

Patho-physiology of COVID-19 and possible management principle from *Ayurveda's* perspective

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Abstract

This opinion article is prepared in light of connecting the dots related to symptoms and complications seen in COVID-19 cases. *Ayurveda* understands the patho-physiology from the perspective of deranged body constituents. Based on same principles and the clinical picture of COVID-19 worldwide, this opinion article is prepared. The information regarding disease progression, collated from authentic sources, the disease maybe a *pitta* condition primarily triggering *kapha* release. *Pitta* and *Kapha* together are instigating complications such as hepatitis, myocarditis, GI symptoms, pneumonitis, Disseminated intravascular coagulation (DIC) and Acute Respiratory Distress Syndrome (ARDS). Also, there happens to be a stark resemblance between advanced symptoms of COVID-19 with complications of Herpes zoster and ZSH (Zoster-sine-herpete) despite different viruses triggering that. As per *Ayurvedic* patho-physiology, herpes is a *pitta* predominant disorder and COVID-19 too seems to exhibit similar symptoms in advanced stages. *Pitta* pacifying medicines have been effective in conditions like herpes zoster, Chicken pox etc. Based on this information, a hypothesis about the management plan for COVID-19 is proposed in this opinion article. Primarily *pitta* pacifying (inflammation relieving) medicines may have a role in treatment of a certain subset of SARS-CoV-2 infected individuals.

Key words : COVID-19, Ayurveda, Visarpa, Viral infection, Cytokine storm, Herpes zoster

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Introduction

Amidst of COVID-19 pandemic, where the medical fraternity and the scientists are trying to find the best solution to this viral infection, here is an approach from *Ayurveda* that may prove beneficial as a stand-alone treatment or an integrative approach. *Ayurveda*, understands diseases in its own paradigms that allows to translate many new age diseases in *Ayurvedic* language. Congruently, here is an effort to find solution from *Ayurveda*.

The hypothetical synopsis is made by back-tracing the information received from various sources regarding COVID-19. From the published literature and other sources, it is evident that COVID-19 is known to trigger inflammatory pathways and subsequent cytokine storm

leading to multiple organs dysfunction (MOD) and failure.¹ From previous studies done so far, it is evident that *Ayurvedic* herbs can modulate inflammatory pathways and may help body adapt better in conditions like cytokine release.^{2,3}

Methods

Ayurveda's approach

Viral infections, such as chicken pox, measles, herpes zoster etc. are considered as manifestations of *Pitta* vitiation in *Ayurveda's* paradigm.⁴ *Pitta* is characterized by properties like heat, sharpness, pungency and liquid form in normalcy. Vitiating of *pitta* results in aggravation of body heat resulting in triggering of cascade similar to stimulating inflammatory processes. It is noteworthy to mention that *Ayurvedic* medicines in such cases are administered devoid of understanding of they having any

antiviral properties and yet are traditionally known to be efficacious. Though experimental evidence suggests that certain medicinal plants are known to possess potent antiviral properties.⁵

Hypothetically, like Herpes zoster and chicken pox, if it is believed that SARS-CoV-2 is also creating imbalance in *Pitta* and allowing body heat to exacerbate causing harm to tissues, then the clinical picture fits into this pathology.⁶ The aggravated heat from vitiated *pitta*; akin to triggering inflammatory pathways may be causing initial symptoms of COVID-19 such as dryness initially leading to weakness, malaise, body-ache and fever. *Pitta* vitiation possibly results in the disruption of the immunoregulatory molecules skewed towards the unregulated trigger of proinflammatory cytokines facilitating more cytokine release and viremia resulting in cytokine storm leading to MODS.^{7,8}

From the available articles about COVID-19, it has been proposed that uncontrolled inflammatory response results

in more severe form of the disease. Although the basic pathogenesis remains the same in patients who have mild to moderate symptoms; the immune system adapts and responds optimally to overcome the covert viral mechanism leading to favorable outcomes. It is a well-known fact that inflammation can release exudates which have potential to interfere with the health of an individual. Similarly, in *Ayurvedic* pathophysiology, when *pitta* gets vitiated, there is a qualitative and quantitative change in its natural form which may trigger various kinds of disruptions in the body physiology.

Aggravation of *pitta* allowing dryness and raised temperature to manifest.



Aggravated heat has a strong potential to attract the moisture from the healthy tissues causing excess accumulation of water element.



Accumulated water allows kapha to increase due to homologous nature.

Table 1. Proposed patho-physiology of COVID-19 according to *Ayurveda*

	Physiological disruption	Immediate effect	Symptoms/Conditions	Similarities with known diseases
Phase I	<i>Pitta</i> aggravation	Causing dryness and exacerbation of heat leading to raised temperature/fever	Raised Temperature/Fever, Excessive thirst, Fatigue, Discomfort	Herpes Zoster without rash (Zoster-sine-Herpete) ⁱ
Phase II	Water being pulled from dhatus due to excess heat as a bodily compensation mechanism	Accumulated water being homologous to <i>kapha</i> leads to <i>Kapha</i> aggravation	Sneezing, cough, anosmia	
Phase III	Excess moisture/water liberated gets dried up due to the excessive heat (possibly due to subclinical <i>pitta</i> aggravation) manifesting excessive heat and dryness – aggravation of <i>Pitta</i> and <i>Kapha</i>	Vascular damage leading to hemorrhages, Severe inflammation leading to involvement of various organs	Pneumonitis Hepatitis Hemorrhagic conditions MODS Etc.	Complications of Herpes zoster ⁱⁱ

(This accumulation of excess moisture and allowing *kapha* to get aggravated is considered as 'Syanda' in *Ayurvedic* terminology).^{9,10,11}

(This equates to the inflammation and the related release of exudates that can be seen in form of cytokine release.)

However, in individuals having mild to moderate symptoms, this pathophysiology does not progress into a more severe form due to better adapting immune system which is a resultant of a better pre-disease health status. This pre-disease health status according to *Ayurveda* depends on a disciplined lifestyle that helps to build stronger immunity¹².

Certain observations from Western Medicine

In a recent finding, it is observed that SARS-CoV-2 is attacking the endothelium and subsequently has potential to harm various other organs along with a high risk of thrombosis and haemorrhagic conditions.¹⁵ This is in line with the disease - *Raktapitta*¹⁶ This pathophysiology could be responsible for the symptoms observed in COVID-19 and the complications like pneumonitis, ARDS, myocarditis, hepatitis, DIC, etc. and MODS found thereafter.⁸

With the available information, it is proposed that *pitta* pacification¹⁷ may lower down inflammation and subsequent reduction in the proinflammatory cytokines¹⁸ and regulation of the uncontrolled immune response.

Discussion

Principle of management as per *Ayurveda* –

As the COVID-19 condition progresses it is manifesting *pitta* involvement as a prime factor. It also shows a similar pattern to that of *Abhyantar Visarpa*⁵ (similar to Zoster-sine-herpete /ZSH) especially in the comorbid or older patients in advanced stages. There is a strong possibility that if COVID-19 cases get treated by pacifying *pitta* and also as observed in management of *abhyantar visarpa*, there may be positive outcomes. The focus will be on

pacifying predominantly *Pitta* and *Kapha*. So far in the proposed *Ayurvedic* therapeutic approach, *pitta* has not been considered to be pivotal in pathogenesis of COVID-19 as the disease advances except a few where *pitta* is considered as part of pathology.⁶ Apart from COVID-19, it is observed that viral infections such as Herpes zoster have been treated with *pitta* pacifying management.⁷

Some *Ayurvedic* medicines exhibit *pitta* pacifying actions due to heterologous nature due to presence of cooling characteristics in them. Whereas, few have an action of channelization and elimination of aggravated *pitta* because of laxative action. Some of them are enlisted here.

- Praval Pishti⁸ – calx of coral,
- Mauktik pishti⁹ – calx of pearl,
- Ushir – **Vetiveria zizanioides**¹⁰,
- Musta – **Cyperus rotundus**¹¹
- Phalatrikadi Guggul^{12, 13}
- Medicated ghee - Mahatiktak ghrita¹⁴

This treatment is expected to show positive outcomes. It is also expected to improve the status of organs like liver (hepatoprotective) and lungs (lung protective). The subsequent aim of *Ayurvedic* treatment will be reestablishing the health of *dhatu*s and thus minimizing the vulnerability in them. These *Ayurvedic* treatments may modulate the inflammatory pathways resulting in improvement in *dhatu* & *dhatvagni* and thereby improved immune response resulting in improved outcome in this viral infection.¹⁵

Conclusion

It maybe hypothesized that above said *Ayurvedic* treatment plan for *pitta* aggravation/inflammatory status, has potential to show a remarkable change in the health status of COVID-19 patients and *Ayurvedic* treatment may be deployed as integrative approach or as a stand-alone treatment in case of COVID-19. Clinical trials with this hypothesis will be helpful for assessment.

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