

COVID-19: The Pandemic

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ABSTRACT

The Covid-19 pandemic has hit us far and hard. It is spreading like a forest fire among the developed and developing countries. The epidemiology of Covid-19 is still unclear and the public health specialist is adding evidence day by day. The Covid-19 pandemic is currently affecting more and more individuals throughout the globe, and everyone is susceptible to the virus. Moreover, the epidemics as well as pandemics have impacts on the vulnerable and lower socioeconomic communities. COVID-19 presents with a wide range of clinical symptoms including Fever, Cough, Shortness of Breath (SOB), Headache and Muscle Pain Etc. Prevention is critical as there is no specific and approved treatment for COVID-19 at this time. Although many trials are underway, none has so far been very successful with a breakthrough in this regard. Treatment generally revolves around giving symptomatic and supportive care to control fever, hydration and nutrition. Different drugs including the use of Antivirals with or without a combination of antibiotics has been warranted but to no major success so far. Alternative options including the use of Passive immunization via monoclonal antibody therapy show progress but so far, the antibodies haven't been marketed. The rise of neutrophils in the lungs and a serum elevated level of cytokines and chemokines responsible for inflammation is believed to be related to the lung damage seen in the COVID-19 patients. Presence of the SARS-CoV-2 viral antigen in the sample detected via the PCR or ELISA technique, confirms the diagnosis of COVID-19 Infection. The Covid-19 infection showed strong relationship with age, gender, socio-economic, important determinants like chronic co-morbidities, obesity, tobacco smoking, PPEs knowledge, health information, and supplements intake, and thus comprehensive preventive and promotive strategies are needed to prioritize the vulnerable communities to reduce the spread and transmission of Covid-19 along with coordination and cooperation from all stakeholders. COVID-19 has an economic fall out that most countries of the world now fear an economic recession due to the existing and extended lockdown imposed at the moment. Therefore, measures need to be taken to curb this before the situation gets out of hand, especially for developing countries.

Key Words: Covid-19; Pandemic; Isolation; Socio-Economic; Co-morbidities

INTRODUCTION

The Covid-19 pandemic has resulted in public health security threat; with millions of cases and related deaths being recorded globally. The First case of Covid-19 was reported in December 2019 from China, and since then covid-19 has spread globally and resulted in pandemic [1]. In Pakistan, the first case was reported on February 26, 2020 from Pakistan [2]. This had led to public health emergency on international concern [3]. Corona Virus Disease 2019 or more simply known as the COVID-19 emerged from the City of Wuhan in the Hubei Province of China in the last quarter of 2019 as cases presenting with pneumonia but unknown aetiology. The virus responsible for the clinical condition is Severe Acute Respiratory Syndrome Corona Virus 2 or the SARS-CoV-2 [4].

The virus has since then become a global issue of imminent concern. The primary thought behind writing this review was to give a broad view of this less known but rapidly evolving medical condition. Coronavirus, as the name indicates, has a crown-like appearance. SARS-CoV-2 is an RNA virus and shares a sequence identity of 79% to SARS-CoV, that caused the 2003 outbreak [5]. This is an outline and a simplified review to learn the basics of this healthcare menace facing the world during these war times.

REVIEW

CLINICAL PRESENTATION

COVID-19 presents with a wide range of clinical symptoms including Fever, Cough, Shortness of Breath (SOB), Headache and Muscle Pain Etc [6]. The diversity yet the similarity of symptoms to other respiratory conditions makes it a physician's nightmare to diagnose clinically. However, most cases have a very mild course of illness [6].

PREVENTION

Prevention is critical as there is no specific and approved treatment for COVID-19 at this time. Although many trials are underway but none has so far been very successful with a breakthrough in this regard. Community involvement including avoidance of large gatherings, is of utmost importance as social distancing is an effective tool to not only decrease the risk of spread but to also reduce the ever-growing disease burden on the healthcare facilities. Preventive measure includes maintenance of good sunlight and adequate airway ventilation to kill the virus on the surfaces. Patients should be advised to wear surgical mask while care givers including healthcare workers and those who tend for the patients should wear surgical mask and personal protective equipment and practise hand hygiene frequently [7].

Surfaces should be decontaminated regularly and extra precaution needs to be taken when high risk procedures like intubation are being carried out.

CURATIVE INTERVENTION

Isolation of the positive cases is the first and foremost step in this regard. Treatment generally revolves around giving symptomatic and supportive care to control fever, hydration and nutrition. Different drugs including the use of Antivirals with or without a combination of antibiotics has been warranted but to no major success so far [8].

The use of steroidal therapy has not shown benefits rather a possibility of harm to the patients has been observed and is therefore not recommended to use corticosteroids for COVID-19 [9]. Remdesivir, an antiviral medication has shown some promise and the clinical trial is undergoing but it would be too early to use it as a recommended treatment option [10-12].

PATHOLOGY

A receptor by the name of Angiotensin Converting Enzyme (ACE) 2 found in the human lower respiratory tract, regulates inter specie and intra specie transmission of SARS-CoV-2 [13]. Both SARS-CoV and SARS-CoV-2 use the same entry point receptor mechanism. S-glycoprotein present on the surface of the virus attached itself to the host cells receptor (Human Cells) [14]. Following membrane fusion, viral RNA is release into the cytoplasm. A complex process results in the

formation of viral peptide buds. These vesicles fuse to the plasma membrane, releasing the virus [15-16]

The rise of neutrophils in the lungs and a serum elevated level of cytokines and chemokines responsible for inflammation is believed to be related to the lung damage seen in the COVID-19 patients [17-18]

LABORATORY DIAGNOSIS

Blood samples, Sputum samples and Nasal secretions taken from the suspected cases are subject to investigations including biochemical, serological and molecular tests for COVID-19 infection. Presence of the SARS-CoV-2 viral antigen in the sample detected via the PCR or ELISA technique, confirms the diagnosis of COVID-19 Infection [19].

PLASMA THERAPY

Monoclonal Antibody therapy is a newer concept when it comes to preventing infections. It carries the advantage of many drawbacks of serum therapy and Intravenous immunoglobulin preparations such as efficacy, specificity and low blood borne infections. Monoclonal Antibody therapy is an excellent curative intervention [20-23]. With limited data on the subject, no specific treatment or licensed vaccines to treat COVID-19 Infection, there is a need to look for alternative options including the use of Passive immunization via monoclonal antibody therapy especially in pandemic situations like this [24]. There is progress but so far, the antibodies haven't been marketed.

CONCLUSION

The Covid-19 infection showed strong relationship with age, gender, socio-economic, important determinants like chronic co-morbidities, obesity, tobacco smoking, PPEs knowledge, health information, and supplements intake, and thus comprehensive preventive and promotive strategies are needed to prioritize the vulnerable communities to reduce the spread and transmission of Covid-19 along with coordination and cooperation from all stakeholders. COVID-19 has kept the healthcare facilities on their toes and had an economic fall out that most countries of the world now fear an economic recession due to the existing and extended lockdown imposed on most countries of the world at the moment. Therefore, measures need to be taken to curb this before the situation gets out of hand especially for developing countries.

REFERENCES

1. De Groot NG, Bontrop RE. COVID-19 pandemic: is a gender-defined dosage effect responsible for the high mortality rate among males? : Springer; 2020.
2. COVID-19 Situation. Government of Pakistan. <https://covid.gov.pk/>. (Accessed on 5th April 2021).
3. Liu N, Zhang F, Wei C, Jia Y, Shang Z, Sun L, et al. Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry research*. 2020;112921.
4. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. *Lancet*. 2020. [https://doi.org/10.1016/S0140-6736\(20\)30185-9](https://doi.org/10.1016/S0140-6736(20)30185-9).
5. Lu R , Zhao X , Li J et al . Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding . *Lancet* 2020.

6. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 2020;395:507–13
7. Chang D, Xu H, Rebaza A, Sharma L, Dela Cruz CS. Protecting health care workers from subclinical coronavirus infection. *Lancet Respir Med*. 2020. [https://doi.org/10.1016/S2213-2600\(20\)30066-7](https://doi.org/10.1016/S2213-2600(20)30066-7).
8. Stockman LJ, Bellamy R, Garner P. SARS: Systematic review of treatment effects. *PLoS Med* 2006; 3: 1525–31.
9. Sheahan TP, Sims AC, Leist SR et al. Comparative therapeutic efficacy of remdesivir and combination lopinavir, ritonavir, and interferon beta against MERS-CoV. *Nat Commun* 2020; 11: 222
10. Holshue ML, DeBolt C, Lindquist S et al. First case of 2019 novel coronavirus in the United States. *N Engl J Med* 2020
11. National Health Commission of the People's Republic of China. Diagnosis and Treatment of Pneumonia Caused by 2019-nCoV (version 6). 2020. http://www.gov.cn/zhengce/zhengceku/2020-02/19/content_5480948.htm.
12. WHO. Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected. [https://www.who.int/publicationsdetail/clinical-management-of-severe-acute-respiratory-infection-when-novelcoronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publicationsdetail/clinical-management-of-severe-acute-respiratory-infection-when-novelcoronavirus-(ncov)-infection-is-suspected).
13. Jia HP, Look DC, Shi L, Hickey M, Pewe L, Netland J, et al. ACE2 receptor expression and severe acute respiratory syndrome coronavirus infection depend on differentiation of human airway epithelia. *J Virol*. 2005;79(23):14614–21.
14. Tortorici MA, Veesler D. Structural insights into coronavirus entry. *Adv Virus Res*. 2019;105:93–116.
15. Hussain S, Pan J, Chen Y, Yang Y, Xu J, Peng Y, et al. Identification of novel subgenomic RNAs and noncanonical transcription initiation signals of severe acute respiratory syndrome coronavirus. *J Virol*. 2005;79(9):5288–95.
16. Perrier A, Bonnin A, Desmarests L, Danneels A, Goffard A, Rouille Y, et al. The C-terminal domain of the MERS coronavirus M protein contains a trans-Golgi network localization signal. *J Biol Chem*. 2019;294(39):14406–21.
17. Peiris J, Chu C, Cheng V, et al. Clinical progression and viral load in a community outbreak of coronavirus-associated SARS pneumonia: a prospective study. *Lancet*. 2003;361(9371):1767–1772.
18. Wong CK, Lam CWK, Wu AKL, et al. Plasma inflammatory cytokines and chemokines in severe acute respiratory syndrome. *Clin Exp Immunol*. 2004;136(1):95–103.
19. Corman VM, Landt O, Kaiser M, Molenkamp R, Meijer A, Chu DK, Bleicker T, Brünink S, Schneider J, Schmidt ML, Mulders DG, Haagmans BL, van der Veer B, van den Brink S, Wijsman L, Goderski G, Romette JL, Ellis J, Zambon M, Peiris M, Goossens H, Reusken C, Koopmans MP, Drosten C. Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR. *Euro Surveill* 2020; 25. doi: 10.2807/1560-7917.
20. Sui J, Li W, Roberts A, Matthews LJ, Murakami A, Vogel L, et al. Evaluation of human monoclonal antibody 80R for immunoprophylaxis of severe acute respiratory syndrome by an animal study, epitope mapping, and analysis of spike variants. *J Virol*. 2005;79(10):5900–6.
21. Both L, Banyard AC, Dolleweerd CV, Wright E, Ma JK-C, Fooks AR. Monoclonal antibodies for prophylactic and therapeutic use against viral infections. *Vaccine*. 2013;31(12):1553–9

22. Davey RT Jr, Dodd L, Proschan MA, Neaton J, Neuhaus Nordwall J, Koopmeiners JS, et al. A randomized, controlled trial of ZMapp for Ebola Virus infection. *N Engl J Med*. 2016;375(15):1448-56.
23. Caskey M, Klein F, Lorenzi JCC, Seaman MS, West AP Jr, Buckley N, et al. Viraemia suppressed in HIV-1-infected humans by broadly neutralizing antibody 3BNC117. *Nature*. 2015;522(7557):487-91.
24. Shanmugaraj B, Malla A, Phoolcharoen W. Emergence of Novel Coronavirus 2019-nCoV: Need for Rapid Vaccine and Biologics Development. *Pathogens*. 2020;9(148)