It has profoundly affected our healthcare system and the economy²². The Italian government has implemented many security measures in the hope of effectively containing the spread of the virus²³. Surely most sensitive populations are elderly and people with associated comorbidities. However, there is a high risk of contagion for anaesthesiologists, dentists, maxillofacial surgeons, otolaryngologists and pulmonologists. Many patients do not have obvious signs and symptoms, these represent a risk for all specialists dealing with the oral cavity. The Covid-19 pandemic has in fact seriously compromised safety in surgical practices, considering the increased risk of specialists operating on the airways, such as oral-maxillofacial surgeons²⁴. Surgical procedures involving the regions of the oral, nasal and endotracheal mucosa expose these surgeons to a high risk of contagion due to the high amount of aerosol virus in these areas²⁵⁻²⁶. Most Italian hospitals have given priority to urgent and emergency visits and procedures, until the current conditions stabilize; all elections, such as benign tumour surgery, have been postponed or suspended. In addition, many hospitals have reduced their operations in order to transform ordinary wards into Covid-19 wards. In line with this trend, our hospital has also merged many medical and surgical departments to make room for departments dedicated to Covid-19-positive patients. This penalized many patients, first of all cancer patients²⁷⁻²⁸. They represent a high-risk group as they are more susceptible to infections due to their underlying disease and typically immunosuppressed state; this implies a greater risk of serious viral complications

which can lead to the need for intensive care or even death²⁹. Anyhow in case of HNC, surgical treatment (excision and reconstruction) must be prompt in order to improve the prognosis³⁰⁻³¹. The duration of hospitalization, therapeutic outcomes, morbidity and the possible use of adjuvant treatments depend on the size and progression of the tumour. HNC can produce severe breathing difficulties if left untreated³²⁻³³ and therefore the postponement of surgical treatment of these neoplasms can be life-threatening. As we have shown, our unit recorded an increase in oncological surgical activity compared to previous years. Considering the halving of the number of beds available, this increase has become statistically significant; this is demonstrated in (Table II). To optimize patients' access to care, telemedicine was essential²¹. Indeed, the increase observed is due both to easier access to visits and treatments (being our unit exclusively dedicated to oncological and traumatic pathologies), and patients selection made through telemedicine.

(Table I) summarizes the cancers diagnosed and the procedures performed. No Covid-related complications were recorded during the period examined. This data is mainly due to compliance with general and specific Covid-19 measures: telephone triage and NPS test for SARS-CoV-2 before hospitalization; as well as respect for social distances and hygiene standards and use of PPE.

Conclusion

The COVID-19 emergency requires a continuous effort of prevention, above all for those health workers (maxillofacial surgeons, ENT, dentists etc.) who have to deal inevitably with the oral cavity, upper airways and patient's secretions (such as saliva, mucus, blood), both during diagnosis and treatment processes. In recent months it has been essential to continue to treat patients. Surgical activity can and must continue, primary health care must be maintained, and diagnostic and screening process of cancer patients must not be delayed. The study demonstrates how it is possible, following strict guidelines and standard surgical protocols, to address the growing demand for surgery on cancer patients without delaying their treatment and containing the spread of COVID-19 infection.

Riassunto

L'epidemia della nuova infezione da coronavirus del 2019 (COVID-19), dichiarata pandemia globale dall'OMS nel marzo 2020, ha interferito con la pratica medica ordinaria, in particolare con l'oncologia chirurgica della testa e del collo. Lo scopo di questo studio retrospettivo è analizzare l'impatto del Covid-19 sull'attività chirurgica oncologica dell'Unità Operativa Complessa di Chirurgia

Orale e Maxillo-Facciale dell'Università "Magna Graecia" di Catanzaro, Italia. Questo è uno studio monocentrico che include pazienti trattati per cancro alla testa e al collo durante i mesi di lockdown di marzo, aprile, maggio 2020 (fase 1) e ottobre, novembre e dicembre 2020 (fase 2); i dati sono stati confrontati con gli stessi mesi del biennio precedente (2018-2019). In totale, sono stati eseguiti 35 interventi chirurgici oncologici presso la nostra Unità Operativa Complessa di Chirurgia Maxillo Facciale nel 2020. I dati per tutti e tre gli anni (2018-19-20) sono stati normalizzati per il numero di posti letto disponibili e sono stati confrontati. Applicando sia l'analisi di t-Student che l'ANOVA è emerso un aumento dell'attività per il 2020. Lo studio dimostra come sia possibile, seguendo rigide linee guida e protocolli chirurgici standard, affrontare la crescente domanda di interventi chirurgici su pazienti oncologici e contenere la diffusione dell'infezione da COVID-19.

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Commento e Commentary

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Questo lavoro, seguendo la linea di altre pubblicazioni, ha voluto mettere in evidenza le modifiche del numero di patologie trattate chirurgicamente nel medesimo arco di tempo in periodo pre e post-covid in una medesima Unità Operativa. Sono stati raccolti i dati numerici di tutte le patologie benigne e maligne di diverso tipo istologico ottenendo dei risultati grezzi, inevitabilmente non omogenei, ma che possono essere utili per interpretare i cambiamenti dovuti all'epoca pandemica. Emerge da questo lavoro che, rispettando le procedure, è possibile contenere il contagio senza ridurre la attività istituzionale.

Le Direzioni Sanitarie delle Aziende Ospedaliere potrebbero ricavare da questi studi statistici utili indicazioni per ottimizzare le proprie risorse in termini di strutture e di personale.

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This article, following the line of other publications, wanted to highlight the changes in the number of pathologies surgically treated in the same period of time in the pre- and post-covid period in the same Operative Unit. Numerical data of all benign and malignant pathologies of different histological types were collected, obtaining rough results, inevitably not homogeneous, but which may be useful for interpreting the changes due to the pandemic era. It emerges from this work that, by respecting the procedures, it is possible to contain the infection without reducing institutional activity. The Health Departments of Hospitals could derive useful information from these statistical studies to optimize their resources in terms of structures and personnel.