Coronavirus Disease-19 and Dentistry: A Review

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Abstract

Novel coronavirus (nCoV) is a novel form of virus with a new strain identified recently in humans. Common clinical signs and symptoms primarily consist of fever, cough, and breathing difficulties. In severe cases, it can result in pneumonia, severe acute respiratory syndrome, kidney failure, and even death. It is important to follow all infection control measures in prevention of the nCoV from spreading and controlling the epidemic situation. The risk of cross infection can be high between dental practitioners and patients due to the features of dental clinical settings. Here, we are summarizing the nCoV related information and infection control measures to be followed in dental practice.

Introduction

The pandemics of coronavirus disease (COVID-19) started from Wuhan, China, last December and Chinese Center for Disease Control and Prevention [1] on January 8, 2020, officially announced a novel form of coronavirus (nCoV) as the causative agent. It was first named as 2019-nCoV, but later officially as severe acute respiratory syndrome nCOV 2 (SARS-CoV-2) [2]. Now, it has become a major health problem not only for China but also majority of countries around the world [3]. The World Health Organization on January 30 announced that COVID-19 outbreak is a public health emergency of international concern [2], [4], and β-CoV mainly infect the respiratory, gastrointestinal, and central nervous system of humans and mammals, while γ-CoV and δ-CoV mainly infect the birds [7].

SARS-CoV and the Middle East respiratory syndrome CoV explored in 2002–2003 and in 2012, respectively, belong to the β-CoV. The virus explored in Wuhan, SARS-CoV-2, also belongs to the β-CoV [11].

The genome nucleotide sequence uniqueness was 96.2% between nCoV detected in the bat Rhinolophus affinis from Yunnan Province, China, and SARS-CoV-2, indicating the natural host of SARS-CoV-2 is the R. affinis bat [7].

However, the genome sequence similarity was 99% to the nCoV isolated from pangolins, indicating that these are the most likely intermediate host of SARS-CoV-2 [2], [7].

Characteristics of Virus

SARS-CoV-2 is a zoonotic virus [2]. nCoVs are from the family of Coronaviridae, of the order Nidovirales. It has genome of large, single, and plus-stranded RNA [5], [6]. There are four genera of nCoVs, namely, α-CoV, β-CoV, γ-CoV, and δ-CoV. The α-CoV and β-CoV mainly infect the respiratory, gastrointestinal, and central nervous system of humans and mammals, while γ-CoV and δ-CoV mainly infect the birds [7].

Incubation Period

An average of 5–6 days is the estimated incubation period of COVID-19. There is evidence that it might be as long as 14 days, which is now the universally adopted duration for medical surveillance.
and quarantine of potentially exposed or exposed persons [2].

People at High Risk of Infection

1. Peoples of all ages are usually susceptible to COVID-19. Healthcare workers and other individuals who are in close contact with patients of symptomatic and asymptomatic COVID-19 are at higher risk of SARS-CoV-2 infection [2].
2. Patients with most severe disease were more likely to have hypertension respiratory disease and cardiovascular disease [8].
3. In other studies, obesity and smoking were associated with increased risks [9], [10].

Common Symptoms

The characteristics symptoms of the patients were fever, cough, and myalgia or fatigue with abnormal chest computed tomography (CT). The less common symptoms were sputum production, headache, hemoptysis, and diarrhea [7].

Oral Manifestations

- Ulcerations (unilateral palatal ulcerations) or blistering in the oral cavity
- 52% – changes in taste sensation 56.25%
- – dry mouth 11% – pain in muscles of mastication
- Necrotizing periodontal disease
- Oral reddish lesions and ulcerations
- Smell and taste loss (chemosensory dysfunction)

- Reported as possible signs and symptoms in confirmed case of COVID-19 by Sinadinos and Shelswell [11]
- Reported as major changes in study by Biadsee et al. [12]
- Patel and Woolley in their letter to the editor proposed this can be an oral manifestation in patients with COVID-19 [13]
- Soares et al. [14] and Chaux-Bodard et al. [15] in their letter to the editor marked in patients of COVID-19
- Reported by Pedrosa et al. [16]

Source of Transmission

1. Patients with symptomatic COVID-19 have been the main source of transmission [2]
2. Asymptomatic patients in their incubation period [2].

Epidemiology

- Interpersonal transmission occurs mainly through respiratory droplets and contact transmission [2], [7].
- Studies have suggested that 2019-nCoV may be airborne through aerosols produced during medical procedures. However, the aerosol transmission route and the fecal–oral transmission route worried by the public still required to be further studied and confirmed [2], [7].

Spread in Dental Clinics

Eyes, nose, and oral cavity as the “T” zone in the maxillofacial region being the main entry for the virus into an individual, alerts all dental professionals while doing any procedures [17].

Dental care settings invariably carry the increased risk of 2019-nCoV infection due to the following reasons (Table 1 and Figure 1).

Table 1: Risk factors in dental clinic settings

| Risk factor                                                                 | Description                                                                 |
|----------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Have more face-to-face communication with patients                         | [2],[7]                                                                     |
| Everyday exposure to saliva, blood, and other body fluids                  | [2],[7]                                                                     |
| Handling of the sharp instruments                                           | [2],[7]                                                                     |
| Contact with droplets and aerosols                                         | [18]                                                                        |
| Direct contact with patient materials                                       | [19]                                                                        |
| Indirect contact with contaminated instruments and/or environmental surfaces| [20]                                                                        |

Infection Control in Dental Practice

In the early stages of COVID-19, the viral load in the saliva was constantly found high than that in the
Diagnosis and Laboratory Tests

1. The diagnosis of COVID-19 can be based on a combination of [31]
   • Clinical symptoms
   • CT imaging findings (seen in severe infection patients), and
   • Laboratory tests: For example, reverse transcriptase polymerase chain reaction (RT-PCR) tests on respiratory tract specimens using nasopharyngeal, oropharyngeal, and blood samples.

2. It should be mentioned that a single negative RT-PCR test result from suspected patients does not rule out infection. Clinically, we should be alert of patients with an epidemiologic history, COVID-19-related symptoms, and/or positive CT imaging results [31]

3. Saliva was found to be even more sensitive for SARS-CoV-2 detection in COVID-19 patients than nasopharyngeal swabs [32].

Treatment

In the present scenario, there has been no confirmation from randomized controlled trials to suggest any particular anti-nCoV treatment. Thus, the management consists of measures such as controlling the source of infection; lower the risk of infection transmission; and also provide early diagnosis, isolation, and supportive care for affected patients [9].

Conclusion

Although dental clinics have been closed during the epidemic, a large number of emergency patients need dental treatment. We have summarized the virology of 2019-nCoV, possible transmission routes and its control in dental clinics.

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