

COVID-19 Mini Review article

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Introduction

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)

- a) The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a RNA virus
- b) Genetically located within the genus Betacoronavirus
- c) Betacoronavirus uses a glycoprotein (spike protein)
- d) This spike protein binds to angiotensin-converting enzyme (ACE receptor)

RNA Sequence of COVID-19

- a) Its RNA sequence and that of the bat coronavirus are more than 80% similar.
 - b) There is a strong theory that the pangolin acted as an intermediate between bats and humans.
2. Infection Route Of COVID-19
- a) Human-to-human transmission through droplets is the primary route of transmission.
 - b) A number of research results suggesting the possibility of airborne transmission have recently been published.
 - c) There are reports that SARS-CoV-2 was cultured in secretions such as feces or urine.
 - d) It is not clear whether transmission through feces or urine can actually occur or not.
 - e) Conventional alpha, beta, gamma, delta COVID -19 could come into our body and could cell membrane fusion with our body cell at this ACE receptor area and spike protein of COVID-19.
 - f) Omicron COVID-19 virus is mutated at spike protein area, could not make cell membrane fusion with ACE receptor, could come into our body by cell uptake.

Infectivity of COVID -19 and IgG & IgM Detection of COVID-19

- 1) COVID-19 patients become contagious 2-3 days before the onset of symptoms.
- 2) Infectivity usually lasts 5-7 days after infection.
- 3) The COVID-19 patients showed that 100% of patients tested positive for IgG about 17-19 days following the onset of symptomatology.
- 4) There was an increase in SARS-CoV-2 specific Ig G and Ig M antibody titers after the three weeks following the onset of symptomatology.

Clinical Symptoms and Clinical Processes and Complications of COVID-19 Disease

- 1) Asymptomatic (50%), mild-to-moderate (40%), severe (10%) including respiratory failure.
- 2) At any age, regardless of the presence or absence of pre-existing diseases, after infected with COVID-19, severe form with respiratory failure could occur.
- 3) Cough (50%), high fever (40%: 38°C or higher), headache (35%), dyspnea (30%), sore throat (20%), diarrhea (20%), nausea and vomiting (15%).
- 4) Other symptoms include loss of smell, loss of taste, fatigue, decreased appetite, hemoptysis, dizziness, runny nose, nasal congestion, chest pain, conjunctivitis, skin changes, etc.
- 5) long term respiratory complications: lung fibrosis due to pneumonia and ARDS.
- 6) Cardiovascular complications: elevated blood pressure, elevated blood glucose and cholesterol, acute myocardial injury, arrhythmia, myocarditis, heart failure, acute coronary syndrome, atherosclerotic event and venous thromboembolism.

- 7) Acute kidney injury: Acute kidney injury due to uncontrolled long term high fever and severe dehydration and poor oral intake.
- 8) Gastrointestinal complications: poor oral intake, indigestion, diarrhea, nausea and vomiting, elevated hepatobiliary function parameters and pancreatic enzyme levels.
- 9) Nervous system-related symptoms and complications: Ischemic stroke, encephalitis, meningitis, impaired consciousness, Ataxia, convulsions, neuralgia.
- 10) Poor oral intake and severe dehydration could induce volume loss and electrolyte imbalance (hyponatremia and hypernatremia) especially to old age patients.
- 11) Cytokine release syndrome: ARDS, sepsis, DIC, multiple organ failure pattern, autoimmune disease pattern multi-organ inflammation.
- 12) Conventional alpha, beta, gamma, delta COVID -19 usually induce pneumonia, Omicron COVID-19 virus is mutated at this spike protein area ACE receptor, could not come into well our lung parenchyme cell: usually induce bronchitis, pleurisy, pericarditis as like asthmatic attack

COVID -19 Disease Patterns and Severity Risk Factors in Patients with Pre-Existing Diseases

- 1) Elderly patients with many underlying diseases are considered to have a high mortality rate because they cannot endure the pulmonary symptoms and clinical manifestations itself of COVID-19 (high fever, high blood pressure, dehydration, breathing difficulty, thromboembolic events etc.).
- 2) Patients with pre-existing diseases such as high blood pressure, diabetes, hyperlipidemia generally suffer of a worsening of these diseases which then become difficult to control and require more higher medications.
- 3) In many instances patients develop newly diagnosed disease in the course of their COVID-19 infection, such as high blood pressure, diabetes, hyperlipidemia, which need continual follow up even after recovery from COVID-19.
- 4) Another chronic underlying diseases that are well controlled (solid cancers, hematologic diseases, autoimmune diseases, etc.) do not have much influence on the conversion of COVID-19 to severe form.
- 5) Obesity is a risk factor for severe respiratory failure regardless of age or underlying disease.

Clinical courses of COVID-19 Disease

- 1) Each person has a different incubation period (7-10 days) depending on the individual's immunity.
- 2) The duration of the illness and the transition period of the corona virus test to be negative lies between 14 to 21 days.

- 3) The clinical features and complications experienced by each person are different.
- 4) The first stage of COVID-19, which is characterized by upper respiratory infection and nausea and vomiting and diarrhea also possible.
- 5) The second stage is characterized by the onset of dyspnea and pneumonia or bronchitis and so on.
- 6) The third stage is characterized hyper-inflammatory state that determines local and systemic consequences causing arterial and venous vasculopathy in the lung with thrombosis of the small vessels and evolution towards serious lung lesion s up to ARDS and DIC by cytokine storm.
- 7) The fourth stage is characterized by death or recovery. Mortality is associated with advanced age, the presence of comorbidities, worsening of respiratory failure, high level of D-dimer and BNP and C-reactive protein.

Treatment of COVID-19 Disease

- 1) Early treatment is important, especially within 7 days after the onset of symptoms. Early administration of monoclonal antibody (Regdanvimab) and antiviral agent (Veklury) is very important.
- 2) Monoclonal Antibody (Regdanvimab) is effective in preventing a progression to a severe disease pattern within the 7 days after the onset of symptoms for patients older than 50 , even when oxygen saturation is maintained above 95% with a diagnosed pneumonia (by CT scan).
- 3) Conventional alpha, beta, gamma, delta COVID -19 usually effective by monoclonal antibody (Regdanvimab), but Omicron COVID-19 virus is mutated at this spike protein area ACE receptor, could not be effective by monoclonal antibody (Regdanvimab).
- 4) Popular treatment (fluid treatment, antibiotic treatment, antipyretic analgesic, and anti-inflammatory drugs, etc.) for symptom relief and normalization of test values, control of abnormal findings.
- 5) Public medications are also helpful to overcome mild to moderate COVID-19 disease.
- 6) The antiviral drug (Veklury) has been proven effective when administered as early as possible in case of pneumonia (confirmation by CT scan) and an oxygen saturation level below 94 %.
- 7) Nowadays, new guideline including 3day Veklury infusion regimen without lowering Oxygen saturation level below 94%.
- 8) Corticosteroid (Dexamethasone 6mg) once a day intravenously or orally for ten days. Based on the research conducted so far, monoclonal antibodies and corticosteroids are useful to counteract and prevent a cytokine storm and they have appeared to improve clinical outcomes in patients in a critical stage of COVID-19

Treatment of COVID-19 Disease

1. Early treatment is important, especially within 7 days after symptom started. Early using of monoclonal antibody and antiviral agent is very important.
2. Popular treatment (fluid treatment, antibiotic treatment, antipyretic analgesic, and anti-inflammatory drugs, etc.) for symptom relief and normalization of test values, control of abnormal findings such as high fever, cough, sputum and pain by public medications is also helpful to overcome mild to moderate COVID-19 disease.
3. Monoclonal Antibody (Regdanvimab) is effective in preventing progression to severe disease pattern when administered within 7 days of a diagnosed pneumonia (by CT scan) for patients under 50 years and in any case for patients

older than 50 even when oxygen saturation is maintained above 95%.(exception about omicron COVID-19).

4. The antiviral drug (Veklury) has been proven effective when administered as early as possible in case of pneumonia (confirmation by CT scan).
5. Corticosteroid (Dexamethasone 6mg) once a day intravenously or orally for ten days.
6. Based on the research conducted so far, monoclonal antibodies against specific cytokines and corticosteroids are useful to counteract and prevent cytokine storm, and they are appeared to improve clinical outcomes in patients with critical stage COVID-19.



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