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Management in oral and maxillofacial surgery during the COVID-19 pandemic: Our experience

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Abstract

A novel β -coronavirus (2019-nCoV), identified in Wuhan City in late December 2019, is generating a rapid and tragic health emergency in Italy due to the need to provide assistance to an uncontrollable number of infected patients and, at the same time, treat all the non-deferrable oncological and traumatic maxillofacial conditions. This article summarises the clinical and surgical experience of Maxillofacial Surgery Unit of "Magna Graecia" University (Catanzaro -Italy) during the COVID-19 pandemic and would like to provide a number of recommendations that should facilitate the scheduling process of surgical activities during the COVID-19 pandemic and reduce the risk of infection among healthcare professionals.

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Introduction

The epidemic of coronavirus disease 2019 (COVID-19), originating in Wuhan, Hubei province, China, and rapidly spreading to other provinces of China and 190 other countries, was declared a global pandemic by WHO on March 9, 2020, becoming a "public health emergency of international concern". Patients who are COVID-19 positive are the main source of infection, the asymptomatic ones are extremely contagious, with a strong infectivity in the incubation period ranging from 1 to 14 days. The person-to-person transmission routes of 2019-nCoV included direct transmission, such as coughing, sneezing, droplet inhalation, and contact transmission, such as contact with oral, nasal, and eye mucous membranes. The faecal-oral route remains to be

determined. Infection control measures are necessary to prevent the virus from further spreading and to help control the epidemic situation.¹ The risk of infection during the diagnosis and treatment of oral diseases was also quickly assessed, suspending non-urgent outpatient oral treatments and maintaining the main emergencies of the oromaxillofacial district represented by trauma, malignant neoplasms, and infections, which require timely treatment.

The maxillofacial surgeon belongs to a specific category of healthcare worker as they must inevitably come into contact with the oral cavity, first airways and with patient's secretions (such as saliva, mucus, blood) during the diagnosis and treatment process, puts them in a situation of high risk of contracting the infection and becoming, in turn, a source of contagion.²

There is a high viral burden in the nose and the aerosolised form of the virus can persist for up to 3 hours in the air and 48 to 72 hours on select surfaces.

The aim of this work is to present a protocol to standardise facial pathology triage and precautions to impose to appropriately care for patients while minimising the risk to surgeons. This protocol has been used on patients successfully treated at the Maxillofacial Surgery Unit of "Magna Graecia" Uni-

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Table 1
Demographic characteristics of the study population.

Sex	Mean age	Residence
Male	60.53	Province of Catanzaro 15 Other provinces 5
Female	65.11	Province of Catanzaro 5 Other provinces 4

versity of Catanzaro (UNICZ) from February 29 to April 16, 2020 for traumatic and oncological pathology that cannot be postponed, according to the directives given by the Minister of Health of Italy on March 9, 2020.

Material and methods

From February 29 to April 16, 2020 the medical schedules of all patients hospitalised in the Maxillofacial Unit of “Magna Graecia” University of Catanzaro have been collected. During this month, 33 patients were treated. Patients age, sex, and pathology were taken into consideration; also all have undergone two triages, one by telephone and one at the time of admission.

Results

Demographic characteristics and pathology of the study population

A total of 33 patients were included in this study; 24 were males and 9 females with a male to female ratio of 2.6:1.

The range age was of 20 to 80 with a mean age of 60.53 years. Of all patients, 13 were resident in the province of Catanzaro and 20 were from other provinces of Calabria (Table 1).

During this period of COVID-19 emergency, the main pathologies were traumas and non-differentiable oncological diseases, in particular 20 were fractures and 13 tumours. Among injured patients, the mandible was the most frequently involved bone (7 patients) followed by orbital-maxillo-zygomatic complex -COMZ- (5 patients), orbital walls (4 patients), nasal bones -OPN- (3 patients), naso-orbital-ethmoid complex -NOE- (1 patient). Of these, only

Table 2
Type of treated pathology.

Pathology	Type	Surgery in general anesthesia	No Surgery	Hospitalisation time
Trauma: 20	Mandible: 7	Mandible: 7		5 days
	Orbital walls:4	Orbital walls: 4		5 days
	COMZ: 5	COMZ: 3	COMZ: 2	5 days
	NOE: 1	NOE: 1		5 days
	OPN: 3		OPN: 3	
Neoplasm: 13	Skin, head and neck carcinoma: 5	Skin, head and neck carcinoma: 5		5–7 days
	Oral carcinoma: 7	Oral carcinoma: 7		7 days
	Submandibular carcinoma: 1	Submandibular carcinoma: 1		5 days

Table 3
Screening questionnaire.

1. Do you have fever or have you experienced fever within the past 14 days?	YES or NO
2. Have you experienced a recent onset of respiratory problems, such as a cough or difficulty in breathing within the past 14 days?	YES or NO
3. Have you, within the past 14 days, travelled to risk areas or visited neighborhoods with documented 2019-nCoV transmission?	YES or NO
4. Have you come into contact with a patient with confirmed 2019-nCoV infection within the past 14 days?	YES or NO
5. Have you recently participated in any gathering, meetings, or had close contact with many people you are not acquainted with?	YES or NO

10 have been treated under general anaesthesia with internal rigid fixation through plates and screws (7 patients with mandibular fracture, 4 with orbital wall fractures, 3 with COMZ fracture and 1 with NOE), the remaining 5 were returned to the outpatient clinic because they suffered from compound fractures that did not require surgical treatment.

Of 13 cancer patients, 7 have been treated in general anaesthesia, for oral squamous cell carcinoma, 5 for squamous skin cancer and 1 for submandibular gland mucoepidermoid carcinoma (Table 2).

Proposed management of maxillofacial patients

Patients' first evaluation

A questionnaire has been used to screen patients both by phone and at the time of admission as summarised in Table 3.

This procedure is important because the patients with maxillofacial emergencies often have symptoms such as fever and fatigue due to acute stress and inflammation. Therefore, a first evaluation is essential to accurately identify suspicious or high-risk patients. For all 33 patients, their temperature was < 37 °C, nobody had presented with a cough, diarrhoea or breathing difficulties, and there was no history of viral exposure in the past 14 days.

Preoperative treatment

Before entering the ward, the triage was repeated, the nasopharyngeal swab (RT-PCR) was performed at the time

of admission and after 24 hours and the patients remained in dedicated areas until the results were available.

All patients had negative results. They were isolated in well-ventilated rooms and had to wear surgical masks. Visits were limited to one accompanying person with an individual protection measure. Blood pressure, body temperature, heart rate, and oxygen saturation were constantly monitored. Because all patients were negative for COVID-19, normal preoperative tests were performed: ECG and chest radiograph. All medical measures, including medical history, physical examination, and any auxiliary tests were performed in the patient's room. Also in this case, a preoperational antimicrobial mouth rinse containing 1% hydrogen peroxide or 0.2% povidone was given.

Intraoperative protection

Healthcare staff must strictly implement preventative measures as indicated by interim guidance of WHO. Healthcare staff used Personal protective equipment (PPE): N95 or FFP2 mask, eye protection, fluid-resistant gown, and surgical gloves.

The number of personnel and materials used during the operation has been reduced.

Postoperative management

The patients remained hospitalised in individual rooms. They have undergone medical therapy reducing the use of glucocorticoids, and periodic control of the values of blood pressure, body temperature, heart rate, and oxygen saturation. The devices used for monitoring clinical values were different for each individual patient.

The dressings were performed in the patient's room by the medical and paramedical staff who operated with medical masks with eye protection, gowns and gloves. Patient mobilisation was also started early in order to reduce hospitalisation. The patients had a usual hospital stay of about 5 days excluding those who underwent operations for oral cavity cancer for whom it was 7 days.

Discussion

The first autochthonous infection case was confirmed in Italy on February 21 2020, and since then there has been an exponential increase in infections, making Italy the second highest country in the world by number of active cases and by number of total cases, after the United States, and the first in the world by number of deaths. This situation made it necessary for not only the application of measures to limit the spread of the infection, but also the identification of health facilities capable of managing patients infected by COVID-19. In the Calabria Region, Catanzaro UNICZ Hospital represents the only centre that has an intensive care unit with the ability to treat patients with severe forms of infection that require extracorporeal oxygenation technique (ECMO) and with high specialisation in the management of severe forms

of ARDS. A clinical management protocol for both suspected and confirmed cases has been adopted. This protocol was scrupulously followed in the diagnostic and therapeutic pathway of patients affected by traumatic and oncological pathology at the Maxillofacial Unit Surgery of "Magna Graecia" University of Catanzaro, which also represents the only public reference centre for the Calabria Region.³ The surgical pathology of the oromaxillofacial district is highly specific and the maxillofacial surgeon can be exposed to pathogenic micro-organisms, including viruses and bacteria that infect the oral cavity and respiratory tract. Maxillofacial care settings invariably carry the risk of 2019-nCoV infection due to the specificity of its procedures, which involves face-to-face communication with patients, and frequent exposure to saliva, blood, and other body fluids (if during the clinical examination the patient coughs the smallest droplets of saliva floats in the air for a long time, also some strains of viruses have been detected in the saliva for up to 29 days after the infection).

However, it is necessary to guarantee healthcare even in this pandemic period, while strengthening the surgeon's awareness of the protection and optimisation of the diagnostic and therapeutic pathway.

In the period from February 29, 2020, the day on which the first case of COVID-19 was recorded in Calabria, to date, we have treated only patients with trauma or malignant neoplasms of the oro-maxillofacial district for which the surgical intervention, at this precise stage, could be decisive, according to the directives given by the Minister of Health of Italy on March 9, 2020.

For trauma patients, the domestic accident has been the main cause of trauma, in contrast with the literature, in which the most frequent causes are road accidents, followed by sports injuries, although this is difficult to establish due to the limited number of cases.^{2,3} The reason could be due to the severe restrictions applied during this epidemic period, including the prohibition on travelling from one municipality to another with your own or public means, except for work needs, absolute urgency or health reasons. Considering that the COVID-19 virus is a new type and its biological behaviour and the treatment of the pneumonia caused by it are still in the research phase and to date there is no clear specific therapeutic drug, in the treatment of maxillofacial diseases, prevention is the best way to reduce the risk of spreading the epidemic by medical activities. For this reason, it was important to share the diagnostic and therapeutic pathway with the Unit of Anesthesia and Resuscitation and Service Medicine.

The patients who presented with facial trauma had a first triage at the Emergency Department of their local hospital. Of the 20 patients observed, hospitalisation was required for only 15. For the 13 cancer patients, a pre-triage was performed the day before admission, repeated at the time of admission to the hospital.

For all the treated patients, the precautionary measures applied in the pre-hospitalisation and hospitalisation stages have made the diagnostic pathway more than safe.⁴⁻⁶

We recommend:

- repetition of triage
- 48 hours of preoperative testing, before entering the ward, that includes two COVID-19 tests 24 hours apart (if both tests are negative, then surgery can proceed with enhanced airborne precautions)
- accommodation in a single hospital room,
- speed of execution of the preoperative preparation.

The use of PPE was limited during the operating time because all patients were negative as indicated by interim guidance of WHO.^{6,7} Much attention was paid to preoperative and postoperative oral hygiene with the use of mouthwash containing 1% hydrogen peroxide or 0.2% povidone because 2019-nCoV is vulnerable to oxidation. In fact, some studies have shown that povidone iodine effectively reduces the number of droplets and aerosols produced during oral operations.^{8–11}

To perform oral and maxillofacial surgery during this epidemic period, we have adopted principles of simplification of surgery, trying to avoid very complicated surgical techniques in order to reduce operating times. These precautions could be a valid suggestion when it is not possible to determine if a patient is positive COVID-19, because longer the intervention time, the greater the risk of potential infections for medical and paramedical staff.²

In the case of covid-19 positive patients, all surgical procedures should be performed in a negative pressure operating room.^{12,13} As all of our patients were registered negative, they were treated in non-negative pressure operating rooms. The surgical therapeutic protocol adopted for oncological patients was that reported in the literature and specific to the site of injury. To reduce surgical time and hospital stay, patients underwent excision and reconstruction with local/regional flaps. During the operation we used scalpels over monopolar cautery for mucosal or skin incisions and bipolar cautery on a lower power setting for haemostasis. For malignant neoplasms in a more advanced state, neoadjuvant therapy to control the development of the disease may be indicated. For non-critical cancer patients, elective surgery should be postponed, provided that this choice does not negatively affect the prognosis. Because these patients are often candidates for radiotherapy which must be performed 4–6 weeks after surgery, careful hygiene and disinfection are recommended to limit the spread of the infection.

Although some facial traumatic injuries are not emergent, they may necessitate surgical repair to prevent unacceptable sequelae that require more resources to treat than those required by the initial fracture. These sequelae can include infection, permanent functional deformity, and severe cosmetic deformity if left untreated.

The management of facial fractures is particularly high risk given the viral load within the oral cavity/nasal–oropharyngeal mucosa, and the surgical instrumentation that is likely to aerosolise viral particles.⁷

The surgical therapeutic protocol adopted for facial fractures was that recommended by AO-CMF⁶: the use of scalpel over monopolar cautery for mucosal or skin incision and bipolar cautery on lower power setting for haemostasis, low-speed drill with minimal irrigation, osteotome instead of power saw.

All these precautions are needed to better allocate limited hospital resources while balancing long-term patient outcomes and the protection of medical personnel.

In fact, even if the stringent lockdown has made it possible to stop the advance of the virus where it emerges, there is always the possibility that it can recur with new outbreaks. Moreover, most of the population is still susceptible to infection, don't have an immune history and since there isn't a vaccine; in addition, the numbers of the infected are too low to guarantee flock immunity to a population of 2 billion people. The above suggestions are based on the currently published scientific information available combined with the work experience and thinking of the hospitals involved in the front line to tackle and stem the pandemic and which will be further improved.

Conclusion

The COVID-19 epidemic situation is still serious and for a long time preventative measures must be necessary to prevent and / or slow down the spread of the infection. Although maxillofacial surgeons are not frontline figures in the management of the epidemic, their support is indispensable in treating especially the traumatic pathology of the oromaxillofacial district that require urgent/emergency surgery. The choice of surgical technique must be based on careful evaluation and compliance with the treatment principles to simplify the intervention and reduce operating times. It is also necessary to establish continuous contact with the administrative control bodies of the hospital to minimise the risk of infection and spread of COVID-19.

Conflict of interest

We have no conflicts of interest.

Ethics statement/confirmation of patients' permission

Ethics approval obtained from Comitato Etico Regione Calabria – Sezione Area Centro. We have obtained ethics approval and patients' consent.

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