

Diagnosis And Investigation Of Covid 19- Review

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ABSTRACT

Coronavirus Disease 2019 (COVID-19) is a pandemic which enters through nasal and larynx mucous membranes and enter into the lungs through respiratory tract. It has common clinical features in adults include fever, dry cough, sore throat, headache, fatigue, myalgia and breathlessness. In infected patients the disease manifestations range from mild pneumonia to moderate pneumonia and critical illness. Patients most frequently presents with xerostomia, and oral mucosal lesions, Gustatory dysfunction. A gold standard test used for routine confirmation of cases of COVID-19 is Nucleic Acid Amplification Test, that is based on RT-PCR technique . A routine imaging tool for pneumonia diagnosis is Radiological examination which has great importance in the early detection and treatment of patients affected by COVID-19. Thin-section chest CT examination plays a key role in assisting diagnosis. SARS – COV-2 and the resulting COVID -19 pandemic present in a series of public health challenges that affect dental practice.

Key words: COVID -19 pandemic, Route of transmission, Diagnosis, RT- PCR, Nasopharyngeal specimen, Chest CT, Ground Glass Opacification

INTRODUCTION

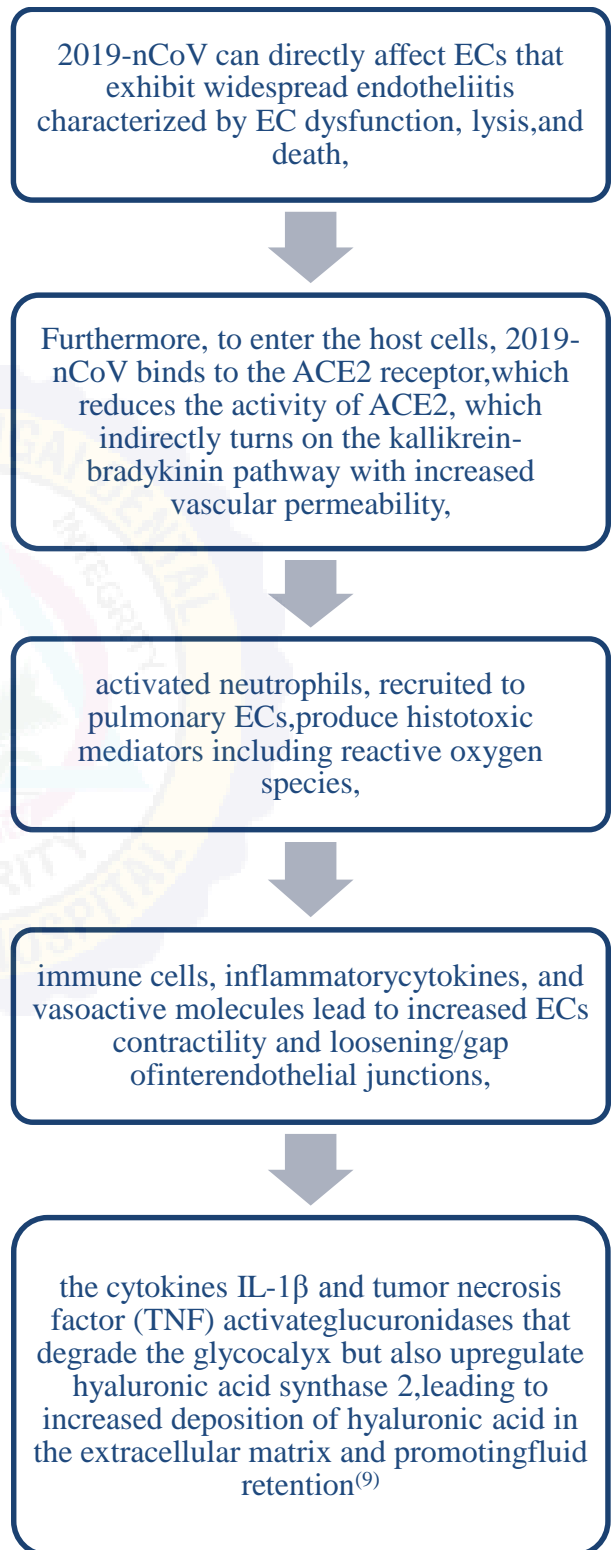
COVID 19 is a pandemic which is deadliest among Infectious diseases to have emerged in recent history(1) Coronavirus Disease 2019 (COVID-19) was declared as pandemic by the WHO on March , 2020 because of the speed, and transmission of the disease(2) This disease was first identified in December 2019 in Wuhan. SARS-CoV-2 is related to the original SARS-CoV. The virus is primarily spread between people during close contact and small droplets that are produced by coughing, sneezing. People may also become infected by touching a contaminated surface. COVID-19 patients remain the primary source of infection. (3)

ETIOPATHOGENESIS

Considering that the virus is present in the body fluids of patients and tear fluid is a type of body fluid, so it is speculated that there may be a risk of tear and conjunctival transmission (4). Another possible route might be faecal – oral transmission, particularly through adults with gastrointestinal symptoms has the possibility of a faecal–oral route of transmission(5)

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection (COVID-19), is characterized by respiratory symptoms.(5) .Virus enters through nasal and larynx mucous membranes and enter into the lungs through respiratory tract. (6)

Binding of some viral proteins with receptors expressed by host cells is the first step of viral infection followed by fusion with host cell membrane. Ultimate target of spike protein of SARS-CoV-2 is speculated as ACE2. Lung epithelial cells are includes as initial target cells , and this is where virus attach through its spikes to cellular angiotensin converting enzymes 2 (ACE2) receptor(6)



Flow chart(7)

The process of SARS-CoV-2 entering target cells is mediated by binding angiotensin-converting enzyme 2 (ACE2) receptor and the subsequent prim spike proteins by trans membrane protease serine 2 (TMPRSS2). (8)

SARS-CoV-2 attaches to the surface of the epithelial membrane of the oral cavity, the mucosal membranes of the conjunctiva or the otic canal. Angiotensin-converting enzyme 2 (ACE 2) protein, which is highly

expressed on multiple human cells including type II alveolar cells (AT2), oral, esophageal, ileal epithelial cells, myocardial cells, kidneys, bladder(9)

High levels of cytokines intensify the destructive progression that leads to additional epithelial cells dysfunction, DIC, inflammation, and vasodilation of the pulmonary capillary bed. Altogether, these disorders ultimately lead to multi organ failure and death due to alveolar dysfunction and ARDS with hypoxic respiratory failure. (7)

GENERAL MANIFESTATION

COVID-19 pneumonia has the common clinical features in adults include fever, dry cough, sore throat, headache, fatigue, myalgia and breathlessness. In infected patients the disease manifestations range from mild pneumonia to moderate pneumonia and critical illness. Depending on age, underlying comorbidities and severity of the disease the risk of death is increasing. The severity of the diseases is reflected by. Thrombocytopenia, Acute kidney injury, thrombosis in pulmonary vessels associated with COVID-19. In severe COVID19, histopathological evidence confirms the existence of thrombosis in pulmonary vessels. Symptoms like severe diarrhea and/or vomiting, extra renal potassium loss could also cause or aggravate hypokalemia. In initial manifestations Conjunctival hyperemia and eyelid edema have been found. Because of SARS-CoV detected from the tear sample, studies suggests possible conjunctivitis related to SARS-CoV via droplets to the eyes, lacrimal infection and virus migration from the nasolacrimal duct Secondary hemophagocytic lympho histio cytosis contributed by the pathogenesis of multi organ dysfunction in COVID-19. Several studies exposes that most of COVID-19 Patients displayed Neurologic manifestations like acute cerebrovascular diseases, encephalopathy and also had GI symptoms such as diarrhea, abdominal pain and vomiting (9)

ORAL MANIFESTATION

COVID-19 patients most frequently presents with dysfunction, xerostomia, and oral mucosal lesions, Gustatory dysfunction and xerostomia. Growing evidence that angiotensin-converting enzyme 2 (ACE2), the main host cell receptor of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2),

is highly expressed on the epithelial cells of tongue and of the salivary glands, that explains development of dysgeusia in patients with COVID-19.(10)

Patients with COVID 19 commonly reports even at the pre symptomatic stage are ageusia, non-specific anosmia, and hyposalivation. Several Studies discloses ulcers in the oral cavity which is unexplainable, desquamative gingivitis, herpetiform ulcers, blisters or irregular ulcers on the tongue, enlargement of submandibular glands, and cervical lymph node enlargement. (11)

DIAGNOSIS AND INVESTIGATION

Efficiently multiple approaches are being used for the diagnosis of COVID-19 infection. High sensitivity displayed by RT-PCR based method(85–90%) and high specificity for the COVID-19 diagnosis as it is dedicated to the direct amplification of viral genetic material and the turnaround time (TAT) is about 2.5–3.5 h which is quantitative in nature. Sample types for RT-PCR includes two types of swabs and they are nasopharyngeal swabs and oro pharyngeal swabs. (6) and this RT-PCR method also uses the tracheal aspirate or broncho alveolar lavage (BAL) specimens. Several studies suggests that the primary and preferred, method for diagnosis is collection of upper respiratory samples via nasopharyngeal and oro pharyngeal swabs. But blood and stool specimens also used in detection of SARS-CoV-2 RNA. Anyway specificity of the RT-PCR test seems to be very high, although there may be false-positive results also produced by the RT-PCR tests due to swab contamination, especially in asymptomatic patients. Due to this the sensitivity rate is not clear(12)

To test SARS-CoV-2 virus Naso Pharyngeal specimen is a vital and sensitive sample Another important specimen recommended by the WHO and CDC to detect SARS-CoV-2 infection is OP swab which is collected from the posterior pharynx region, avoiding contact with the tongue. For severely ill and hospitalized patients Collection of the broncho alveolar lavage (BAL) and tracheal aspirate is recommended with that Blood and stool samples are also used in diagnosis of infection since SARS-CoV-2 is known to present in blood and stool.

A gold standard test used for routine confirmation of cases of COVID-19 is Nucleic Acid Amplification Test that is based on RT-PCR technique.

Factors that hampers the results of RT-PCR

such as poor quality of specimen,

- specimen with small amount of patient material,
- specimen collected late in the infection
- specimen collected very early in the infection,
- improperly handled specimens
- shipped specimens, and
- inherent technical reasons such as virus mutation testing.

Antibodies in the blood are detected when the body is responding to a specific infection, like COVID-19. IgM is most useful for determining recent infection which is one of the first types of antibodies to be produced that may not be detected in the early days of an infection when the body's adaptive immune response is still building. A study reveals the presence of IgM antibodies for SARS-CoV-2 has been observed to range from 7 to 10 days after the onset of symptoms.(13)

For detecting viral nucleic acid RT-PCR is an effective technique. It has high sensitivity and specificity and also has the advantages of simplicity, convenience, and efficiency.(4)

A routine imaging tool for pneumonia diagnosis is Radiological examination which has the great importance in the early detection and treatment of patients affected by COVID-19. Thin-section chest CT examination plays a key role in assisting diagnosis.

In COVID 19 patients CT features includes

- Ground Glass Opacification which is typical CT imaging finding.
- Consolidation,
- interlobular septal thickening,
- adjacent pleura thickening, and
- air bronchograms.

GGO, consolidation, and adjacent pleura thickening are the features which is manifested in More than half of the patients . Imaging findings mostly

involved the bilateral lungs and those Imaging findings also located in the peripheral area of the lungs. The infection can involve all the lobes but mostly the infection are manifested in the bilateral lower lobes. Several studies states that the typical CT features of COVID-19 are lung consolidation and GGO which some of the GGO were further developed into reticular interlobular septa thickening and crazy paving pattern, indicating that the infection leads to diffuse alveolar edema and interstitial

inflammation . Some patients seemed to have pleural effusion, that represent a poor prognostic indicator. Similarly in other infections also these imagine features are seen, but the final diagnosis of COVID-19 should still be based on reverse-transcription polymerase chain reaction.(14)

CONCLUSION

SARS-CoV-2 and the resulting COVID-19 pandemic present a series of public health challenges that affect dental practice. Three potential sources of contamination are pertinent in this context close interpersonal interaction (<1 m), contact with saliva, or AGP (AGP = aerosol-generating procedure). As such, the relative risk of in-office visits depends on the epidemiological setting at a specific time and in a geographic region, patient characteristics, and the type of procedures to be performed. Since the worldwide spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, management of coronavirus disease 2019 (COVID-19) has been challenging for health care providers.

Awareness regarding these initial symptoms is vital, and if in suspicion, the patient should be referred to a dedicated COVID-19 facility where the diagnosis and further management can be properly done. Telephonic consultation should be preferred, and elective treatment should be deferred until the COVID-19 situation improves.

Despite the great challenge posed by the COVID-19 pandemic and the surfaced ethical issues, the ongoing efforts to fight the virus and the excellence and hardworking of many research groups across the world offer hope that in a near future we can win this battle.

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