

AN AYURVEDIC APPROACH TO POST COVID ILLNESS

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ABSTRACT

Introduction: COVID-19 manifests as varied clinical features affecting different organ systems. In post-COVID state, patients often present with post-viral fatigue, dyspnea, olfactory and/or gustatory dysfunction, depressive mood and behavior, thrombotic events, cardiac complications, etc. These can be managed on principles of *jwara*, *raktapitta*, *shwasa*, *vatavyadhi*, *marmopghata*. **Aim:** To understand presenting features of post-COVID-19 illness through principles of *ayurveda* and devise a preventive and therapeutic plan for the same. **Methodology:** LitCovid engine, google scholar, WHO website, *ayurvedic* texts are searched with specific keywords and evidence gathered is critically analyzed on therapeutic concepts of remnant *dosha* post *Sannipataja Jwara*, secondary *Raktapitta*, *Shwas* resulting in *urah shushkta*, *marmopghata*, *oja*, and *vyadhi sankara* etc. **Results and discussion:** Post-COVID manifestations bear resemblance to concepts of depletion in *oja*, state of *asanjaat bala* post *jwara*, remnant *doshas* post *jwara*, *shotha* complications, *urah shushkta* due to *shwasa*, *shira* and *hridaya marmopghata*, *indriya santapa*, *rakta* vitiation, *raktapitta*, *bhaishaj vyapad*, *kleda* and *krimi*. Preventive measures should be propagated. Preexisting co-morbidities must be checked for and *dashvidha rogi pariksha* should be done to assess *atura* and *dosha bala* in order to assess prognosis and decide dosage of therapeutics. Treatment should be started after proper evaluation of *roga avastha*, *rogi* and *roga bala*, status of *prana*. Outcomes of therapeutic regime can be evaluated through examination of characteristics of *vikaropshaman* reflective of *dhatuamyata*. **Conclusion:** Post-COVID illnesses manifest differently in different people. Underlying process of delayed recovery, continuous inflammation, altered coagulation, and profibrotic mechanisms are common culprits. These pathologies have a notorious history of becoming chronic autoinflammatory, autoimmune diseases. Multiple viral illnesses are known triggers for such inflammatory disorders. Therefore it is essential to prevent and manage all *updrava*, *vyadhi sankara*, and especially diseases of vital organs through timely assessment of *rogi-roga avastha* and *bala*.

KEYWORDS: *Ayurveda*, *Jwara*, post-COVID.

INTRODUCTION

Coronavirus disease 2019(COVID-19) is not just a respiratory illness but a disease affecting several organ systems with wide array of clinical manifestations. It is seen that some of the symptoms persist or a new set of clinical features develop even after recovery from COVID-19. Patients present with post viral fatigue, dyspnea, olfactory and/or gustatory dysfunction, depressive mood and behaviour, thrombotic events, cardiac complications, Guillain-barre syndrome(GBS) and diplopia etc.

COVID underlies the symptomatic umbrella of *agantuja-bhootabhishangaj sannipata jwara* with subtle variance in *dosha* dominance in different individuals.^[1] While most of the post COVID complications can be understood and explained as sequelae of *sannipataja jwara/hatojasa* leading to the diminution of physical, mental and immunological endurance consequent to loss

or diminution of *ojas*, other complications can be explained and managed on the principles of *vyadhi sankarya*, *marmopghata*.^[2,3,4]

Post COVID complications can be managed on the principles of treatment of *jwara*, *raktapitta*, *shwasa* and *vatavyadhi*. The treatment in post COVID complications is aimed at instituting therapies in order to achieve targets of *vikaropshama* (~symptomatic treatment), *dhatuamyata* and *prakriti sthapan*(~restoring normal physiological status).^[5]

Aim

To understand presenting features of post COVID-19 illness through principles of *ayurveda* and devise a preventive and therapeutic plan for the same.

METHODOLOGY

Online published articles on post COVID-19 illness using keywords post viral syndrome, post COVID-19 illness, post COVID-19 sequelae, post infectious illness, post COVID-19 recovery, post coronavirus, post SARS-CoV-2, post infectious myocarditis, COVID-19 neuroinvasive were searched on LitCovid engine of ncbi.nlm.nih.gov (<https://www.ncbi.nlm.nih.gov/research/coronavirus/>) and on google scholar (<https://scholar.google.com/>). COVID-19 Clinical management, living guidance 25th January 2021, World Health Organisation was searched for the word 'recovery' to find accepted parameters of recovery from COVID-19.^[6] Editorials were excluded, articles with medical background and patient data were included for study. Authentic *ayurvedic* texts available in institutional library of the CBPACS, New Delhi, or online were searched with keywords *jwara*, *raktapitta*,

rakta dushti, *shotha*, *shwasa*, *marmopghata*, *ojas*, *dashvidha pariksha*, *nidana arthkara roga*, *vyadhi sankara* and compiled for literary and critical analysis. *Trimarmiya chikitsa*, *basti*, *nasya*, *dhatuamyata* and *vikaropshaman* were also searched, compiled, and analyzed. Clinical features of post-COVID-19 illness were critically analyzed on *ayurvedic* principles. On the basis of the above-mentioned references, post-COVID complications were critically analyzed and clinically relevant preventive and management protocols were designed.

The same is presented in this review article.

RESULTS

The following clinical entities are being seen in patients post-COVID-19 recovery. (Table-1)

Table-1: Post viral manifestations in COVID-19.

S. No.	Clinical feature	Supportive evidence	Article	Ayurvedic perspective
1.	Fatigue, myalgia, feverish feeling, headache, anxiety	Many patients showing symptoms consistent with chronic fatigue syndrome. Finding thought to be compatible with dysautonomia.	Post-COVID-19 chronic symptoms: a post-infectious entity? ^[7]	a. Depletion in <i>Oja</i> (<i>bala visransa and bala vyapad</i>) ^[8] b. Stage of <i>Asanjaat bala</i> after <i>Jwara mutki</i> . ^[9] c. As a complication of <i>Shotha</i> post <i>Jwara</i> . ^[10] d. <i>Deenta</i> (~weakness, asthenia) and <i>glani</i> (~debility) due to remnant <i>dosha</i> post <i>jwara mukti</i> . ^[11]
2.	Dyspnea in pulmonary fibrosis	Fibrotic changes in the lung evident on chest imaging	Post COVID -19 Pneumonia Pulmonary Fibrosis ^[12]	a. <i>Shwasa</i> complicated by <i>urah shushkta</i> . ^[13] b. <i>Shwasa</i> due to <i>hridaya</i> and <i>shira marmopghata</i> . ^[14,15]
3.	Olfactory and/or gustatory dysfunction	a. It is postulated that virus can effect peripheral neurons in olfactory bulb. Neuro invasive potential of SARS-CoV-2 is suspected. b. Neuroinvasive potential of COVID-19 is strongly suggested.	a. Olfactory and gustatory dysfunctions as a clinical presentation of mild-to-moderate forms of the coronavirus disease (COVID-19): a multicenter European study. ^[16] b. SARS-COV-2 (COVID-19) has neurotropic and neuroinvasive properties. ^[17]	a. <i>Indirya santaapa</i> ^[18] b. Sequelae of <i>Shira marmopghata</i> ^[19]
4.	Diplopia	Patient presented with third cranial nerve paralysis after recovery from COVID-19. This paralysis self resolved in seven days. Several arterial micro-ectasia were visible on MRI.	Isolated post SARS-CoV-2 diplopia. ^[20]	a. <i>Indirya santaapa</i> b. Sequelae of <i>Shira marmopghata</i>
5.	GBS	Peripheral demyelinating neurological disorder with suggestive	Post SARS-CoV-2 Guillain-Barre syndrome. ^[21]	a. <i>Indirya santaapa</i> b. Sequelae of <i>Shira marmopghata</i>

		electrodiagnostic studies, CSF cytology and protein levels were strongly suggestive of GBS.		
6.	Thrombotic, thromboembolic and hemorrhagic events	A retrospective observational cohort. Thrombotic and hemorrhagic events are comparable in patients post COVID-19 discharge.	Post discharge thrombosis and hemorrhage in patients with COVID-19. [22]	a. <i>Rakta</i> vitiation due to <i>santaapa</i> . Daytime sleep after intake of meals and indigestion, <i>adhyashan</i> (~binge eating) can also act as precipitating factors for <i>rakta</i> vitiation due to preexisting disturbed metabolic fire in <i>jwara</i> . [23] b. <i>Raktapitta</i> due to <i>jwara</i> . [24]
7.	Post viral myocarditis	a. Cardiac imaging show sub-epicardial edema, Presenting features consistent with that of Kawasaki disease. Post viral myocarditis due to immune complexes is suspected. b. Cardiac imaging studies hint towards persistent perimyocarditis post-COVID-19.	a. SARS-CoV-2 post-infective myocarditis: the tip of COVID-19 immune complications? [25] b. Outcomes of Cardiovascular Magnetic Resonance Imaging in Patients Recently Recovered From Coronavirus Disease 2019 (COVID-19). [26]	a. Sequelae of <i>Hridya marmopghata</i> [27] b. <i>Shotha</i> due to <i>marmopghata</i> . [28]
8.	Depressive mood and behavior, anxiety.	Maybe due to post-traumatic stress and neurobiological injury	Abstract of Post COVID syndrome and suicide risk. [29]	<i>Mansika santaapa</i> . [30] <i>Oja</i> depletion.
9.	Hyperglycemia	High-dose corticosteroids used for COVID treatment, inflammation, impaired immunity and induction of renin-angiotensin aldosterone system(RAAS) are the potential mechanisms.	Post-COVID-19 Hyperglycemia: A Concern in Selection of Therapeutic Regimens. [31]	<i>Bhaishaj Vyapad</i> (~adverse drug reactions). [32] <i>Kleda</i> (~viscosity). [33,34] <i>Oja</i> depletion.
10.	Opportunistic infections	Cytokine storm, drugs given in the treatment of COVID 19, high-grade fever, poor oral hygiene are the suggested mechanisms.	Post COVID-19 fungal and microbial infections. [35]	<i>Oja</i> depletion. <i>Kleda, Krimi</i> (~microbes). [36]

It is important to differentiate whether these clinical features can be attributed to convalescent phase of illness, have a post-viral immunologic footing, or are simply reflective of damage in tissues due to complications during COVID-19 illness.

Several *ayurvedic* articles discussing post-COVID illness are published, including proposed protocols and interventional studies. Table 2 discusses these publications. (Table 2)

Table 2: Previously published articles on post-COVID illness in *ayurved*.

S. No	Ayurvedic rationale	Type of article	Title
1	Correlated post COVID illness to <i>Jeerna jwara</i> , <i>Punaravartak jwara</i> , <i>Kshat ksheen</i> . Focusses on <i>ayurved</i> as first line therapy to prevent post-COVID complications. Dietetics, <i>dincharya</i> , <i>sadvritta</i> , <i>yoga</i> are emphasized upon. Use of <i>rasayana</i>	Proposed <i>ayurvedic</i> pathogenesis and line of approach	Potential of <i>ayurveda</i> in the prevention and management of post-COVID complications. [37]

	such as <i>Chyavanprash</i> , <i>Kushmand Avleha</i> , <i>Rasayan Churna</i> etc is advocated.		
2	Correlated post-COVID symptoms to state of <i>Dhatukshaya</i> and low metabolic fire. Postulates symptom-based treatment such as <i>Pachan</i> for fatigue; sudation and <i>nasya</i> for headache, <i>Agastya haritaki</i> for dyspnea, <i>shirodhara</i> for anxiety. Mentions use case of psychotherapy and management of insomnia.	Proposed <i>ayurvedic</i> pathogenesis and <i>yuktivyapashrya</i> and <i>sattva-avjaya</i> symptom-based treatments.	An ayurvedic approach to post-COVID symptoms. ^[38]
3	Describes COVID as <i>Vata Kapha</i> dominant <i>sannipata jwara</i> . Post-COVID correlated with <i>ojakshaya</i> , <i>vata-ridhhi</i> due to <i>dhatukshaya</i> and/or <i>avarana</i> . Advised use of <i>Ayush kwath</i> , <i>Chyavanpraash</i> , <i>Amalaki</i> , and <i>yoga</i> .	Proposed <i>ayurvedic</i> pathogenesis and line of treatment	Approach to <i>ayurved</i> in post COVID management. ^[39]
4	Classification of post-COVID illness on type of <i>srotas</i> involved. Interventional clinical study with two groups. Effect of <i>Dashmoolkatutryadi Kashaya</i> and <i>Guluchyadi kwath</i> seen. Possible anti-inflammatory effect suggested.	Clinical, prospective, interventional, comparative study.	The post-COVID19 long term surveillance study sequel to add on <i>ayurvedic</i> regimen. ^[40]
5	Interventional study on mucormycosis with statistically significant results of lower recurrence. No mortality in intervention group of <i>Panchtikta ghrita guggulu</i> with add on <i>Nishamalaki</i> , <i>Kaishore guggulu</i> , <i>Vasant kusumakar rasa</i> , <i>Shilajeet capsule</i> , <i>Triphla churna</i> , <i>Gandharvahastadi eranda</i> oil. Intervention was clubbed with amphotericin-B and given in intermediate or late presenting cases.	Clinical, prospective, interventional, controlled study.	Evaluation of efficacy and safety of adjuvant <i>ayurvedic</i> therapy in patients with severe post COVID mucormycosis. ^[41]
6	<i>Shadbindu nasya</i> , <i>Naradiya lakshmvilas rasa</i> , and acupuncture was given to a patient with post-COVID parosmia. Reduction observed in VAS for parosmia and improvement in Indian smell identification test for anosmia.	Case study	An integrative approach with <i>ayurved</i> and traditional Chinese: acupuncture in post-COVID parosmia: A case study. ^[42]

Ayurvedic measures for prevention of post-COVID symptoms.

- a. There is no clear-cut definition of COVID-19 recovery in WHO's living guidance for COVID-19 clinical management. Transmission-based precautions are discontinued and patients are released from the hospital on symptomatic grounds and followed up for the development of any long-term ill effects.^[43] *Ayurvedic* principles rely on the assessment of characteristics of *jwara mukti* to call a person free from *jwara*.^[44]
- b. In convalescent phase, a person should avoid the cause of *jwara* by practicing infection prevention

and control measures, refrain from over exertion of all kinds, bathing, intake of incompatible, unwholesome, heavy, and acidic food should also be avoided. It is because any indulgence in these contraindications during the state of *asanjata bala/daurbalya* easily aggravates the remnant *doshas*.^[45]

- c. Restoration of *bala* (~physical strength and replete physiological reserves) of the patient should be promoted through use of *yapana basti* and light and wholesome food.^[46]

d. Use of *Ojo vriddhikar/Balavardhak* medicines should be promoted to restore the lost physical and physiological strength.

e. Use of gold formulations containing *jeevaniya* and *bruhaniya* herbs is advocated for prompt repletion of lost vigor and vitality.^[47] *Swarna vasantmalti rasa* is one such preparation.

Treatment perspective of *ayurveda*. (Table 3)

Table 3. Ayurvedic therapeutics for post-COVID-19 illness.

S. No.	Clinical feature	Ayurvedic perspective	Ayurvedic therapeutics
1.	Fatigue	<i>Deenta, daurbalya, glani, gatra sada</i>	a. <i>Swarna vasant malti rasa</i> b. <i>BaladiYapana basti</i> . ^[48] c. <i>Drakshasava</i> . ^[49]
2.	Dyspnea in pulmonary fibrosis	<i>Shwasa</i> due to <i>marmopghata</i> or <i>urah shuskta</i> due to <i>shwasa</i> .	<i>Dashmooladi ghrita, Tryaushnadi ghrita</i> . ^[50]
3.	Olfactory dysfunction, gustatory dysfunction, diplopia, GBS	<i>Indriya santaapa, Chakshu vibhrama</i> due to <i>shira marmopghata, Shotha</i> due to <i>marmopghata</i> . <i>Indriya uptapa</i> - slight dysfunction. <i>Indriya upghata</i> - total loss (poor prognosis).	a. <i>Abhyanga, snehapana, trapan and shaman nasya/pratimarsh nasya</i> - eg. Anu taila. ^[51] b. <i>Guda ardraka</i> to relieve <i>shotha</i> that developed due to <i>marmopghata</i> . ^[52]
4.	Post viral myocarditis	Sequelae of <i>hridya mamropghata. Shotha</i> due to <i>marmopghata</i> . Common symptoms of <i>hridroga</i> are: ^[53] <ul style="list-style-type: none"> • <i>Vaivarnya</i> • <i>Murchha, pramoha</i> • <i>Jwara, kasa, shwasa, hikka</i> • <i>Trishna</i> • <i>Ruja</i> • <i>Kapha utklesha, chhardi, aruchi, aasya vairasya</i> ✓ <i>Vataja hridroga</i> predominantly has <i>stambha, toda and hrida drava</i> . ✓ <i>Pittaja hridroga</i> predominantly has <i>murchha, trishna, sweda, jwara</i> . ✓ <i>Kaphaja hridroga</i> predominantly has <i>guruta, praseka, tandra, kasa, staimitya</i> .	a. <i>Yogendra Rasa, Trinetra rasa, Hridyarnav rasa</i> . b. <i>Arjuna ksheer paka</i> mixed with <i>sharkara</i> . (In <i>pitta</i> predominance) ^[54] c. <i>Sarpiguda</i> . (In <i>pitta</i> predominance) ^[55] d. <i>Virechan</i> ^[56] e. <i>Pushkarmooladi churna</i> with <i>kshara, amla, sarpi</i> and <i>lavana</i> . (In <i>vata</i> predominance) ^[57] f. <i>Drakshadi churna</i> with cold water. (In <i>pitta</i> predominance) ^[58] g. <i>Guda ardraka</i> to relieve <i>shotha</i> that developed due to <i>marmopghata</i> .
5.	Thrombotic, thromboembolic and hemorrhagic events	a. <i>Rakta vitiation</i> due to <i>santaapa</i> . b. <i>Raktapitta</i> due to <i>jwara</i> .	a. <i>Yashtimadhu</i> and <i>katurohini</i> paste with <i>sitajala</i> . ^[59] b. <i>Durvadya ghrita</i> . ^[60] c. <i>Virechan, raktamokshana</i> . d. <i>Eladi gutika</i> . ^[61]
6.	Depressive mood and behavior, anxiety	<i>Mansika santaapa</i> in <i>jwara</i> . <i>Oja</i> imbalance	<i>Jeevaniya</i> drugs - <i>Shatavari, Ashwagandha, Jeevanti, Yashtimadhu</i> .
7.	Hyperglycemia	<i>Kleda, oja</i> imbalance.	a. <i>Shilajatwadi lauha</i> b. <i>Nishamalaki Katak, Musta, Parpata, Chirayata</i> .
8.	Opportunistic infection	<i>Oja</i> imbalance, <i>Kleda, Krimi</i> .	a. <i>Bilvadi gutika</i> (<i>Bilva, Sursa, Karanja, Nata, Devdaru, Triphala, Trikatu, Haridra, Daruharidra, Gomutra</i>) ^[62] b. <i>Mustadi kwath</i> ^[63] b. <i>Rasakarpoora</i> c. <i>Krimimudgar Rasa</i>

DISCUSSION

COVID-19 is essentially *sannipataja jwara* leading to *raktapitta, shwasa, shotha* and *marmopghata*. *Ojo-*

visransa, vyapat and *kshaya* are pathognomic of this disease condition. Imbalance of *tridoshas, sapta dhatus* and diminution of *ojas* leads to multiple complications.

Absence of fatigue referred as *klama* and *santapa* in *ayurved* is one of the characteristic clinical feature of *dwara mukti*^[64] *Santaapa* presented as *vaichitya*, *arati* and *glani* is largely due to diminution of *ojas*.^[65] It is mostly observed in the patients who have undergone overzealous treatment procedures or drugs during course of COVID treatment or in the patients who have not followed desired dietary and physical regimen during convalescence period. The patients who indulge in *chankramana*, *vyavaya* and *vyayama*; or eat *vidahi*, *guru*, *virrudha* and *asatmya* food, are at risk of relapse of the *dwara* in the form of *punaravartak dwara* due to aggravation of the remnant *dosha* in the body, decrease in *agni* and absence of *anna kamata*.^[66] Another natural progression is that *dhatu*s undergo *paka* (~ get catabolized excessively) which is manifested as *deenata*, *shvayathu*, *glani*, *panduta*, emergence of *kotha*, *pidika*, *kandu*.^[67]

Further *dwara* is mentioned as *nidanarthkar roga* (~predisposing factor) for *raktapitta*,^[68] *shwasa*.^[69] The *dwara* may subside or coexist with consequent diseases caused by it. In case it coexists with the consequent diseases the condition is known as *vyadhi sankarya*. This occurs either due to *prayog aparishudhta* (~ lack of wholesome and correct treatment) or *anyonya sambhavata* (~when diseases are risk factors for one another).^[70] *Vyadhi sankara* (~coexistence of *vyadhis*) is a complicated state designated as *krichhra tama* (~difficult to treat).

The *ayurvedic* rationale of the post COVID clinical manifestations listed in Table 1 can be explained in following ways:

- a. Dyspnea due to pulmonary fibrosis in post COVID-19 can be explained as *shwasa krichrata* (~dyspnea) due to *urah shushkta*^[71] as a result of *vataprakopa* and *kaphakshaya* due to *dhatupaka* and *doshaprakopa* of *sannipataja dwara*.
- b. Corresponding cardiac events due to ongoing cycle of inflammatory injury in cardiac and nerve tissues arising post infective viral myocarditis in COVID-19 can be explained as *shotha* and *marmopghata* consequent to aggravation of *nija doshas* leading to *shopha*.^[72] It is pertinent to mention that *dwara* itself is one of the causative factors of *shotha*.^[73] The *hridyopghata* (~cardiac injury) is manifested as *kasa*, *shwasa*, *kloma akarshana* (~mediastinal shift), *balakshaya*, *pralapa*, *apasmara*, *unmada*, *chittanaasha*.^[74] *Hridyopghata* may also develop due to *gada atichaar* (~adverse effect of treatments) in COVID illness giving rise to clinical features of cardiac injury.^[75]
- c. GBS reported in some people can be seen as sequelae of *shira marmopghata* which includes clinical features of *ardita*, *chakshu vibhrama*, *chesta naash*, *kasa*, *shwasa*, *spandana*, *vadana jimhatva*.^[76] Spectra of GBS, olfactory dysfunction, gustatory dysfunction, diplopia can occur both due to *indriya santaapa* and *shira marmopghata*.
- d. Persistent fatigue post COVID-19 can be seen as *daurbalya*. *Daurbalya/asanjaat bala* (~depleted strength), a symptom of convalescent phase of the illness *dwara*,^[77] is one of the seven complications of *shotha*.^[78] Simultaneous *ojo* depletion due to *dwara* hampers body's ability of reversal to pre morbid state. This *kriya sannirodha* due to improper *oja* accentuates *gatra sada*, *glani* and *tandra* in post infective period.^[79]
- e. The thrombotic, thromboembolic and hemorrhagic events in COVID-19 recovered patients may be due to *santaapa* due to vitiation of *rakta dhatu*.^[80] Infliction of the *rakta* due to *vata* and *pitta* makes it *askandi*^[81] promoting bleeding if *srotasa paka* (~vasculitis) has pre occurred at the stage of *sannipata dwara*.^[82] *Askandi rakta* prolongs the bleeding time in direct trauma as observed in the retrospective cohort mentioned above. Complication of bleeding can also be viewed as development of *raktapitta* post *dwara*.
 1. The potential factors of *rakta* vitiation in *dwara* are the daytime sleep after meals, binge eating in condition of low digestive fire. Increase in *bahala guna* of *kapha* vitiated *rakta* increases prothrombotic potential of *rakta*.
 - f. Psychological symptoms are reflective of the impact of *mansika dwara*. Social stigma, neglect and fear of a morbid or mortal outcome of the disease can also negatively impact psych of the people.
 - g. Hyperglycemia in COVID-19 treated patients may be explained as a *bhaishaja vyapad* due to indiscriminate corticosteroid use, IV infusions precipitating excess bodily *kleda* and inflammatory and post infective *ojo* imbalance.
 - h. Imbalanced *tridosha*, such as decreased normal functions of *vata* and increased functions of abnormal *pitta* and *kapha*, in a susceptible immuno compromised patient increase bodily *kleda*. *Vata* cannot carry out its normal function of *kleda shoshan*.^[83] Overtly expressed deranged *pitta* and *kapha* increase *kleda*, *updeha* and predispose to *kotha*.^[84] So, patients who are immuno compromised, do not maintain mucocutaneous hygiene and indulge in *mrijavarjan* are at increased risk for catching opportunist infections. Conditions that cause *shareer dhatu shaithilya*, increased *abaddha dhatu* and *vikrit dosha* acting as *mala*, *aama* promote microbial growth. In *janpadodhwansa*, environmental air is also impure. This impure air is unable to dry out the environmental *kleda*, which a *prakrit loka vayu* otherwise would.

Prevention strategies

1. Clinical staging of the disease and executing appropriate treatment strategies during COVID. This is essential to avoid both modest and overzealous treatments.
2. Appropriate dietary and physical regimen in COVID patients till stage of *prakritisthapan* is achieved.^[85]

3. Appropriate *sansarjan* and *rasayana* regimens post COVID. Restoration of physiological states of *dhatus* is necessary to facilitate *oja* and to prevent lodging of *doshas* and their further aggravation.
4. Appropriate *panchkarma* therapies post COVID.

Treatment strategies

1. Appropriate understanding and clinical staging of post COVID complications.
2. Assess status of *agni*, *bala*, *oja* imbalance, *dhatu saara* and psychological impact of disease. Look out for *arishtha* (~fatal signs).^[86]
3. Targeted therapies as described in Table 3.

Preventive measures, as listed above, should be propagated. Preexisting co-morbidities must be checked for and *dashvidha rogi pariksha* should be done to assess *atura bala* and *dosha bala* in order to assess prognosis and decide dosage of therapeutics. Treatment options as mentioned in Table 3 or their equivalents can be used after evaluation of *roga avastha*, *rogi* and *roga bala*, status of *prana*. Outcomes of this therapeutic regime can be evaluated through examination of characteristics of *vikaropshaman* reflective of *dhatuamyata*.

Yapana basti can be given in all the periods of time. It has immediate *bala* promoting effect and *rasayana* characteristics, and is said to be beneficial in *vata*, *pitta*, *sleshma*, *rakta* disorders.^[87] Vital organs have to be protected from ill effects of *vata* at all times, because imbalanced and aggravated *vata* poses significant danger to vitality and life if it hampers normal functioning of *trimarma*. *Basti* is the best treatment modality to control *vata*. Hence treatment through use of *basti* is of prime importance in disorders pertaining to *trimarma upghata*.^[88]

Nasya is administration of medications through nasal route and is preferred mode of drug administration in supra-clavicular disorders. It brings clarity and strength to all *indriya*. It also delays development of age-related degenerative changes in *shira*.

Virechan is done for treatment of vitiated *pitta* and *virechan* along with *raktamokshan* are done for treatment of vitiated *rakta*.

The *shaman* and *shodhan* measures mentioned above should be used after proper assessment of disease and diseased.

CONCLUSION

Post-COVID syndrome is an illness with a wide range of manifestations. The clinical picture widely befits the broad umbrella of post- or prolonged *Jwara* sequelae. Underlying process of delayed recovery, continuous inflammation, altered coagulation, and profibrotic mechanisms are common culprits. These pathologies have a notorious history of becoming chronic

autoinflammatory, autoimmune diseases. Multiple viral illnesses are known triggers for such inflammatory disorders. Therefore, it is essential to prevent and manage all *updrava*, *vyadhi sankara*, remnant *doshas*, *ojakshaya*, secondary complication of *shwasa*, opportunistic infections, and the diseases of vital organs through timely assessment of *rogi-roga avastha* and *bala* and administering preventive and/or curative treatments. Improper and incomplete management of such illnesses can lead to chronic debility due to several secondary diseases of varying morbidity and mortality. *Ayurvedic* principles are wholesome and their careful application can rid mankind of the burden of several illnesses, including novel diseases of the post-COVID spectrum.

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