

Preventive measures and primary intervention against COVID-19 (Coronavirus)

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Dear Editor:

Coronavirus are single standard enveloped RNA virus and gets its name from Latin meaning “crown” as envelope of this virus appears crown-like under electron microscopy. The coronavirus has few importance structural proteins that include spike (S), envelope (E), membrane (M) and nucleocapsid (N). Virus commonly infects birds & mammals causing gastroenteritis and respiratory infection ranging from common cold to *SARS-COV* (Severe Acute Respiratory Syndrome-Associated Coronavirus) and *MERS-COV* (Middle-East respiratory syndrome) [1].

COVID-19 (Coronavirus Diseases 2019):

In 2019, December the first novel corona virus was identified as a cause of Respiratory tract infection in Wuhan a city of China and spreading to the other part of the world except Antarctica. The world health organization (WHO) designate the diseases, COVID-19, which is also known as corona virus diseases 2019. All of the countries have considered this as a national emergency [2].

Severe Acute Respiratory Syndrome (SARS):

SARS associated coronavirus is the animal virus and it is most likely originated from bat and it is known as SARS-Cov.

Middle East Respiratory Syndrome (MERS):

In 2012, A diseases discovery by coronavirus as a cause of severe illness in the middle East and this is also known as human coronavirus.

Incidence Rate:

The rate of incidence of coronavirus suspected case over the world is 17,73,084 and is still the cases are on increasing trend.

Mortality Rate:

The death rate over the world is approx. 1,11,652 till April, 2020 as per the data by WHO.

Epidemiology:

The epidemiologic investigation shows that the outbreak of this virus was first reported in a sea food market of Wuhan city of China. This sea food market also sold various live animals like snakes, rabbits, bats etc. Therefore, the initial study proves that the virus is originated from snakes but later few other studies prove that from bats. The diseases can be transmitted through person to person via droplets & fomites [3].

Droplet transmissions:

The virus is coexistent in the respiratory secretions. It can be spread via coughing, sneezing or talking to the infected person in the form of both macro and micro droplets. It makes direct contact with the mucous membranes and indirectly by infected surface followed by touching over eyes, nose or mouth. The travelling rate of droplets is generally not more than 2 meters and do not linger in air [1]. But few latest studies suggest that it can travel up to 6mtrs too. Some studies suggest that the virus is also found on feces and contaminate place like toilet, bathroom, bathroom sinks [4]. In the month of February 2020, A pregnant Chinese female was diagnosed with Covid-19 and delivered a new-born which was also found to be Covid-19 positive. Similar case was reported in London where new-born was tested positive [5].

Epidemiological Risk Factors:

- Diabetes
- Medical comorbidities
- Old age
- Chronic kidney diseases
- Chronic pulmonary diseases
- Cardiovascular diseases
- Male sex
- Chronic smoker

Clinical

Diseases Spectrum: Coronavirus is the most commonly presented as upper and lower respiratory tract infection in humans and an occasional cause for gastroenteritis in children [6].

Site of Infection: The most common site of infection including;

- **Upper Respiratory Tract:** Common cold, COPD flares, asthma flare, acute bronchitis, sinusitis.
- **CNS:** Encephalitis very rare.
- **Gastrointestinal:** The gastrointestinal infection manly occurs in infant like Nausea, vomiting, diarrhea.
- **Lungs:** cause pneumonia.

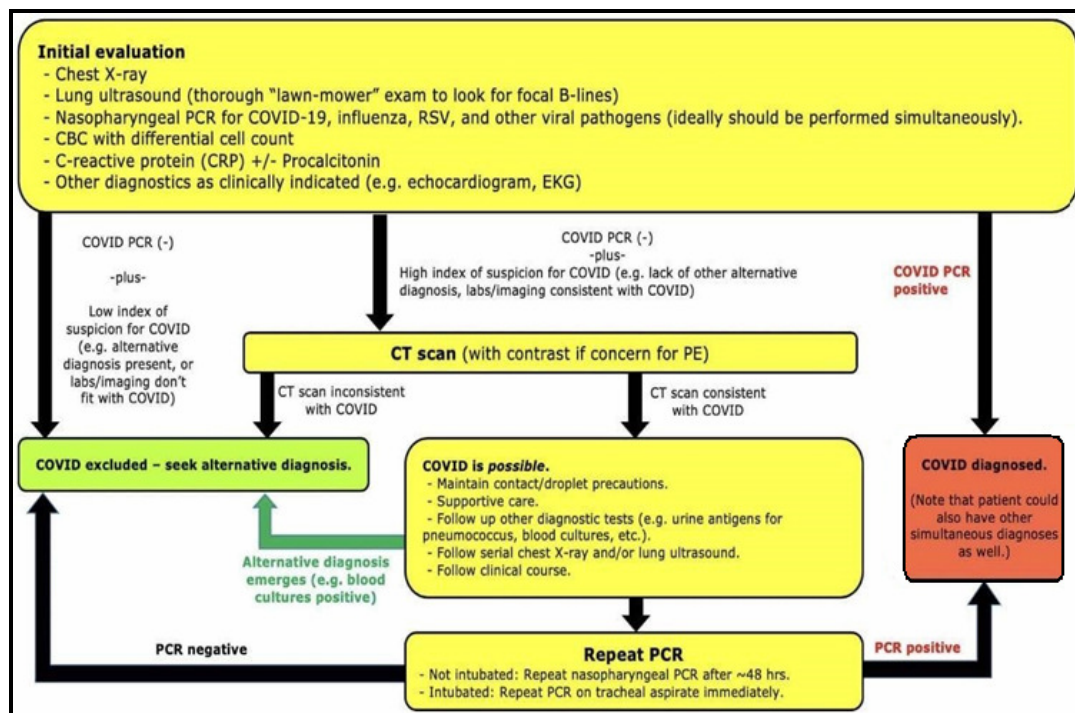
Symptoms:

Headache, Sore Throat, Rhinorrhoea, Fever, Fatigue, Dry Cough, Dyspnea, Shortness of Breath, Nausea, Vomiting, Diarrhoea [7].

Diagnosis:

- Diagnosis of COVID-19 still has no standard protocol.
- Complete blood count is non specific. Leukopenia, leukocytopenia, lymphopenia have been reported and thrombocytopenia is associated with poor prognostic markers.
- Inflammatory markers such as serum procalcitonin & CRP (C-Reactive Protein) have raised levels.
- Other test such as PCR, Bronchoscopy, Chest x-ray. CT scan, PFT is also performed, depicting the effect over tissue by the viral pathology.
- Lately, rapid tests are available that detects the IgG and IgM antibodies over shorter span of time. Hence, the management and measures can be promptly undertaken.
- Samples are taken by an expert that includes sputum, nasopharyngeal and oropharyngeal swabs, blood, serum, urine and feces.

Fig-1: Possible diagnostic approach to ill patient admitted to hospital with suspected COVID-19 [8]



Potential strategy for ill patients with suspected COVID-19. This algorithm doesn't address exactly when to initially suspect COVID-19, which will become increasable challenging as community spread occurs.

Preventive Measures:

To minimize the infection there are only supportive and preventive measures, to reduce the transmission in the community.

- Isolation.
- Wearing PPE (Personal Protective Equipment).
- Wearing gloves and masks.
- Maintain proper hygiene.

- Washing hands properly and frequently.
- Social distancing.
- Sanitize all items with closer contact.
- Well-functioning of immune system by adequate care and immunity buster.
- Exercise.
- Adequate sleep.
- Avoiding handshakes, hugs and kisses.
- Avoiding non-essential gathering and travels.
- Avoid crowds.
- Intake of healthy food.
- Intake of medicines as advised by physician especially by patients with associated comorbidities.
- Adequate hydration.

Management

Table-1: Initial Management: There are no proven treatment for COVID-19	
Severity of Diseases	Plan
Mild illness without any risk factors/ Comorbidities	<ul style="list-style-type: none"> • Outpatient care • Home Quarantine • Supportive care
<p><i>Moderate Illness:</i></p> <ul style="list-style-type: none"> • Dyspnoea • Hypoeximia • Infiltrates/ consolidation on chest • x-ray/CT-scan 	<ul style="list-style-type: none"> • Admit in isolation room of hospital • Supportive care • Start antibiotics treatment as per guidelines of pneumonia treatment • Oseltamivir 75/150mg BD • If sign and symptoms of diseases appear then start Hydroxychloroquine or Lopinavir/Ritonavir
<p><i>Critical illness:</i></p> <ul style="list-style-type: none"> • Mechanically ventilator patients • Bilateral lung consolidation • There drug not use in multiple comorbid patient 	<ul style="list-style-type: none"> • For compassionate use Remdesivir • Tocilizumab use in patients with evidence of cytokine release syndrome • Antibiotics and supportive care • Reduce ventilator associated pneumonia, catheter infection, bacterial infection, viral and fungal infection • In ventilator patients use ARDS NET protocol

Table-2: Currently available drugs used for the treatment of COVID-19			
Drugs	Mechanism of Action	Dosage	Side Effects
Hydroxychloroquine	Hampers low PH dependent steps of viral replication	400mg p/o BD(2doses) then 200mg BD for 5 days	Increase QT interval
Oseltamivir	Neuraminidase enzyme inhibitor in influenza	150mg BD for 5 days	Headache, GI disturbance, insomnia
Remdesivir	RNA polymerase inhibitor	Loading dose-200mg IV then 100mg IV daily for 10 days	Hepatotoxicity, GI intolerance
Lopinavir/Ritonavir	3CLpro inhibitor	400/100mg BD for 10 days	QT prolongation, Hepatotoxicity
Ribavirin	RNA polymerization inhibitor	2gram loading dose then 600mg TID	Haemolytic anemia
Interferon beta B1	Immunomodulator		Flu like syndrome, depression
Tocilizumab	Monoclonal antibody to IL6 receptor		Increase liver enzymes and increase risk of respiratory infections
Antibiotics (Broad Spectrum)	Secondary bacterial infection		
Corticosteroids	Not indicated treatment but use in septic shock. If patient has other indication for steroid use.		

Conclusion

The study concludes that coronavirus diseases 2019 has been reported as cluster of diseases in China and across the world except Antarctica and WHO has declared COVID-19 as a "PANDEMIC". Pneumonia is the most common complication seen. It is spread mainly through respiratory droplets and elderly people with

multiple comorbidities are more vulnerable. So far, there is no treatment or vaccine available for COVID-19. Prevention is the best option to protect self that includes social distancing, hygiene, self-care, immunity boosting, hand washing, etc. This article might include further advancements as the research progresses.

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