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COVID-19: Changing trends and Safety Challenges in Dentistry

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Abstract

Introduction/Objective: The outbreak of Coronavirus disease 2019 (Covid-19); rapidly escalated into worldwide pandemic, creating global health and economic crisis. It is an ongoing outbreak of a new virus; Novel Coronavirus (n-CoV) has spill over event, with its epicentre in Wuhan. People of the Republic of China and Chinese horseshoe bats being the most probable origin. Due to the characteristics of dental settings, the risk of cross infection between dental health care personnel (DHCP) and patients can be very high. The article provides a brief overview of the structure of the virus, modes of transmission and clinical features of Covid-19 disease. The aim of this article is to recommend infection control strategies and patient management protocols to provide optimum dental care and simultaneously prevent nosocomial infection in dental settings.

Data Sources: We systematically screened latest research articles of COVID-19, guidelines of American Dental Association, guidelines of WHO and summarised the knowledge and our experiences about the disease transmission in dental clinical setup and prevention of DHCP (dental health care personnel) and nosocomial infections.

Study Selection: The management of rapidly rising cases of COVID-19 has raised alarms in the healthcare facilities all over the globe. Hence, protection of DHCP and patients is of paramount importance.

Conclusion: Until the time we get any specific drug or vaccine, only preventive measures are the solution. Dental health care personnel need to understand the implication of potential transmission of the SARS CoV-2 virus in the clinical setup. Hence, the need to keep themselves updated with any new information regarding the disease.

Introduction

Various epidemics such as H1N1, H5N1, Avian influenza, Ebola, SARS, Zika and Nipah have affected the human population in various countries in the past and were successfully tackled with appropriate research [1]. But the Coronavirus pandemic is a major threat to humanity. The world is facing another zoonotic infection caused by novel strain of Coronavirus [2].

The Coronavirus was provisionally named "2019-n-CoV" by the WHO but now called (from 11th Feb 2020) as severe acute respiratory syndrome coronavirus (SARS-CoV-2) [3]. The virus came to lime light following a spate of cases of pneumonia with no obvious reasons in December, 2019 from Wuhan city of China's Hubei province [4]. Now has outspread global concern. Human to human transmission has been confirmed [2].

Due to the characteristics of dental setting, the risk of cross infection may be high between dental practitioners and patients. Due to widespread transmission of the SARS CoV, healthcare providers are at an increased risk of contracting the infection or becoming potential carriers of the disease.

According to the Occupational Safety and Health Administration (OSHA) dental health care personnel (DHCP) are placed in very high exposure risk category as dentists work in close proximity to the patient's oral cavity [5]. Dental procedure involves the use of rotary instruments, such as hand pieces and ultrasonic scalers and air-water syringes, which generate aerosols. As dentists are at a greater risk, strict and effective infection control protocols are urgently needed. Hence present article based on our experience and relevant guideline and research introduces the knowledge about coronavirus and nosocomial infection in dental settings and provides recommended management protocols for dental practitioners and students in potentially affected areas.

Structure

SARS-CoV-2 is an enveloped positive stranded RNA virus, diameter of 40-140 nm, spherical, shows corona like appearance under electron microscope. It is the seventh member of the family of coronaviridae and order Nidovirus that infect humans. It is a novel virus belonging to the subgenus Sarbe CoVirus, Orthocoronavirinae subfamily with Chinese horse shoe bats (Rhinolophussincus) being the most probable origin [6].

Source of transmission

Although patients with symptomatic Covid-19 have been the main source of transmission, recent observations suggest that asymptomatic patients and patients in their incubation period are also carriers of SARS-CoV-2 [7,8].

Incubation Period

The incubation period of Covid-19 has been estimated at 5 to 6 days on average, but there is evidence that it could be as long as 14 days [9,10].

Clinical Manifestations

Individuals of all age groups are vulnerable to SARS-CoV-2. The aged and those with underlying chronic disease are highly susceptible to become acute cases [11]. The clinical features mainly involve respiratory tract, the common presenting symptoms include fever (99%), dry cough (60%), fatigue (70%), myalgia (44%) and dyspnoea [12,13]. Less common symptoms are headache, dizziness, diarrhoea, nausea and vomiting [14]. In addition, patients who are elderly have co-morbidities including hypertension, diabetes, cardio-vascular disease and cerebro-vascular diseases are more likely to have adverse outcome. In severe cases, the coronavirus can cause pneumonia, kidney failure, acute respiratory distress syndrome, septic shock, coagulation dysfunction and death [15].

Infection Control in Dental Settings

Risk of Nosocomial Infection In Dental Settings

Dental patients, who cough, sneeze or receive dental treatment including the use of a high-speed hand piece or ultrasonic instruments make their secretions, saliva or blood aerolize to the surrounding.

DHCP (Dentists, dental hygienists, dental assistants and receptionists) need to update their knowledge and skills regarding infection control and strictly follow the protocols recommended by the relevant authorities to protect themselves and their patients against infection. According to the CDC Interim infection prevention and control guidance [for Dental setting during the coronavirus disease 2019 (COVID 19) pandemic] latest on 4th August,2020; Dental settings should balance the need to provide necessary services while minimizing risk to patients and DHCP [16].

An attempt should be made to telephone triage all patients in need of dental care. Teledentistry can be of great assistance in the current pandemic situation. This technology has made possible patients partial or complete management at distances of kilometre away from health care centre. The entire process of networking, sharing digital information, distant consultation, workup and analysis is dealt with by a segment of science of telemedicine concerned with dentistry is called "Teledentistry" [17,18]. On the basis of patient's signs and symptoms, a decision should be taken to determine whether the patient needs to be seen in the clinic. Appropriate pharmaceuticals and detailed home care instructions should be provided by teledentistry in situation where dental treatment can be delayed [5].

Information provided by American Dental Association (ADA) helps to decided what constitute an emergency. However, dentists should use their personal judgement in determining a patient need for urgent emergency care [Table I, figure I] [19]. When the decision is made that the patient needs to visit the dental clinic, the next step is to evaluate risk from patients.

Table 1: What constitutes a dental emergency? (adapted from American Dental Association)

Dental emergencies	Urgent dental care	Other urgent dental care
(i) Uncontrolled bleeding	(i) Severe dental pain from pulpal inflammation	(i) Extensive dental caries or defective restorations causing pain
(ii) Cellulitis or a diffuse soft tissue bacterial infection with intraoral or extraoral swelling that potentially compromises the patient's airway	(ii) Pericoronitis or third-molar pain	(ii) Manage with interim restorative techniques when possible (silver diamine fluoride, glass ionomers)
(iii) Trauma involving facial bones, potentially compromising the patient's airway	(iii) Surgical postoperative osteitis, dry socket dressing changes	(iii) Suture removal
	(iv) Abscess or localized bacterial infection resulting in localized pain and swelling	(iv) Denture adjustment on radiation/ oncology patients
	(v) Tooth fracture resulting in pain or causing soft tissue trauma	(v) Denture adjustments or repairs when function impeded
	(vi) Dental trauma with avulsion/luxation	(vi) Replacing temporary filling on endo-access openings in patients experiencing pain
	(vii) Dental treatment required prior to critical medical procedures	(vii) Snipping or adjustment of an orthodontic wire or appliances piercing or ulcerating the oral mucosa
	(viii) Final crown/bridge cementation if the temporary restoration is lost, broken, or causes gingival irritation	
	(ix) Biopsy of abnormal tissue	

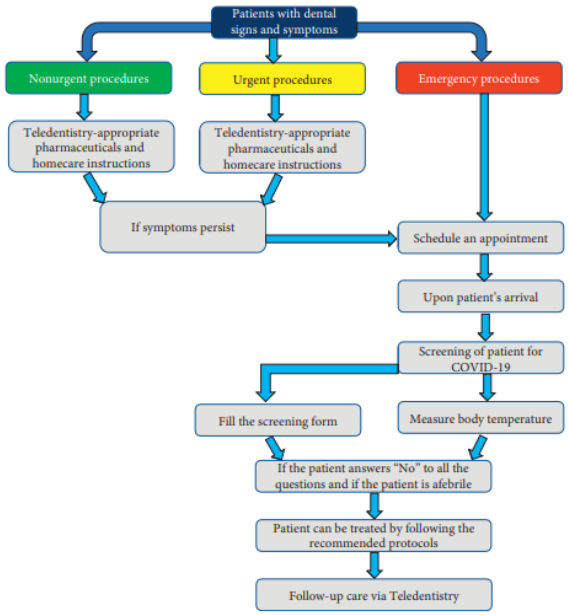

Figure 1: Management of dental problems during COVID-19 pandemic

Patient should be evaluated in the following steps:

A. During Covid-19 dental clinics are recommended to establish triage to measure and record the temperatures of every staff and patient as a routine procedure.
B. When the patient calls for an appointment, the precheck staff should ask about the symptoms, history of travel to endemic areas and possibility of coming in contact of confirmed SARS-CoV-2 patient [20].

The patient who answer in a affirmative should not be called for treatment instructed to seek medical help first or refer to designated hospital.

C. If patient answers no to all questions or not having any contact or travel history, fever, respiratory problem only then the patient can be treated by the dental surgeon.

Oral Examination

Pre-operative anti-microbial mouth rinse could reduce the number of microbes in the oral cavity [21]. Procedures that are likely to induce cough should be avoided or performed cautiously [20]. Aerosol generating procedures e.g. use of a 3-way syringe should be minimized as much as possible. Intra-oral X-ray examination is the most common radiographic technique in dental imaging but it can stimulate saliva secretion and coughing. Therefore, external dental radiography such as Panoramic radiography and cone beam CT are appropriate alternatives during Covid-19 Pandemic.

Treatment of Emergency cases

Dental emergencies can occur and exacerbate in a short period therefore need immediate treatment. Rubber dams and high-volume saliva ejectors can help to minimize aerosol or spatter in dental procedures.

Personal Protective measures by Dental Professions and Supportive Staff:

Medical, travel, clinical and family history of all staff members working in clinic / hospital should be recorded. An immuno-suppressed team member should be encouraged to stay at home.

A. Hand Hygiene: It is one of the Principle pathways for reducing the transfer of micro-organism to patients [22]. It should be done in two ways. Hand washing with water and soap and hand disinfection using alcohol-based solutions both for 20 seconds. Dental professionals should follow hand hygiene protocols and prevent their hands from direct contact with eyes, nose and mouth before examination of patients; beginning of treatment and after contact with patients and materials / substances contaminated with blood and body fluids and after contact with secretions, mouth mucosa and injured skin.

B. Gowns: disposable gowns should be worn. They should be sterilized after every patient.

Implement Universal Use of Personal Protective Equipment (PPE):

According to the new updated guidelines of CDC (4th August, 2020);

1. DHCP should wear surgical mask,
2. Eye protection: Goggles and face shield should be recommended as ocular tissue have shown susceptible to transmission of aerosol,
3. Head cap: This forms the covering of head and protects the possibility of settling down of the virus in hair in the form of aerosols,
4. Facemask: Special masks i.e N-95 mask should be used when performing procedures or is at a distance of <6 feet,
5. Gloves: Dental professional and personnels should change the protective gloves after termination of dental treatment,
6. Hand hygiene protocols should be followed immediately before and after termination of dental treatment,
7. They should adhere to proper donning and doffing sequences of PPE as recommended by the WHO in a manner to prevent self-contamination.

Disinfection of Dental Clinic, Patient waiting room and front desks

All surfaces including waiting room, front desk as well as bathrooms should be kept cleaned and sanitized frequently. These should by cleaned with 0.1% Sodium hypochlorite, 0.5% Hydrogen Peroxide or 62-71% ethanol. Waiting room and clinic should be properly ventilated. The use of air purifiers with ultraviolet-c lamp is recommended. Dental clinic should be isolated room with negative pressure relative to the surrounding area. Dental chair-side surfaces, chair, keyboard, connected computers/laptops, oral camera, drawer handles etc should be disinfected in the interval between patients using ethanol 70% and also proper recommended sterilization and disinfection of patient care items should be done.

Conclusion

Since there is currently no specific anti-viral treatment or vaccine; however on-going research is giving ray of hope for the development of vaccine. Till the time we get any specific drug or vaccine, efforts should be aimed at managing symptoms and preventive measures. Dental healthcare personnel need to understand the implication of potential transmission of the SARS-CoV-2 virus in clinical setup. They need to keep themselves updated with any new information regarding the disease.

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