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Management of COVID-19 patients of CT Severity 15/25 and above with Ayurveda drugs as add-on therapy – A Case Series

Case Report

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Abstract

Ayurveda, which is the oldest life science in the world, has yet to be fully accepted as the only or even an additional therapy for severe diseases. It is a common perception that Ayurveda has a significant role in the preventive aspect of diseases, and the drugs of Ayurveda are more effective in chronic ailments. Most publications are also limited to these areas only, as use of Ayurveda in acute or severe cases is not yet justified scientifically because of the lack of significant scientific clinical data as very few case reports are published about the use of Ayurveda in acute cases. Here we present a case series of treatment of five COVID-19 patients with CT Severity 15/25 and above with Ayurveda drugs as add-on therapy admitted to tertiary care, a Level-3 COVID-19 treatment hospital. These five patients sought Ayurveda opinion and consented to Ayurveda treatment along with the ongoing treatment regime. All the patients showed improvement with Ayurveda treatment as an add-on therapy, and none of the patients needed ICU, and all patients were discharged when they started maintaining oxygen saturation at room air. This report addresses the clinical effectiveness of Ayurveda drugs as add-on therapy in severe cases of COVID -19. It also attempts to invite the attention of researchers towards the use of Ayurveda concepts and drugs in severe or acute cases of diseases.

Keywords: *Ayurveda, Jwara, Chikitsa*.

Introduction

Ayurveda is one of the oldest life sciences which has survived a long spell of the history of humanity because of its keen observation-based and time-tested concepts. In the literature of Ayurveda, there is an elaborated description of etiology, pathogenesis, symptoms, and treatment of various diseases, both acute and chronic diseases, in various ways, whether they are known or novel. In the present era, Ayurveda is preferred for treating chronic ailments, where contemporary biomedical science has a limited role or diseases for which no definite treatment is available. COVID-19 is an ongoing pandemic that has resulted in over 770 million confirmed cases with over 6.95 million deaths worldwide, as reported on 30 August 2023.(1) Disease with such tremendous severity has tested the potential of the medical system developed so far and forced the world to try all existing options to counter the disease. In these circumstances, all country's traditional medicine also got the opportunity to test their efficacy in managing the disease.

Therefore, the pandemic of COVID- 19, in which many drugs are tried, had given the opportunity to test the potentials of Ayurveda in treating the diseases. In India, the use of Ayurveda medicine as standalone intervention was limited to mild cases only as per protocol issued by the Ministry of AYUSH for managing COVID-19 in which Ayurveda management was recommended to be as Add on to the present contemporary line of management.(2) However, conceptual papers based on the classical literature recommend using Ayurveda medicines even in severe COVID-19 cases. The use of Ayurveda in acute or severe cases is not yet justified scientifically because of the sparse significant scientific clinical data. However, the published case reports in many diseases(3–7), including COVID -19(8–17) are encouraging and demand clinical trials to explore its significance in the diseases, which may open newer vistas to understand human physiology, pathology, and treatment of diseases as described in the ancient literature of Ayurveda.

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Ayurveda perspective

As discussed in the article by *Adluri USP & Tripathi AK* 2020 (18), based on pathophysiology, COVID-19 should be taken as *nija jwara* and *Oupasargika jwara* from Ayurveda perspective. The sign and symptoms of COVID-19 mostly correlate with *vataj* or sometimes *vata kapha jwara*, usually in *sama avastha*. It is the *Ama* which may provoke *pitta* and *kapha,* making the *jwara* a *vatolbana sannipata* in the more advanced stages. Depending upon signs, symptoms, and severity, the disease can be diagnosed and categorised into various *sama* or *nirama avastha* of the different types of *jwara* viz. *vata, kapha, pitta, dwandaja* with its subtypes or *sannipataj* with its subtypes. After the diagnosis, the treatment protocol of the patient may be decided ideally consisting of the following interventions as discussed in the article by *Adluri USP & Tripathi AK 2020*(18)–

Dietary management

Dietary management of the *jwara* is the most important but at the same time is the most neglected part of the management of the *jwara* specially in the IPDs, in fact, high protein and fat rich diet are advised, which is against the protocol of Ayurveda. Based on appetite, the *amavastha* of *jwara* can be assessed and can be categorised and managed as described in the above said article.

Medication

The medicine should be advised according to the category of the patient as described in the above said article which may be summarised as follows in Table A.

Table A - Summary of Covid -19 category and its ayurveda correlate and medicine

S.no	Category of COVID	Symptoms	Ayurveda correlate	Medicine
1	Mild illness	Rhinitis, sore throat, bronchitis & do not have shortness of breath, dyspnoea, or abnormal chest imaging.	Patient may be assessed for *vata jwara, pitta or kapha jwara*. *sama and nirama avastha* may be assessed	*Sudarshan churna kalpas*, *Tribhuvankirti,* etc. Drug according doshas dominance as described in the above said article.
2	Mild illness/ moderate pneumonia	Evidence of lower respiratory disease during clinical assessment or imaging and who have an oxygen saturation (SpO_2) ≥94% on room air at sea level.	Same as above with *doshas* in *pravridhha avastha*	Same as above with medicine in maximum dose.
3	Severe illness / Severe	Resp. rate>24/min Sp02<90% on room air)	*Vatolbana Sannipataj jwara*	*Dasamula katutrayadi Kasayam*, if *Swasa*(SOB), Kasa(Cough) dominant or *Santata Jwara Kasayam*, (*kalingaka, patolapatra katurohini*) If fever is Dominant, then *Sudarsana Churna kalpas*. *Amritarishtam / Vasakasavam* (if *Pittanubanda*). *Tribhuvana kirti* (if fever dominant) (up to 500 mg/day) alternatively *Sanjeevani vati* or *Swasa kuthar rasa*.
4	ARDS/ Critical illness	(severe respiratory distress Pa02/ Fio2<200) (Spo2/ Fio2<315)	Mostly Vatolbana Sannipata (sometimes *Vata Kapholbana Sannipata*) with *Pravruddha Swasa* or predominance of dyspnoea due to *Saama Rasa, Rakta Dhatu* with increased *Picchila Guna* (adhesiveness) of *Ama* leading to *Srotorodha* (Obstruction) due to micro & macro vascular thrombosis.	*Dasamula Katutrayadi kasayam*; *Sudarsana Churna Phantam*; Any One of the following in each section based on patient's condition: *Dasamularishtam* (if dry cough) or *Vasakasavam* (if hemoptysis/purulent sputum) or *kanakasavam* (copious sputum); *Tribhuvana kirti* (upto 500 mg/day) alternatively *Sanjeevani vati* or Swasakuthara ras (Anyone of the following); Rasasindoor with anupana of pippali *churna* 1-3gms or *sitopaladi churna* 3-5 gms (*Vata Pradhana*); *Samira Pannaga ras* (*Vata Kapha Pradhana*)/ *Mallachandrodaya* or *Mallasindoora, Hiranya Garbha Potali* if *Kapha* dominant

Apart from above understanding, other conditions must be taken in consideration which can summarised as follows –

Patients with *jirna jwara* (chronic fever.i.e. more than 10-12 days of fever) , if there is no symptoms of *ama* and *agni* is good, *jayamanagal rasa,* and other

swarna preparations like *suvarna vasant malti,* may be added. Elderly patients with comorbidities like hypertension, diabetes mellitus, COPD, etc. – any one or two medicines like - *Abharak bhasma, Swaskas Chintamani rasa, Naradiya Lakshmi vilas rasa*, etc depending on the condition of the patients may be added.

The selection of medicine is subjected to many factors as *dosha pratyanika (targeted to treat dosha), vyadhi pratyanika (targeted to treat symptoms)*, *mukhyadravya visheshatvam (active ingredient based),* etc. (for detail refer to point no .12 of the article *Adluri USP & Tripathi AK* 2020 (18))

Considering these understanding, we here present a case series of 5 patients of COVID-19 with CT Severity 15/25 and above, treated with Ayurveda medicines as add-on therapy admitted to the third floor, Trauma Centre, Banaras Hindu University, Varanasi, India, a Level -3 facility hospital. There were 127 patients admitted on this hospital floor between 24th April 2021 to 19th May 2021, out of which 64 (50.39 %) patients needed ICU and were shifted for the same. Out of the remaining 63 patients treated on this floor, there were 15 (23.80 %) mortality.

The following five patients sought Ayurveda opinion and consented to Ayurveda treatment along with the ongoing treatment regime.

All the cases were advised to take light and easily digestible food as strict control over diet was not possible as per Ayurveda protocol in the hospital setup.

Case 1

A 58-year female from Varanasi was a known case of diabetes mellitus type 2 and hypertension, got the first symptom of sore throat, running nose, mild grade fever, on 13th April, 2021 due to which she started treatment on 17th April, 2021 in consultation to a doctor and had taken azithromycin (AZ), Doxycycline (DX), Ivermectin (IVM), Methyl Prednisolone (MP), Sinarest, Montec LC, Vit.C, Calcium with Vit.D3 and paracetamol. She continued the treatment until 24th April 2021, but her symptom gradually worsened.

She sought opinion in Ayurveda on 24th April, 2021; she was diagnosed with *Swasa Pradhana vatolavan sannipataj jawra* and was advised with *Swaskasa Chintamani ras* (125mg/tab)1 tab twice daily and *Mahasudarshan ghan vati* (250 mg/tablet) 3 tablet four times daily meanwhile her oxygen saturation started dipping below 92% , therefore she was admitted in the trauma centre with the chief complaint of dyspnoea, severe weakness, chest pain, fever, and inability to maintain oxygen saturation on 25th April, 2021. Her oxygen saturation (Spo2) at the time of admission was 90% and her inflammatory markers were also raised. After hospitalization, the COVID-19 protocol drugs were started. She started taking Ayurveda drugs along with the medications given in the hospital. After eight doses of the Ayurveda drugs, the patient started feeling better as her chest pain and fever subsided and her inflammatory markers were also settled by 29.04.2021. She was discharged from the hospital on 01-05-2021. She continued only Ayurveda treatment until 14.05.2021. After that, she was advised with *Amritaristha* 15ml twice a day with equal amount of water, which she continued until 05.06.2021 till she was free from all symptoms and stopped all medications related to COVID-19.

Table No. 1 – Showing levels of parameters of the Case no. - 1

Date	*25-04-2021	26-04-2021	27-04-2021	28-04-2021	29-04-2021	30-04-2021	01-05-2021
Oxygen_saturation_Morning (Oxygen flow/min)		99 FM (13L)	98 FM (10L)	99 FM (10L)	99 FM (6L)	97 RA	94 RA
Oxygen_saturation_Evening (Oxygen flow/min)	99 FM (13L)	91 FM (13L)	96 FM (10L)	99 FM (8 L)	93 RA	94 RA	96 RA
CT_severity _score		15/25					
Haemoglobin -Hb (gm/dl)	13.5				12.4		
Total white blood cell count (x 10^3/ mm^3)	11.0				13.1		
Neutrophils (%)	78				91		
Leucocytes (%)	20				5		
Monocytes (%)	2				2		
Platelets (Lac/mm^3)	241				358		
Serum Glutamic Oxaloacetic Transaminase-(SGOT) (IU/L)	28				28		
Serum Glutamic Pyruvic Transaminase - (SGPT) (IU/L)	34				34		
Alkaline phosphatase (IU/L)	89.9				212		
Total Bilirubin (mg/dl)	0.58				0.3		
Direct Bilirubin (mg/dl)	0.22				0.1		
Creatinine (mg/dl)	1.14				0.76		
Urea (mg/dl)	23.6				28.6		
Sodium (Na^+)(mmol/l)	133.4				142		
Potassium (K^+)(mmol/l)	4.14				4		
Date	**25-04-2021**				**29-04-2021**		

D-dimer (ng/dl)	276.3				0.26		
C- Reactice Protein (CRP) (mg/L)	111.48				26.7		
Ferritin (ng/ml)	147.91				395.6		
RT-PCR	POSITIVE -26.04.2021				NEGATIVE – 13.5.2021		

Case 2

A 67-year male known case of diabetes mellitus, hypertension, and left ventricular systolic dysfunction with LVEF 45%, belonging to the rural area of Jaunpur district, Uttar Pradesh, had his first symptom of fever on 16th April 2021. He consulted a local doctor where he was started with treatment that he continued till 26th April 2021. The patient gradually developed dyspnoea, cough, fever, severe weakness, and he could not maintain oxygen saturation, which fell to 80%.

He was admitted to the hospital on 27th April 2021 with the chief complaint of chest congestion, cough, and weakness. Despite treatment at the hospital, the patient felt no relief in the symptoms, and his oxygen saturation also deteriorated. In these circumstances, his son enquired about Ayurveda's opinion and consented to start Ayurveda medicine. The patient was diagnosed with *Swasa Pradhana vatolavan sannipataj jawra* and he was advised with following drugs –

1. Drug mixture (DM -2. a) of *Swarna Bhasma* 20mg, *Shastraputi Abharaka* 180mg, *Sadharana Abharak* 250mg, *Rasa Sindhoor* 10mg, *Yastimadhu* 2.5gm, *Sitopaladhi churna* 1.5gm per day in six divided doses given 4 hrly with lukewarm water.
2. Tab. *Dashmoolakatutrya Kashaya* 2 tablets (250mg / tablet) twice a day
3. Tab. *Mahasudarshan ghan vati* 3 tablet (250 mg/ tablet) thrice a day
4. *Amritaristham* 20 ml twice a day with equal amount of water

The patient started taking the Ayurveda drugs along with the treatment given at the hospital on 30th April 2021 and after taking three doses patient noticed relief in symptoms of chest congestion, cough, and weakness along with these, marked improvement was observed in oxygen saturation which was deteriorating before. However, the inflammatory markers were elevated even there was symptomatic relief.

The patient was discharged from the hospital on 13th May 2021. The drugs mixture DM- 2.a was continued till 14th May 2021in the same dose then the dose was reduced to half for 10 days. From 24th May 2021 onwards following drug was advised.

1. *Swaskas Chintamani ras* 1 tablet twice a day and
2. Drug mixture (DM-2. b) consisting of *Sitopaladhi churna* 700mg, *Trikatu* 700mg, and *Sadharan Abharak* 400mg per day in three divided doses given 8 hrly with lukewarm water.

The above drug was continued till 10th June 2021 and after that only DM-2. b was continued for 10 days. The patient felt improvement in all symptoms and recovered without need of ICU.

Table 2: Showing levels of parameters of the Case 2

Date	Oxygen_saturation_Morning (Oxygen flow/ min)	Oxygen_saturation_Evening (Oxygen flow/min)	CT_ severity_score
27/04/21		85 RA	16/25
28/04/21	98 FM (13L)	99 FM (13L)	
29/04/21	92 RB (13L)	99 RB (13L)	
*30-04-2021	89 RB (13L)	95 RB (15L)	
01/05/21	92 FM (15L)	92 FM (15L)	
02/05/21	99 RB (15L)	96 FM (10L)	
03/05/21	93 FM (10L)	92 FM (15L)	
04/05/21	92 FM (6L)	98 FM (12L)	
05/05/21	94 RA	99 FM (6L)	
06/05/21	92 RA	96 FM (2L)	
07/05/21	92 RA	93 RA	
08/05/21	90 RA	97 FM (2L)	
09/05/21	97 FM (2L)	93 FM (6L)	
10/05/21	99 FM (6L)	93 RA	
11/05/21	97 FM (3L)	95 RA	
12/05/21	98 RA	94 RA	
13/05/21	93 RA		

Date	28/04/21	02/05/21	07/05/21	10/05/21	02/05/21
Haemoglobin -Hb (gm/dl)	13.5	12.2	14.5	12.7	12.2
Total white blood cell count (x 10^3/mm^3)	11.6	15.23	12.03	10.54	15.23
Neutrophils (%)	77.5	90	89.7	81	90
Leucocytes (%)	10.7	6	5.5	10	6
Monocytes (%)		4	4.5	8.6	4
Platelets (Lac/mm^3)	398	253	299	270	253
Serum Glutamic Oxaloacetic Transaminase-(SGOT) (IU/L)	45	44	26	14	44
Serum Glutamic Pyruvic Transaminase - (SGPT) (IU/ L)	56	66	27	17	66
Alkaline phosphatase (IU/L)	190	128		108	128
Total Bilirubin (mg/dl)	1.3	0.3	0.4	0.3	0.3
Direct Bilirubin (mg/dl)	0.3	0.1	0.2	0.2	0.1
Creatinine (mg/dl)	1.16	0.9	1	1	0.9
Urea (mg/dl)	46	44	37	37	44
Sodium (Na^+)(mmol/l)	139	141	130.5	132.8	141
Potassium (K^+)(mmol/l)	4.6	4.4	4.9	4.5	4.4

Date	28/04/21	04/05/21	08/05/21
D-dimer (ng/dl)	230	530	613
C- Reactive Protein (CRP) (mg/L)	16.7	49	8.17
Ferritin (ng/ml)	276.1	392	134.7
Interleukin -6 (pg/ml)		126.9	31.8
RT-PCR	22-05-2021 - negative		

Case 3

A 55-year male from a rural village of kaimur district, Bihar, India, with no previous co-morbidity had fever and cough on 22nd April 2021 for which he took treatment from the local doctor. The fever subsided on 25th April 2021, but his cough remained, for which he continued the medication. The patient developed breathlessness on 28th April 2021 which aggravated on 30th April 2021, and his oxygen saturation dipped to 85. He was admitted to the local hospital for treatment, but his breathlessness worsened, due to which he was referred to tertiary centre and was admitted in Trauma centre on 3rd May 2021. During admission, his oxygen saturation was 79%, and his general condition was average. His treatment was started as per the standard protocol of the hospital, but during stay at the hospital, his general condition was not improving, and his appetite was markedly reduced. His oxygen saturation was also deteriorating at room air; according to the patient, the lowest recorded oxygen saturation was 62%, but his saturation was within normal limits with oxygen. On 05-05-2021 the patient sought Ayurveda's opinion and started Ayurveda treatment along with the hospital's treatment. The patient was diagnosed with *Swasa Pradhana vatolavan sannipataj jawra* and he was advised with following medications.

1. Drug mixture (DM-3. a) consisting of *Shanshamani vati* 5 gram, *Swarna Bhasma* 30mg, *Shastraputi Abharak* 350mg, *Sadharan Abharak* 150mg per day in 6 divided doses, 4 hrly with lukewarm water.
2. Tab. *Swaskas Chintamani Rasa* 1 tablet (125mg) thrice / day with lukewarm water.
3. *Mahasudarshan ghan vati* 3 tablet thrice/ day.

After taking four doses of the above drug patient felt mild relief in breathlessness and his appetite was improved. Gradual improvement in the general condition as well as in the oxygen saturation was observed. The treatment was continued till 13-05-2021 in same dose after this the dose was modified as follows and the patient was advised to continue for 10 days.

1. Drug mixture (DM-3. b) consisting of *Shanshamani vati* 2.5 gram, *Swarna Bhasma* 15mg, *Shastraputi Abharak* 175mg, *Sadharan Abharak* 75 mg per day in 3 divided doses 8 hrly with lukewarm water.
2. Tab. *Swaskas Chintamani Rasa* 1 tablet (125mg) twice / day with lukewarm water. The patient was discharged on 20-05-2021, and his recovery was uneventful without the need of ICU.

Table 3: Showing levels of parameters of the Case 3

Date	Oxygen_saturation_ Morning (Oxygen flow/min)	Oxygen_saturation_Evening (Oxygen flow/ min)	CT_ severity_ score
03/05/21	92 RB (11L)	91 RB (14L)	16/25
04/05/21	94 RB (10L)	94 RB (10L)	
***05-05-2021**	93 RB (12L)	91 RB (15L)	
06/05/21	90 RB (12L)	94 RB (14 L)	
07/05/21	95 RB (14L)	94 RB (10L)	
08/05/21	96 RB (5L)	98 RB (5L)	
09/05/21	95 FM (8L)	95 FM (12L)	
10/05/21	92 FM (8L)	95 FM (5L)	
11/05/21	97 FM (5L)	94 FM (6L)	
12/05/21	94 FM (6L)	94 FM (8L)	
13/05/21	98 FM (2L)	98 FM (2L)	
14/05/21	99 FM (2L)	98 FM (2L)	
15/05/21	94 FM (2L)	98 FM (2L)	
16/05/21	91 (RA)	93 (RA)	
17/05/21	92 (RA)	93(RA)	
18/05/21	93 (RA)	94(RA)	
19/05/21	94 (RA)	96 (RA)	
20/05/21	98 (RA)		

Date	04-05-2021	08-05-2021	12-05-2021	15-05-2021
Haemoglobin -Hb (gm/dl)	11.4	12.3	12.1	10.9
Total white blood cell count (x 10^3/mm^3)	8.6	12.79	3.96	5.72
Neutrophils (%)	90	93	88	87
Leucocytes (%)	6	3	6.6	6.8
Monocytes (%)	3	3.5	4.7	0.9
Platelets (Lac/mm^3)	90	117	155	151
Serum Glutamic Oxaloacetic Transaminase-(SGOT) (IU/L)	58	25	13	20
Serum Glutamic Pyruvic Transaminase - (SGPT) (IU/L)	26	42	33	34
Alkaline phosphatase (IU/L)	166	140	140	112
Total Bilirubin (mg/dl)	0.9	0.4	0.6	0.6
Direct Bilirubin (mg/dl)	0.5	0.2	0.2	0.2
Creatinine (mg/dl)	1	0.9	0.7	0.5
Urea (mg/dl)	57	54	60	29

	Date	
Parameter	**06-05-2021**	**13-05-2021**
D-dimer (ng/dl)	891.8	598
C-Reactive Protein(mg/L)	26.67	47.6
Ferritin (ng/ml)	167.2	288.5
Interleukin-6 (pg/ml)	61.8	89.7
RT-PCR	Positive - 3rd May 2021	Negative – 17th May 2021

Case 4

A female age 64 yrs from Varanasi, Uttar Pradesh, with no previous co-morbidity, developed fever on 3rd May 2021, for which she took tablet paracetamol 500 mg, the fever subsided, but on the next day she developed a sore throat, loss of smell and taste with fever. On 5th May 2021 she had a high-grade fever with severe body pain, for which she again took paracetamol 500 mg. On 6th May, the patient developed cough and cold along with fever for which she consulted a local doctor who advised her blood test and some drugs, but there was no relief in the symptom of the patient; the symptoms worsened, and the patient developed breathlessness with oxygen saturation reaching 82 % on 9th May 2021. The patient was referred to the higher *centre* on 10th May 2021 due to which the patient was admitted to the hospital with the chief complaint of fever, headache, body ache,

breathlessness, and cough with poor general condition. The patient son sought Ayurveda opinion on 10th may 2021, and she was diagnosed with *Swasa Pradhana vatolavan sannipataj jawra* and she was started with following drugs on 11th May 2021 –

1. *Mahasudarshan Ghan vati* 3tab TDS(250mg/tablet)
2. *Shamshamnai vati* 2-tab BD (250mg each)
3. *Sanjeevani vati* 1 tab OD (150mg each)

Patient's fever and pain start subsiding on 13th May 2021 and her appetite also improved, but the oxygen saturation on RA continued to dip below 60%.

On 13th May her drug was revised as follows –

1. Drug mixture (DM-4. a) consisting of – *Shamshamani vati* 2.5gm, *Yastimadhu* 2.5gm, *Shastraputi abharak* 300mg, *Swarna Bhasma* 30mg per day in 6 divided doses 4 hrly with lukewarm water.
2. *Swaskas Chintamani ras* 1 tablet (125mg) twice a day
3. *Mahasudarshan ghanvati* 3 tablet (250mg/tablet) thrice a day

After taking eight doses of drugs, the general condition of the patient was improved. Her appetite and weakness were reduced, and her chest heaviness, along with oxygen saturation on room air, started improving.

The patient was discharged on 25th May 2021 without the need of ICU, and she continued the same drug till 25th May 2021, and the dose was modified as following

1. Drug mixture (DM -4. b) consisting of – *Shamshamnai vati* 2.5gm, *Yastimadhu* 2.5gm, *Shastraputi abharak* 300mg, *Swarna Bhasma* 30mg per day in 3 divided doses 8 hrly with lukewarm water.
2. *Swaskas Chintamani ras* 1 tablet (125mg) twice a day.

All drugs were stopped on 3rd June 2021, and the patient was free from most of the symptoms.

Table 4: Showing levels of parameters of the Case 4

Date	Oxygen_saturation_Morning (Oxygen flow/min)	Oxygen_saturation_Evening (Oxygen flow/min)	CT_severity_score
*10-05-2021		93 FM (4L)	22/25
11/05/21	93 FM (7L)	97 RB (12L)	
12/05/21	96 RB (12L)	94 RB (15L)	
13/05/21	95 RB (15L)	93 RB (15L)	
14/05/21	92 RB (14L)	96 RB (14L)	
15/05/21	91 RB (15L)	99 RB (12L)	
16/05/21	95 RB (12L)	95 RB (10L)	
17/05/21	94 RB (15L)	93 RB (15L)	
18/05/21	94 RB (15L)	92 RB (15L)	
19/05/21	90 RB (15L)	96 RB (14L)	
20/05/21	95 RB (14L)	95 RB (8L)	
21/05/21	96 FM (3L)	98 FM (2L)	
22/05/21	92 FM (5L)	99 FM (2L)	
23/05/21	99 FM (5L)	99 FM (2L)	
24/05/21	94 RA	98 RA	
25/05/21	95 RA		

Date	*10-05-2021	13/05/21	16/05/21	18/05/21	21/05/21	24/05/21
Haemoglobin -Hb (gm/dl)	8.1	9	9	9.3	8.6	8.6
Total white blood cell count (x 10^3/mm^3)	18.1	15.9	18.75	17.43	17.59	12.95
Neutrophils (%)	90	91.2	94	95	93.4	78.5
Leucocytes (%)	5	5	2.6	2.2	2.3	13.5
Monocytes (%)	4.5	3.5	3.1	2.5	4.2	6.9
Platelets (Lac/mm^3)	272	423	355	376	261	190
Serum Glutamic Oxaloacetic Transaminase-(SGOT) (IU/L)	44		29	10	15	16
Serum Glutamic Pyruvic Transaminase - (SGPT) (IU/L)	36		38	25	20	18
Alkaline phosphatase (IU/L)	304		204	201	150	148
Total Bilirubin (mg/dl)	0.3	0.3	0.4	0.4	0.6	1.4
Direct Bilirubin (mg/dl)	0.2	0.1	0.2	0.2	0.3	0.5
Creatinine (mg/dl)	1.3	1.1	1	1	1.1	1
Urea (mg/dl)	48	62	48	59	69	46
Sodium (Na^+)(mmol/l)	128.7	132.3	125.4	131.9	132.8	134
Potassium (K^+)(mmol/l)	5.3	4.6	4.9	4.5	4.1	4.5
Date		11/05/21	13/05/21	16/05/21	21/05/21	
D-dimer (ng/dl)		534.6			511.57	
C- Reactive Protein (CRP) (mg/L)		67.8	45.7	35.7	14.57	
Ferritin (ng/ml)		312.9			62.67	
Interleukin-6 (pg/ml)		104.8			25.46	
RT-PCR	13-05-21- positive	20-05-2021 - Negative				

Case 5

A 55-year female from rural area of Mau district, Uttar Pradesh was admitted in the hospital on 12th May 2021 with chief complaint of breathlessness, loss of appetite, severe weakness and poor general condition. The patient had mild fever and malaise as the first symptom on 1st May, and on 3rd May she had fever with gastric upset and vomiting, for which she took treatment from the local doctor, but there was no relief in the symptoms. The patient gradually developed breathlessness, cough, and severe weakness. She was tested positive for COVID -19 on 10th May 2021, and her oxygen saturation fell to 70%; in these circumstances, she was referred to a higher centre by the PHC.

The patient's husband sought an Ayurveda opinion and consented to start Ayurveda treatment on 13th May 2021. The patient was diagnosed with *Swasa Pradhana vatolavan sannipataj jawra* and she was advised following drugs –

1. Drug Mixture (DM-5. a) consisting of *Yastimadhu churna* 2.5gm, *Shamshamani vati* 2.5gm *Shastraputi*

abharak 300mg, *Swarna Bhasma* 30mg, *Sadharana abharak* 300mg per day in 6 divided doses given 4hrly
2. *Swaskas Chintamani ras*a 1 tablet (125mg) thrice a day
3. Tab *Mahasudarshan ghan vati* 3 tablet (250mg / tablet) thrice a day

After taking drugs for two days, the patient's general condition started improving. She felt improvement in most of her symptoms like breathlessness, gastric symptoms, appetite, etc. and oxygen saturation was also improved to 85% on room air. The patient continued the treatment in the same dose till 25th May 2021; after this the drug were modified as below –

1. Drug Mixture (DM- 5.b) consisting of *Sitopaladhi churna* 750mg, *Trikatu churna* 750 mg Shastraputi *abharak* 200mg, *Sadharana abharak* 200mg per day in 3 divided doses given 8 hrly.
2. *Swaskas Chintamani ras* 1 tablet (125mg) twice a day.

The inflammatory markers were raised which gradually settled in in 9 days, but her D-dimer remained elevated for which she was observed in for three more days for any symptoms, but she was maintaining saturation at Room Air (RA).

The patient was discharged from the hospital on 29th May 2021 without the need for ICU. The above drug was continued for 15 days and then stopped on 10th June 2021 and patient was free from most of the symptoms.

Table 5: Showing levels of parameters of the Case 5

Date	Oxygen_saturation_Morning (Oxygen flow/ min)	Oxygen_saturation_Evening (Oxygen flow/ min)	CT_severity_score
12/05/21		92 RB (15L)	18/25
*13-05-2021	94 RB (15L)	92 RB (15L)	
14/05/21	91 RB (12L)	94 RB (9L)	
15/05/21	90 RB (8L)	97 RB (12L)	
16/05/21	96 RB (12L)	93 RB (8L)	
17/05/21	90 RB (8L)	93 RB (12L)	
18/05/21	96 RB (8L)	94 RB (12L)	
19/05/21	98 RB (8L)	95 RB (5L)	
20/05/21	93 FM (6L)	96 FM (5L)	
21/05/21	97 FM (4L)	97 (2L)	
22/05/21	97 FM (2L)	98 FM (4L)	
23/05/21	96 FM (2L)	97 FM (2L)	
24/05/21	97 FM (2L)	98 FM (5L)	
25/05/21	94 RA	99 FM (2L)	
26/05/21	97 FM (2L)	94 RA	
27/05/21	95 RA	93 RA	
28/05/21	96 RA	94 RA	
29/05/21	95 RA		

Date	*13-05-2021	15/05/21	19/05/21	21/05/21	24/05/21	27/05/21
Haemoglobin -Hb (gm/dl)	11.5	10.9	11.6	10.3	11	11.4
Total white blood cell count (x 10^3/mm^3)	7.09	11.38	10.97	11.02	8.3	8.66
Neutrophils (%)	84.4	87.2	81.9	70.6	62.8	62.5
Leucocytes (%)	11	8	12.7	19	28	28.4
Monocytes (%)	4	4.3	5	9.3	7.4	7.2
Platelets (Lac/mm^3)	535	368	220	184	181	202
Serum Glutamic Oxaloacetic Transaminase- (SGOT) (IU/L)	22	20	14	19	18	12
Serum Glutamic Pyruvic Transaminase - (SGPT) (IU/L)	21	21	19	14	16	18
Alkaline phosphatase (IU/L)	154	154	171	145	151	164
Total Bilirubin (mg/ dl)	0.4	0.3	0.3	0.2	0.3	0.5
Direct Bilirubin (mg/ dl)	0.2	0.2	0.2	0.1	0.1	0.2
Creatinine (mg/dl)	0.7	0.6	0.7	0.8	0.7	0.6
Urea (mg/dl)	46	36	31	19	12	17
Sodium (Na^+)(mmol/ l)	134	136.9	138.6	137.3	140.9	142.6
Potassium (K^+) (mmol/l)	5	4.1	4.2	3.2	3.6	3.8
Date		13/05/21	20/05/21	21/05/21		
D-dimer (ng/dl)		376.4	>10000	>10000		
C- Reactive Protein (CRP) (mg/L)		86.3		7.52		
Ferritin (ng/ml)		481.6	172.15	131.16		
Interleukin-6 (pg/ml)		113.8	5.04	7.97		
RT- PCR	Positive –25-05-2021			Negative - NA		

Discussion

Ayurveda correlates of the different stages of COVID-19 is summarised in the table A and it is evident from the cases described above that all are in the stage of severe illness, therefore all the cases were diagnosed as *swas pradhan vatolavan sannipataj jwara* with *jwara* in *jirna jwara* category.

The dietary management as per Ayurveda protocol was not strictly followed in the patients; however, they were advised to take light and easily digestible foods.

As far as medicinal management is concerned, there are 18 approaches for the treatment of the patients as described in the literature of Ayurveda(19) but in general, out of eighteen, three approaches are most common as described below –

1. *Vyadhiviprit chikitsa* – this can be correlated with symptomatic treatment in which prime focus is to treat the main symptom concerning the patient. In severe or acute cases *vyadhiviparit chikitsa* is the prime mode of approach, and with relief, in symptoms, the approach is shifted to *hetuviparit chikitsa*.

2. *Hetuviprit chikitsa* – this treatment approach focuses mainly on treating the pathogenesis or root cause of the disease, but it may not be able to subside the symptoms as quickly as Vyadhiviparit *chikitsa*.
3. *Hetu vyadhi viparit chikitsa* – this approach addresses both symptoms and pathogenesis of the disease. This approach is possible after a complete understanding of the disease.

Since, Covid 19 is a novel disease and is an emergency condition, therefore the *Vyadhiviprit chikitsa* approach was emphasised than *Hetuviparit chikitsa*. Based on this approach following drugs were chosen as per the patient's symptoms, co-morbidity, age, the severity of disease, and availability of drugs out of all the drugs discussed in the article by Adluri USP & Tripathi AK 2020 (18)

1. ***Mahasudarshan ghanvati/ churna*** is one of the multiherbal formulation indicated in all types *jwar* irrespective of the nature of *jwar* as described in Ayurveda. Since the major ingredient is *chirayata (swertia chirayita)* which is *tikta rasa* and hence *aampachak, jwaraghna* and *pitta-kapha shamak* also by virtue of its other contents, it is *tridoshashamak*. Therefore, it is indicated in all type of jwar even the diagnosis is not precise. In light of this literature *Mahasudarshan ghanvati* was chosen as it is a drug of choice for diseases in which *jwar* (hyperpyrexia) is a prime feature. (20)
2. ***Swasakasachintamani*** - *Rasa aaushadhi* (Herbo-mineral preparation) are unique medicines, as they are generally preferred in acute conditions due to their prompt action, small dose, palatability, and easy availability. The prime symptoms of COVID-19 patients are dyspnoea, cough and fever and to address these symptoms *Swasakasachintamani* rasa was chosen as it is indicated in all type of *swasa* (dyspnoea), *kasa* (cough) irrespective of the associated disease. By virtue of its major content i.e., *lauha bhasma* it is *tridoshashamak*, *rasayana*, *vaya stambak* and indicated in *vayu ksheentah* associated with *jwa*r, extreme weakness and also in *visha roga*. The other content *Swarna Bhasma* is *sarvadoshaamayaghnam* and is indicated in *swasa, kasa and kshaya* therefore, *Swasakasachintamani* rasa was prescribed in covid patients considering *tridosha* abnormality leading to *swasa, kasa* alongwith *jwara*.[21]
3. ***Swarna Bhasma*** - *Swarna Bhasma* is *tridosha jwara nashanak* and indicated in *swasa*, *kasa, kshaya* and is also *rasayana* and *ojavivardhak*.[22]
4. ***Abhraka bhasma*** – it is *tridoshagnam*, *rasayanam*, and is indicated in all type of *swasa*, *kasa* along with *trikatu*, *vidanga* and *amalaki churna*.[23]
5. ***Amritaristha***– it is indicated in all type of febrile conditions as by virtue of its major content *guduchi*, which is *rasayana* and *pittashamak, agnivardhak* and other content *dashmula*, is *vatashamak* and *sothahar*. [24]

Following drugs were also given to fortify the activity of above drugs

1. ***Yastimadhu*** **(***Glycyrrhiza glabra***)** is advised due to its *rasayana* property. [25]
2. **Samshamani vati** is ghan of guduchi which is indicated in *swasa, kasa and jwar*. [26]
3. **Shitopaladi *churna*is** advised due to its indication in *swaswpa, kasa and jwar*. [27]
4. **Trikatu *churna*** is *aampachak* and *agnideepak.* [28]

In light of *Vyadhiviparit Chikitsa*, above drugs were selected which are indicated in the symptoms irrespective of the pathology and can be summarized below as –

1. In *jwara* (febrile condition) – *Mahasudarshan ghanvati* and *amritasristha* are indicated
2. In *swasa* (breathlessness) and *kasa* (cough) – *abharaka* bhasma (both *sadharan* and *shastraputi*), *Swarna Bhasma* and *swaskasachintamani rasa* are indicated
3. In weakness and anxious conditions – *rasayana* drugs working both on mental conditions and physical conditions like *abharaka bhasma, Swarna Bhasma* and *yastimadhu* are indicated.

These cases were on standard treatment for COVID -19 prescribed by the hospital and were taking Ayurveda medicines as an add-on therapy. All the patients were diagnosed with *swas pradhan vatolavan sannipataj jwara* with *jwara* in *jirna jwara* category.

Though the line of treatment was mainly *vyadhiviparit chikitsa* (symptomatic treatment), the medicine and dose were slightly different in each patient depending upon their age, general conditions, co-morbidity, severity, symptoms, appetite, and response to the treatment.

Case no.1, who has already taken COVID- 19 protocol drugs but was hospitalised with the symptoms of dyspnoea, severe weakness, chest pain, and fever. Since her oxygen saturation fell nominally so, she was advised with *Swasakasachintamani rasa* and *Mahasudarshan ghanvati* only. She responded well to it while Case no. 2 was 67year old having co-morbidity of diabetes mellitus, hypertension, systolic dysfunction, and he presented with dyspnoea, cough, fever, severe weakness. The patient's oxygen saturation fell to 80%, inviting aggressive symptomatic treatment; therefore, he was advised with Drug mixture 2.a (DM 2.a) along with *mahasudarshan ghan vati*, *dashmula katutrayakashaya* tablets and *amritarista* . The patient experienced relief after three doses in the symptom of chest congestion, cough, and weakness; also, there was a marked improvement in the patient's appetite. Since the patient has a history of diabetes mellitus, hypertension, and cardiac disease, he was advised with Drug mixture 2.b (DM 2.b) and *Swasakasachintamani ras* tablet after discharge.

Case-3 presented with dyspnoea, cough, and mild grade fever with critically low oxygen saturation of 62% on room air which invited aggressive treatment; therefore, he was advised with drug mixture 3.a (DM 3.a) containing mainly *shamshamani* vati., tab *mahasudarshan ghan vati* and *swaskasachintamani rasa* in full dose. The patient felt mild relief in

breathlessness, and appetite was also improved. After proper improvement in symptom the patient was advised with DM 3.b consisting of half the dose of DM 3.a and the dose frequency of DM 3.b was also reduced to half and tablet *swaskasachintamani rasa* was advised in 1 BD dose.

The case-4 presented with severe body pain, cough, breathlessness, fever, and her oxygen saturation was 82% with poor general condition, therefore, she was started with *Mahasudarshan ghanvati*, *samshamani vati* and *sanjivani vati*. There was mild improvement in symptoms, but oxygen saturation continued to fall and touched 60%. Therefore, she was shifted to an aggressive line of treatment and was advised with DM 4a, *mahasudarshan ghan vati* and *Swasakasachintamani rasa*.

Case no.5 presented with breathlessness, malaise, severe weakness, fever, and her oxygen saturation was dipping to 70%. So, she was started with DM 5.a, *mahasudarshan ghan vati* and *swaskaschintamani ras,* and after symptomatic improvement she was advised with DM 5b and *Swasakasachintamani rasa*.

Both case 4 and case 5 were female with poor general condition so they were started with drug mixture in consisting of *shamshamani* vati and *yastimadhu* in submaximal dose

The duration in which the patient felt the response of Ayurveda drug is as follows –

1. Case 1 – 8 doses (three days)
2. Case 2 – 3 doses (one day)
3. Case 3 – 4 doses (one day)
4. Case 4 –12 doses (three days)
5. Case 5 – 8 doses (two days)

No adverse effect of drug found in patient as indicated by the kidney profile and liver profile which were within normal limit at the time of discharge and during the treatment.

These cases were on standard treatment for COVID-19 prescribed by the hospital and were taking Ayurveda treatment as an add-on therapy. The addition of Ayurveda treatment showed marked improvement in the patient's symptoms and reduction in the disease's severity. In the hospital, nearly 50% of the admitted covid patient were shifted to ICU with approximately 24% mortality. These five patients had a CT severity score of more than 15 along with the marked reduction in oxygen saturation, fitting them into the severe category of COVID-19. All these patients gradually recovered without need of ICU. However, the hospital stay of the patients was prolonged.

All the cases were surviving and free of symptom till the date of reporting and all cases were reported with COVID-19 negative report except case no. 5 whose negative report was not available at the time of discharge from the hospital as the discharging criteria of hospital was normal oxygen saturation maintenance by the patient.

Patient's perspective

All the patients realised the effect of the addition of Ayurveda drugs along with ongoing treatment of the hospital. All these patients believe Ayurveda drugs expedite the subsidence of the symptoms and help them in health achievement.

Conclusion

This report addresses the clinical efficacy of Ayurveda drugs as add-on therapy in severe cases of COVID -19. All patients exhibited progress through incorporating Ayurveda treatment and none of the patients needed ICU care, and they were discharged upon achieving stable oxygen saturation levels on room air. This paper also attempts to attracts researcher's attention to the application of Ayurveda concepts and medicine in severe or acute cases of diseases.

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References

1. WHO Coronavirus (COVID-19) Dashboard | WHO Coronavirus (COVID-19) Dashboard With Vaccination Data [Internet]. [cited 2021 Nov 21]. Available from: https://covid19.who.int/
2. https://www.ayush.gov.in/docs/ayush-Protocol-covid-19.pdf
3. Gautam AS, Verma P, Kumar Pathak A. Blood pressure normalizing effect of Talahridaya marma therapy: A case report. J Ayurveda Integr Med. 2021 Jul 1;12(3):553–555.
4. Rastogi S, Srivastav PS. Ayurveda in critical care: Illustrating Ayurvedic intervention in a case of hepatic encephalopathy. Ayu [Internet]. 2011 [cited 2021 Nov 21];32(3):345.
5. Rastogi S. Low-Pressure, Low-Flow Voiding Dysfunction in an Elderly Male Treated Through Ayurveda: A Case Report. J Evid Based Complementary Altern Med [Internet]. 2017 Oct 1 [cited 2021 Nov 21];22(4):846–50.
6. Rastogi S. Coma with Glasgow Coma Scale Score 3 at Admission following Acute Head Injury: Experiencing the Complete Recovery Supported through Ayurveda - A Case Report. Complement Med Res [Internet]. 2019 Oct 1 [cited 2021 Nov 21];26(5):353–60.
7. Rastogi S, Srivastav PS. Ayurveda in critical care: Illustrating Ayurvedic intervention in a case of hepatic encephalopathy. Ayu [Internet]. 2011 [cited 2021 Nov 21];32(3):345.
8. Mishra A, Bentur SA, Thakral S, Garg R, Duggal B. The use of integrative therapy based on Yoga and Ayurveda in the treatment of a high-risk case of

COVID-19/SARS-CoV-2 with multiple comorbidities: a case report. Journal of Medical Case Reports 2021 15:1 [Internet]. 2021 Feb 24 [cited 2021 Jul 13];15(1):1–12.

9. View of Covid-19: An Applied Intervention Through Ayurveda [Internet]. [cited 2021 Jun 26]. Available from: http://ijaprs.com/index.php/ijapr/article/view/1445/1130
10. Gandhi AJ, Rupareliya JD, Shukla VJ, Donga SB, Acharya R. An ayurvedic perspective along with in silico study of the drugs for the management of SARS-CoV-2. Journal of Ayurveda and Integrative Medicine. 2022 Jan 1;13(1):100343.
11. Akhila VG. Management of Sannipata Jwara w.s.r to COVID-19 - Case report. J Ayurveda Integr Med. 2022 Jan-Mar;13(1):100416
12. View of Ayurvedic management of a patient with Hypoxia and Co-Morbidities by Home Care through Telehealth in 2nd wave of COVID-19 - Case Report [Internet]. [cited 2021 Jun 8]. Available from: https://jaims.in/index.php/jaims/article/view/1273/1300
13. Wanjarkhedkar P, Sarade G, Purandare B, Kelkar D. A prospective clinical study of an Ayurveda regimen in COVID 19 patients. Journal of Ayurveda and integrative medicine. 2022 Jan 1;13(1):100365.
14. Rais A, Negi DS, Yadav A, Arya H, Verma R, Galib R, Ahmad A, Yadav MK, Ahirwar PN. A randomized open label parallel group pilot study to evaluate efficacy of Ayurveda interventions in the management of asymptomatic and mild COVID-19 patients-experiences of a Lucknow based level 2 hospital of Uttar Pradesh, India. Journal of Ayurveda and Integrative Medicine. 2022 Apr 1;13(2):100393.
15. Girija PLT, Sivan N. Ayurvedic treatment of COVID-19: A case report. J Ayurveda Integr Med. 2022 Jan-Mar;13(1):100329
16. Rastogi S. Ayurveda co-interventions have supported complete recovery in Severe COVID-19 infection with a chest severity score 18/25: a case report. Journal of Ayurveda and integrative medicine. 2022 Apr 1;13(2):100417.
17. Thakar A, Panara K, Patel F, Bhagiya S, Goyal M, Bhinde S, Chaudhari S, Chaturvedi S. Add-on Ayurveda treatment for early stage COVID-19: a single *centre* retrospective cohort study from Gujarat, India. Journal of Evidence-Based Integrative Medicine. 2021 May 31;26:2515690X211020685.
18. Adluri US, Tripathi AC. Understanding COVID-19 pandemic–A comprehensive Ayurvedic perspective. Journal of Ayurveda and integrative medicine. 2022 Jan 1;13(1):100348.
19. Shastri K, Chaturvedi G. Carak Samhita, Vidyotini Hindi Commentary . 1st ed. Sastri R, Upadhaya Y, Pandey G, Gupta B, editors. Vol. 1. Varanasi: Chaukhambha Bharti aAcademy; 2003. 605–607 p.
20. Mishra S. Bhaisjyaratnawali Hindi Vyakhayasahit. 1st ed. Vol. 1. Varanasi: Chaukhambha Surbharati Prakashan; 2012. 128 p.
21. Mishra S. Bhaisjyaratnawali Hindi Vyakhayasahit, 1st ed., vol. 1. Varanasi: Chaukhambha Surbharati Prakashan, 2012. 464p
22. Shashtri K. *Rasa Tarangani Rasavigyan Hindi Vyakhya*, 11th ed., vol. 1. New Delhi: Motilal Banarasi Das, 2004. 376p
23. Shashtri K. *Rasa Tarangani Rasavigyan Hindi Vyakhya*, 11TH ED., VOL. 1. New Delhi: Motilal Banarasi Das, 2004. 242p
24. Mishra S. *Bhaisjyaratnawali Hindi Vyakhayasahit*, 1st ed., vol. 1. Varanasi: Chaukhambha Surbharati Prakashan, 2012. 204p
25. Sharma P, Dravyaguna Vigyan, 1ST Ed., Vol. 2. Varanasi: Chaukhambha Bharati Academy, 2015. 253p
26. Trikamji Y, Siddhayoga Sangraha, 1ST Ed.., Vol. 1. New Delhi: Shri Baidyanath Ayurveda Bhawan Ltd., 2013, 183p
27. Mishra S, *Bhaisjyaratnawali Hindi Vyakhayasahit*, 1st ed., vol. 1. Varanasi: Chaukhambha Surbharati Prakashan, 2012. 407p
28. Chunekar K C, *Bhavaprakasa Nighantu*, 2ND Ed.., Vol. 1. Varanasi: Chaukhambha Bharati Academy, 2015. 18p.

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