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Review Article

Coronavirus Disease: Encounter Pandemic in The Future or Perhaps Sooner? In A Bird's Eye View

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Abstract

Over the past decades, numerous new diseases, such as the Ebola virus, Zika virus, and Nipah virus, have emerged in various regions. In 2002 and 2012, viruses causing severe acute respiratory syndrome and Middle East respiratory syndrome surfaced in East Asia and the Middle East, respectively. In December 2019, a novel coronavirus was identified in Wuhan City, Hubei province, China, now known as the cause of Coronavirus disease 2019 (COVID-19). Despite implementing preventive measures, the global rates of morbidity continue to rise. COVID-19 has also induced anxiety and mental health challenges in both affected individuals and the general population. Medical professionals, including maxillofacial surgeons and dentists who handle procedures involving bodily fluids, face significant risks of exposure to and infection from COVID-19. Dental surgeons, in particular, have had to adapt their practices during the pandemic, as they continue to manage critical conditions, such as oral malignancies, trauma, and facial space infections. Establishing standard operative protocols is essential to safeguard both healthcare personnel and patients during treatments. This review emphasizes recommendations for prioritizing patients and outlines strategies to better address similar pandemics in the future.

Key words: Coronavirus disease 2019, Intraoperative, Pandemic, Post-operative, Strategy, Triage

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which emerged in Wuhan, China.[1] SARS-CoV-2 belongs to the subfamily betacoronavirus gene of zoonotic origin which is responsible for causing infections in humans and vertebrates.[2,3] Soon after the Chinese authorities declared an emergency in Wuhan, other countries in the world also started to report COVID-19 cases.[4] Due to high spread, morbidity, mortality, and infectiousness state, the World Health Organization (WHO) declared the COVID-19 outbreak as a pandemic on March 11, 2020.[5] The virus has reached 240 nations and as on 2nd March 2025, COVID-19 has affected in total of 777,594,331 individuals and killed 7,089,989 individuals globally. In India it has affected 45,000,000 and killed 534,000.[6,7] COVID-19 disease initiates when the spike glycoprotein of the viral envelope attaches to the host cell receptor and then a host protease assists the entry of the virion by cleaving and activating this receptor-spike protein. It has been substantiated that, as in SARS-CoV, angiotensin-converting enzyme II receptor mediates virion entry and is considered to cause a high rate of infections.[6,8] It mainly affects the respiratory system and produces mild to fatal illnesses, such as pneumonia. The mean incubation period of this virus is of 5 or 6 days.[1,9] The person-to-person transmission routes of COVID-19 included direct transmissions, such as coughing, sneezing, droplet inhalation, and contact transmission, such as contact with oral, nasal, and eye mucous membranes. Transmission through the fecal-oral route is yet to be determined.[10] The risk of infection is common among the maxillofacial surgeons, dentists, and otorhinolaryngologists as they belong to a specific category of healthcare worker and inevitably come into contact with the oral cavity, and patient's secretions (such as saliva, mucus, and blood).[11] Many national and international scientific organizations have consistently worked on formulating guidelines for various specialties to navigate the challenges posed by the pandemic.

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The field of dentistry, in particular, has faced notable obstacles, emphasizing the strong connection between oral health and overall well-being. Even during public health emergencies, prioritizing dental care remains crucial. The pandemic has profoundly affected oral health, a critical indicator of general health. Poor oral hygiene is associated with several systemic issues, including atherosclerosis, pulmonary disease, diabetes, complications during pregnancy, low birth weight, osteoporosis, and kidney disease. Furthermore, oral structures such as teeth, gums, and biofilm can harbor pathogens, which may cause lung infections through aspiration, even in healthy individuals. The risk becomes even more significant for critically ill patients with weakened immune defenses, who are more susceptible to ventilator-associated pneumonia.[12] Prompt dental care and regular follow-ups can help prevent severe diseases both in the oral cavity and across the body.[12,13] However, concerns about infection risks have led some to avoid dental treatment. To address this, health authorities and regulatory bodies have issued various and occasionally contentious guidelines for both dental professionals and the public on maintaining oral health care. Dentists, as proponents of oral health, must balance continuing their services with adhering to local epidemiological data and infection prevention protocols. Effective patient triage, prioritization, and emphasizing safety precautions, are key aspects for dental practitioners to consider. This will reduce the postponement of care and reduce mental stress and anxiety among patients. The present review focus on prioritizing the patient and effective management of patients to encounter such a pandemic sooner.

TRIAGING DENTAL PATIENTS

Delivering dental care during the spread of an airborne infectious disease may seem counterintuitive. Organizations such as the WHO, the Centres for Disease Control and Prevention, and the Cochrane community have advised delaying routine dental procedures. However, the American Dental Association has taken a different stance, emphasizing the tension between general public health strategies and the specialized knowledge required during a public health crisis. Addressing public health demands effectively calls for a balanced approach. Numerous dental care protocols highlight the importance of prioritizing emergency and urgent treatments, such as those for swelling, pain, bleeding, dental trauma, and serious infections. In addition, incorporating virtual consultations or phone screenings is recommended before scheduling in-person visits or admitting patients to dental clinics[14-20] [Figure 1].

STATEGY FOR PREVENTING CROSS CONTAMINATION

Healthcare professionals across all specialties face heightened risks of exposure to the virus and may inadvertently contribute to its transmission within the community. Careful patient selection is critical, with priority given to emergencies such as oral and maxillofacial trauma, severe infections, and essential oral cancer surgeries that cannot be delayed. These procedures demand meticulous attention, as timely intervention significantly impacts healing and outcomes. Elective surgeries, on the other hand, should be postponed, or, if planned, patients should undergo 14-day quarantine before the procedure. During the pandemic, stringent measures are necessary to prevent cross-contamination.[22]

The novel coronavirus has reshaped the healthcare system, including the approach to surgical practices. Dental surgeons have a responsibility to ensure the safety of themselves, their support staff, and their patients by minimizing cross-contamination risks. Enhancing and updating infection control protocols in operating rooms during the pandemic are indispensable. The virus is primarily transmitted through contaminated surfaces and

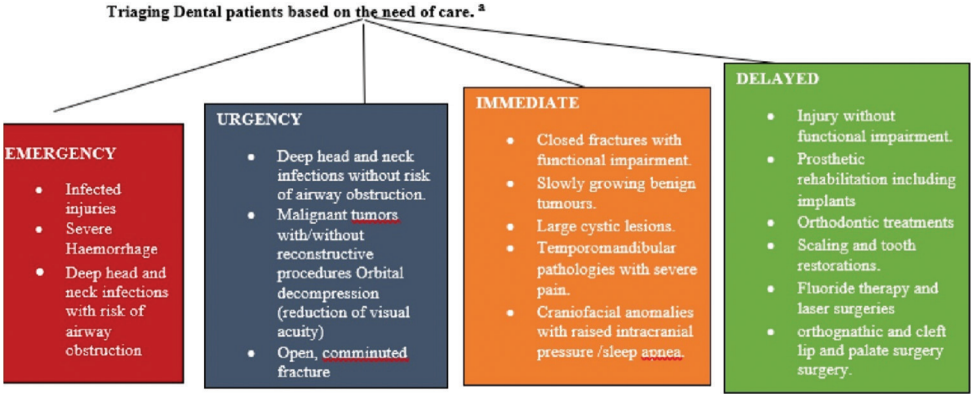

Figure 1: Triaging dental patients based on the need of care. [a]Red indicates: Emergent care, Blue depicts: Urgent care, Orange depicts: Immediate care, Green depicts: Delayed care

aerosols, making its invisible nature a formidable challenge that requires rigorous precautions. Table 1 demonstrates detailed measures for pre-operative, intraoperative, and post-operative management strategies to reduce cross-contamination and transmission of diseases during the pandemic [Table 1].

DISCUSSION

COVID-19, caused by the highly transmissible SARS-CoV-2, has become a worldwide concern. This positive single-stranded RNA-enveloped beta coronavirus was first detected on December 12, 2019, during an outbreak in Wuhan, Hubei province, China. On February 11, 2020, the WHO officially named the disease COVID-19. Initially, the infection was traced to individuals associated with the Huanan Seafood Market in Wuhan. SARS-CoV-2 can infect various hosts, causing illnesses ranging from mild colds to severe and life-threatening conditions, such as SARS, Middle East respiratory syndrome, and COVID-19.[23] Due to the rapid spread and high transmission risks, the WHO declared a global health emergency on January 31, 2020, and a pandemic on March 11, 2020. This pandemic highlights the rapid emergence and spread of novel pathogens, emphasizing the need for better preparedness for future public health crises.[24] However, the real question is, how are we planning to encounter this pandemic in the future or perhaps sooner? The present review focuses on prioritizing the patient for the management of patients to encounter such pandemics in the future.

Dental healthcare professionals face increased risk, as noted by the Occupational Safety and Health Administration,

Table 1: Demonstrate the measures for pre-operative, intraoperative, and post-operative management strategies to reduce cross-contamination and transmission of diseases during the pandemic

Preoperative assessment and investigations	Intraoperative strategy	Post-operative management
Vitals need to be checked before admitting the patient, temperature <37°C, SpO_2 ≥95% respiratory rate <25, heart rate <120[21]	OR should be spacious with two attached rooms for donning and doffing of PPE. Appropriate physical distancing protocol, personal PPE, and use of face masks, face shields, and eye protection, are recommended[22]	OR to be fumigated using formaldehyde and sealed for 24 h. However, it's carcinogenic and mainly affects the lungs. Due to this fogging is preferred as it possesses no risk to the lungs.[22]
Collect throat-swab specimens for RT-PCR in all oral and maxillofacial surgery patients.[22]	Equipments, extra medications, and surgical materials are kept separately in the storeroom and should be removed from the OR.[22]	At the end of each surgery, all disposable materials must be disposed of and all surfaces and electromedical devices accurately cleaned and disinfected. Further, body fluids, tissues, and bacteriological samples are eliminated in bags with double closure.[22,27,30]
Routine blood tests should include a complete blood count, serum biochemical tests (such as renal and liver function, creatine kinase, lactate dehydrogenase, and electrolytes), coagulation profile, myocardial enzymes, procalcitonin, and serum ferritin.[22]	Equipment, such as a computer, radiographs, operating table, anesthesia machine, monitors, electrocautery, and motor drills are to be covered with plastic sheets and should be changed after every patient.[22]	PPE should be removed and disposed of outside or in the doffing areas. Further, these areas should be sanitized so that the virus is not transmitted to the healthcare worker.[27,30]
Special investigations such as IL-6 and CRP levels should be checked in patients who have recovered from COVID-19. These tests indicate viral clearance and assess the overall inflammatory status. In addition, they help to rule out potential complications, such as cytokine storm and septic shock.[22]	It is recommended to use the OR having a HEPA filter (0.1-micron efficiency) or a laminar airflow system to reduce the viral load within the OR.[22]	All the plastic sheets are to be removed and disposed in a disinfectant-containing bin. All the surfaces are to be sprayed with sodium hypochlorite (1%).[22]
D-dimer test: Conducted in both COVID-19 patients and those recovered to check for venous thromboembolism and assess persistent viral load.[22]	Air conditioners are not preferred inside the OR. In addition, a high-volume suction to be one-third pre-filled with the povidone-iodine solution as it has a virucidal property which further reduces viral load in aerosols produced by the suction machine.[22]	Alcohol-based spray to be used on monitors. Both HME filters and the soda lime should be changed.[22]
Visual acuity, intraocular pressure, and dilated fundus examinations should be performed to identify any ocular manifestations.[22]	A negative room pressure of 5 Pa is used to prevent the passage of air from the OR to the outside.[26,27]	Pertaining to the patient's regular temperature checks should be monitored twice a day to rule out post-operative infections.[27,30]
	Scalpels are often used instead of monopolar cautery.[22]	

COVID-19: Coronavirus disease 2019, PPE: Personal protective equipment, OR: Operating room, IL-6: Interleukin 6, CRP: C-reactive protein, HEPA: High-efficiency particulate air, RT-PCR: Reverse transcription polymerase chain reaction, HME: Heat and moisture exchanging

because of their close contact with patients' oral cavities and the use of aerosol-generating tools, such as handpieces and scalers.[16] The scarcity of resources and time calls for efficient task delegation and patient prioritization to manage the crisis effectively. Collaboration between overlapping fields, such as maxillofacial surgery and dentistry, is vital to ensure organized treatment plans, avoid redundancy, and minimize resource waste. General dentists can handle less critical cases, such as removing impacted teeth, treating localized abscesses, managing pulpitis, and repairing oro-antral fistulae. Maxillofacial surgeons, meanwhile, must address severe cases, such as infected wounds, significant bleeding, deep head-and-neck infections that risk airway obstruction, orbital decompressions to preserve vision, and open comminuted fractures. Elective treatments, such as closed fractures without functional issues, benign tumors with slow growth, large cystic lesions, mild temporomandibular pain, and craniofacial anomalies linked to sleep apnea or increased intracranial pressure, can be postponed.[25]

The novel coronavirus presents a profound challenge to global health systems, underscoring the need for a comprehensive understanding of the virus's structure, transmission, clinical effects, and testing methods. Such knowledge is key to formulating effective guidelines for managing surgical cases and controlling infections simultaneously. This review outlines a framework for dental surgeons to adapt to the evolving situation by implementing detailed protective measures during pre-operative, intraoperative, and post-operative stages, ensuring a balance between patient care and infection prevention.[26-28] In addition, remote care methods, such as teledentistry and online consultations should be employed to support patients.[29] Adopting these approaches can help healthcare systems mitigate the present and future pandemics' impact, potentially reducing mortality and morbidity rates. However, as COVID-19 continues to evolve, the findings and recommendations may require updates as new evidence becomes available.

CONCLUSION

The COVID-19 pandemic has placed immense demands on healthcare systems globally. Surgical departments have been compelled to prioritize and reschedule procedures, focusing on those that are emergent and urgent. It is critical to address these emergencies with the highest level of efficiency and effectiveness while ensuring a balance between delivering surgical care and maintaining infection control measures.

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