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Case Report

Ayurvedic management through telemedicine of covid hypoxia non-dependent of oxygen support in a patient with chest CT score of 18/25- A case report

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ABSTRACT

This paper is the first known documentation of a covid patient in ARDS and MODS who recovered from home through Ayurveda telemedicine and when not completely dependent on oxygen. The covid patient suffered from fever, body ache, breathlessness, fatigue, and was admitted to the hospital when his SpO2 was at 56, his CT scores at 18/25, Corads 6 and his NL ratio was at 9. The patient was shifted to another hospital as he refused treatment in the first hospital; in the second hospital also he refused treatment and got himself discharged against medical advice when his SpO2 was at 65, RR 40. The patient sought Ayurvedic treatment through phone voluntarily when in MODS. He showed clinical improvement within a day and the SpO2 steadily raised to reach 94 in 27 days. He may have required invasive mechanical ventilation for COVID-19 ARDS reflected by his raised covid biomarkers (Malik et al., 2021) [1]. But this was not necessitated; also other risk factors for poor outcomes were his old age, comorbidities as diabetes, kidney injury and liver injury. This paper records that oral and ophthalmic administration of Ayurveda medicines can immediately increase SpO2 levels. This case study also opens up possibilities of emergency care in Ayurveda with respect to hypoxia.

1. Introduction

The Ministry of Ayush has formed an Inter-disciplinary Ayush R&D Task Force having representation from the Indian Council of Medical Research (ICMR), Department of Biotechnology (DBT), Council of Scientific and Industrial Research (CSIR), All India Institute of Medical Sciences (AIIMS) and Ayush Institutions to conduct 126 research studies in 152 centres across India to identify effective medicine for managing the patients with symptoms of Covid 19 [2]. Ayurveda practitioners across India are managing mild and moderate covid cases in their respective localities based on the protocol set by the Ministry of AYUSH. Accordingly we set an Ayurveda telemedicine unit in June 2020 and documented 240 covid cases of whom 164 were covid positive and 76 were primary contacts that included hypoxic cases.

If not expertly and individually managed, a COVID-19 patient with ARDS may eventually develop multi-organ failure MODS- that is life threatening [3]. "According to recent researches severe COVID-19 represents viral pneumonia from severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections leading to ARDS. Its manifestations can be viewed as a combination of the two processes, namely viral pneumonia (lung inflammation where air sacs are filled with fluids, pus) and ARDS. COVID-19 ARDS is diagnosed when someone with confirmed COVID-19 infection meets the Berlin 2012 ARDS diagnostic criteria of (i) acute hypoxaemic respiratory failure; (ii) presentation within 1 week of worsening respiratory symptoms; (iii) bilateral airspace disease on chest x-ray, computed tomography (CT) or ultrasound that is not fully explained by effusions, lobar or lung collapse, or nodules; and (iv) cardiac failure is not the primary cause of acute hypoxaemic respiratory failure [4]." In this single case study the covid patient presented with a respiratory rate of 44/min (≥30breaths/min); SpO_2 65 (≤92%) and hence the severity of the condition could be understood.

Abbreviations: ARDS, Acute Respiratory Distress Syndrome; MODS, Multiple Organ Dysfunction; RR, Respiratory rate; CT, Computerised tomography; NL, Neutrophil Lymphocyte; SpO2, Saturation of peripheral oxygen.

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2. Case presentation

2.1. Patient information

2.1.1. Previous history

The patient aged 70 years, of height- 5.3" and weight- 56 Kg, non-vegetarian, regular fast walker, religious person who underwent regular intermittent fasting since 40 years; underwent gall bladder removal 10 years back, he suffered from arthritis since 5–6 years for which he took OTC pain killers twice a week, afflicted with cold during seasonal changes which he used to manage with sips of hot water.

2.1.2. Present medical history

All through the evenings from April 15th 2021 to May 15th 2021 the patient consumed either juice of sweet lime or rose milk (refrigerated). He developed mild cold around 28th April. By 2nd week of May 2021 the cold got severe, the patient developed-fever, cough, weakness, tiredness and lied down most of the time. On 13th May 2021 the patient's SpO2 was at 92; he took an allopath's online consultation who prescribed paracetamol and cough syrup. The doctor recommended hospitalisation which was not possible due to unavailability of beds during the second wave of covid. On 14th May 2021 the SpO2 was at 82–87; on 15th May 2021 the SpO2 was at 76–82. He took another online allopathic consultation on 15th May 2021 and was prescribed Azithral BD, Ivermetecin BD, Monitor OD, Zincovit OD, Fabiflu, Razo D, and Taxim. On 16th May 2021 the SpO2 was at 68 in the morning and the patient stopped-speaking, moving, eating, remained inactive in the bed and was unable to open eyes or respond. SpO2 fell down to 56 in the evening. Two doses of the allopathic medicines were given. The doctors advised them to get him admitted immediately. An ambulance was called for in the evening; in the ambulance the patient's SpO2 showed 76–80 when put on oxygen support.

On the night of 16th May 2021 the patient was admitted to a government hospital in Chennai. RTPCR turned positive with 70% lung involvement and Corads 6. The hospital supported the patient with an oxygen concentrator on 10 L when the SpO2 showed 86. He was unable to sit or lie in the bed. He had a glass of pomegranate juice every day in the morning and a bite or two of an *idli*-steamed rice-legume dumpling every day. As told by the family, the patient in the hospital was semi-conscious, highly non-co-operative, confused and repeatedly kept removing the oxygen mask and tried pulling out the intra venous support. As the patient was not complying to take medicines, food and oxygen on all the 4 days, the family discharged the patient on 20th May 2021 and took him to a private hospital assuming that the patient did not like the atmosphere of the hospital. The medical team orally informed the family that they administered steroids alone. This could not be reconfirmed and no discharge summary is available.

On the night of 20th May 2021 the patient was shifted to a private hospital. During admission the patient accepted the oxygen support when the SpO2 showed 90 and went to sleep. At night around 1 O' clock the family got a call from the hospital that the patient had removed his oxygen mask and was trying to rush out of the hospital. The patient refused oxygen, medicine and food. The hospital worried about his non co-operation, after serious retrospection with permission from the family tied his hands with a cotton bandage to administer oxygen which appeared vital in saving his life. In some time the patient became agitated, angry, bit the bandage that tied his hands and in the process hurt his lips and bled. The family discussed sedation to make him stay in the hospital and treat covid. It was ruled out by the hospital to put him on sedation or invasive ventilation, as the patient was already in MODS. The family unable to retain the patient in the hospital hence forth, discharged him on 23rd May 2021 when the SpO2 showed 65 without O2 support. The hospital informed orally that the patient may not survive for more than three days. Medicines administered-Injection Cegava 1.5 G I.V BD, Injection Methyl Prednisolone 125 mg I.V BD, Injection Vitamin C 1.5 g I.V BD, Injection Pantoprazole 40 mg I.V BD, Injection Clexane 40 mg SC BD, Injection Glutathin 60 g IV OD, Nebulise Duoline 8th Hourly, Nebulise Budecort 8 th hourly, Tablets- Zinc 150 mg 1-0-0, Vitamin C 0-0-1, Pan D 1-0-0, Pulmoclear 600 mg 1-0-1, D Rise P.O OD, Fourts- B 1-0-1, Syrup Corex Tds 10 ml.

2.1.3. Ayurveda telemedicine

On 23rd May 2021 the family made a call to the Covid help desk of our clinic seeking help for their father aged 70 years in respiratory distress. When it was reported that the oxygen level was at 65 the patient was advised to be taken to any allopathic hospital by us as the WHO and ICMR has set rules that SpO2 lesser than 94 requires hospitalisation. The family explained to the Ayurveda team that the patient consistently refused food, medicines, oxygen support in both the hospitals and had to discharge him against medical advice. We agreed to manage the patient on humanitarian grounds as the patient and the family were clear in their stand to be in home isolation. Also the CCIM had issued Telemedicine practice guidelines for ASU practitioners as early as on 7th April 2020 for infectious diseases including covid. As per the guidelines the patient's history was taken in detail and medicines were started from 23rd evening. Standard Ayurveda medicines prepared from reputed ayurvedic pharmaceutical companies as Dhootpapeswar, Zandu, Dabur, IMPCOPS, Kottakkal Arya Vaidya sala, were prescribed. Pulseoxymeter readings and video of the patient were asked to be sent in regular intervals for us to assess the patient.

2.1.4. Case record

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2.1.5. Observations on raise in SpO2 (Table 1)

With oral administration of Ayurveda medicines it was observed that the SpO2 increased temporarily from 68 to 82 and 70 to 87 on the first two days respectively in 20 min, which fell down after five-ten minutes. This temporary rise in SpO2 was observed also during external instillation of medicines- *Vilwadi vati* [5]- a herbal compound preparation. It was advised to be rubbed with water and the resultant paste applied in the lower lids as an *anjanam*/collyrium. This procedure was performed by the patient's son as per the instructions given by the Ayurveda doctors. SpO2 increased immediately from 61 to 98 on the first application, fell down after few minutes to pre-eye application levels i.e.61. On the following day the raise in SpO2 appeared after 15 min by 10 points which again fell down in few minutes. Such an increase in SpO2 values could not be observed after the first two days, through telemedicine due to practical constraints.

Based on his comfort level the covid patient in ARDS (at home or at hospital) decided if he needed oxygen support or not. Also from day one he used oxygen support continuously only during sleep. When the patient was not supported with oxygen on the first two days (when Ayurveda medicines were started), the patient's SpO2 revolved around 65–71. On the fourth day the SpO2 raised to 79–88 range. On the fifth day the SpO2 raised to 70–79, a drop from the previous day's reading, but still not to previous low. On the sixth day SpO2 raised to 78–82 range. From the 7th day onwards the SpO2 steadily raised above 80, slowly reaching 94 on the 27th day. In between-on 2nd June when the patient's sudden abdominal pain of two days duration resolved-there was a sudden spurt in SpO2 to 89–92 and on 7th June a noticeable dip in SpO2 to 81–83, when the patient complained of urinary stranguary. It resolved to

Table 1
Milestones in covid recovery.

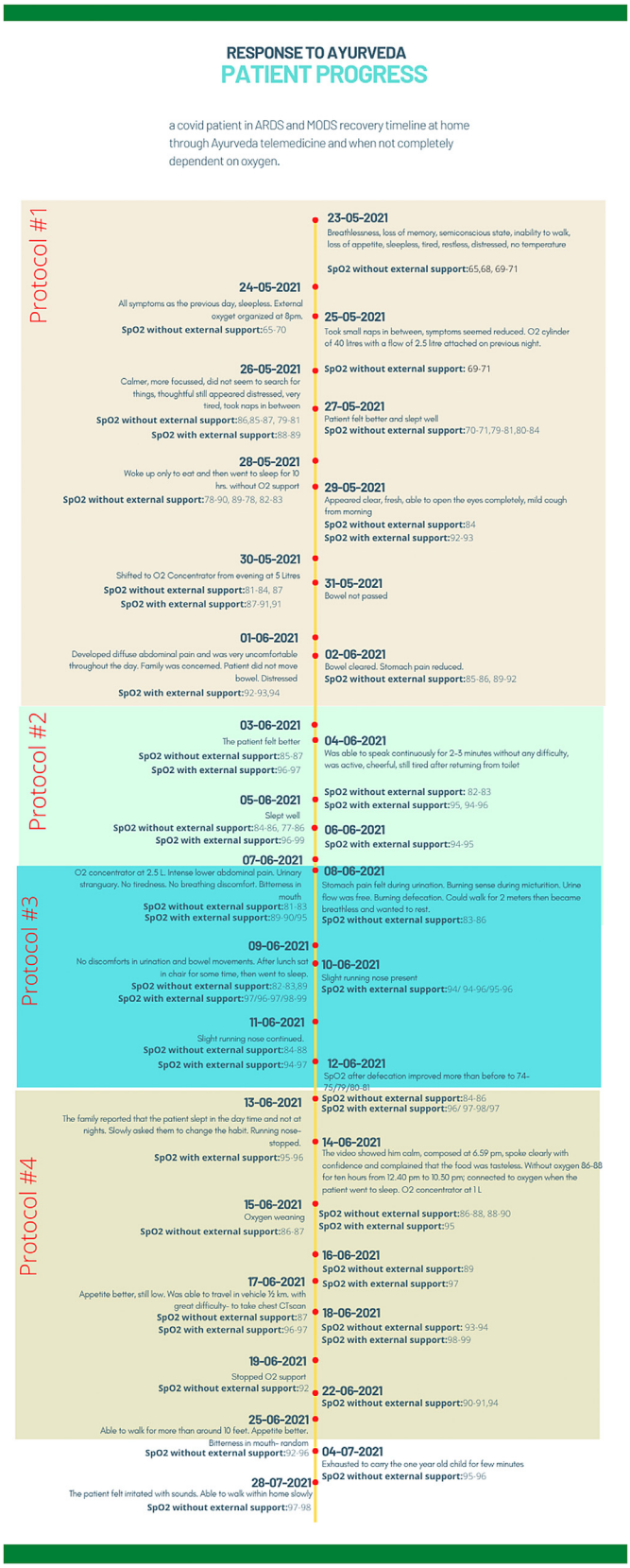

Table 2
Diet cum treatments for COVID ARDS.

	First 7 days	*Kanji*/Rice gruel, goat's milk, sips of warm spiced water, rock salt
Pathya	Next 21 days	Rice with *rasam* (boiled watery tamarind extract seasoned with pepper or garlic), ghee, thin soups, watery *moong dal*/*Phaseolus mungo*, dates in diluted milk with turmeric, pomegranate fruit, steamed Kerala bananas/ *Musa acuminata*, steamed apples, eggs twice a week, wheat roti, sips of warm spiced water
Food good for body channels in *svasa*/respiratory distress	On 3 days with urinary stranguary	½ spoon of roasted fenugreek (*Foeniculum vulgare*) powder twice a day with water and roasted barley gruel/*kanji* as food to enable easy urination.
Apathya		Citrus juices, non- vegetarian foods, thick milk, curds, legumes
Diets not good for channels during *svasa*/respiratory distress		excepting *moong dal*, flatus yielding foods as- potatoes, peas, legumes, cauliflower; excess of water
Treatments done		1 . Eye application (anjana) twice a day- first seven days 2 . Chest fomentation (sneha sveda)frequently-for first 10 days 4 times a day; later 1/2 times a day 3 . Exposure to sun (atapa sevana) once a day 10–15 min at 6.30 am- every day

previous day's levels with change in prescription and resolution of stranguary. The SpO2 level of the patient with oxygen support was also recorded on daily basis. On the first two days the patient was not on any oxygen support and hence no reading is available. On the third day though connected to O2 cylinder, SpO2 was not recorded by family. On both the fourth and fifth day the level of SpO2 of patient when connected to the O2 support, was at 88–89; On the sixth day the SpO2 was at 91 and on the seventh day 92–93, eighth day the SpO2 dropped to 87–91 and on ninth day was at 91, tenth day record not available, from eleventh day the level was above 92. On the day of urinary stranguary i.e. 7th of June it dropped to 89–90 but later picked up to above 92.

2.1.6. Observations on oxygen dependency

For 4 days before hospitalisation, when the SpO2 dropped steadily through 92- 82- 76- 68- 56 since 13th of May to 16th of May 2021- the covid patient was at home and not on any oxygen support. From 16th May to 22nd May the patient was compelled to be on oxygen support in both the hospitals, which he kept discarding. The oxygen levels of the patient during the hospital stay are not available. On the day of discharge against medical advice i.e. 23rd May, the SpO2 was at 65. Ayurveda medicines were administered from 23rd evening. Again for 36 h after discharge from hospital when the SpO2 was at 65, the covid patient in ARDS and MODS was at home-on no oxygen support. Oxygen support with a cylinder of 40 L with a flow of 2.5 L capacity was started on 24th may evening. On 30th May evening an oxygen concentrator with 5 L capacity was arranged for. The family reduced the concentration to 2.5 L in the second week and later to 1 L in the third week of June as they realised the patient's improvement. The oxygen support was altogether stopped on 19th June when the SpO2 touched 92 when without on any external oxygen support. It took 27 days for this patient to be off oxygen support from the date of starting Ayurveda telemedicine. For at least 5–8 days (as readings on all days are not available) the patient's SpO2 was at around 88–91 when on O2 support at home, when it had to be maintained at 92 according to hospital rules (Figure 1).

2.1.7. Observations on respiratory rate

The respiratory rate of the covid ARDS patient steadily improved through 44-38-37-34-22 rate/minute from 23rd May to 28th July. The respiratory rate was at 34/minute when the patient was weaned completely from oxygen support on the 19th June. Further for the respiratory rate to reach 22/minute-probably his pre covid rate, it took almost a month.

2.1.8. Treatment protocol

Protocol I

Patient status- SpO2 65 without O2; RR 40; **Period of Administration**- 23rd May 2021 to 2nd June 2021.

Priority- Emergency recovery of patient from respiratory distress.

Frequency of medicine- 5 divided doses-every 4 h.

Medicines and dosage administered per day- *Sameerapannaga ras* [6]-for bringing immediate relief from breathing distress- 300 mg, *Hema garbha pottali* [7] - to revive the patient from semi-consciousness 100 mg, *Vajra bhasma* [8]-— for clearing up the blocked channels 5 mg, *Svarna bhasma* [9] -for immediately increasing the *ojus*, *Abhraka bhasma* [10]- 250 mg-for rebuilding the lung tissues, *Shilajit* [11] 2.5 g - to give immediate energy were zeroed on. Herbal preparations- *Thaleesadi choornam* [12] 10 g to carry the emergency medicine to the respiratory channels, *Gudoochi* 2.5 g-to strengthen the blood tissue, *Aswagandha*- 2.5 g to provide strength to body, *Bharangyadi kashayam* [13]/100 ml-to open the *prana vaha srotas*/respiratory channels, *Kanakasavam* [14] 60 ml-to ease breathing discomfort, *Dhatree loham* [15] 500 mg-to control acidity.

Protocol II

Patient status - SpO2 85–86, 89–92 without O2 support; RR 38.

Period of Administration- 2nd June 2021 to 7th June 2021.

Priority- Stabilise and strengthen covid patient.

Frequency of medicine - 5 divided doses/every 4 h.

Medicines and dosage administered per day- It was pertinent to change the prescription as the deranged *kapha*/mucus reduced in the body, digestion improved and the *rasavaha*/channels carrying chyle got cleared. Hence *Candraprabha vati* [16] 1250 mg - herbo-mineral to promote the functioning of *raktavaha srotas*/channels producing blood, *Dadimadi ghrita* [17] 15 ml - a medicated ghee to prevent relapse of fever and dry cough, *Svasahara lehyam 5g* - to promote flow of *prana*/oxygen, *Kapikacchu* 750 mg and *Satavari* 750 mg to assist the body in production of the seven tissues and the *ojus* properly, *Rajata bhasma* [18] 250 mg to strengthen respiratory system. *Sameerapannaga* ras 300 mg with *Thaleesadi choornam* 10 g were continued.

Protocol III

Patient status- SpO2 81–83; Without O2; RR 37.

Period of Administration- 7th June 2021 to 12th June 2021.

Priority- Recover injured liver and kidney.

Frequency of medicine- 3 divided doses.

Medicines and dosage administered per day- After the patients' breathing discomfort completely subsided i.e. after 14 days, the dosage of *S. ras* was reduced to 125 mg per day. Also as the

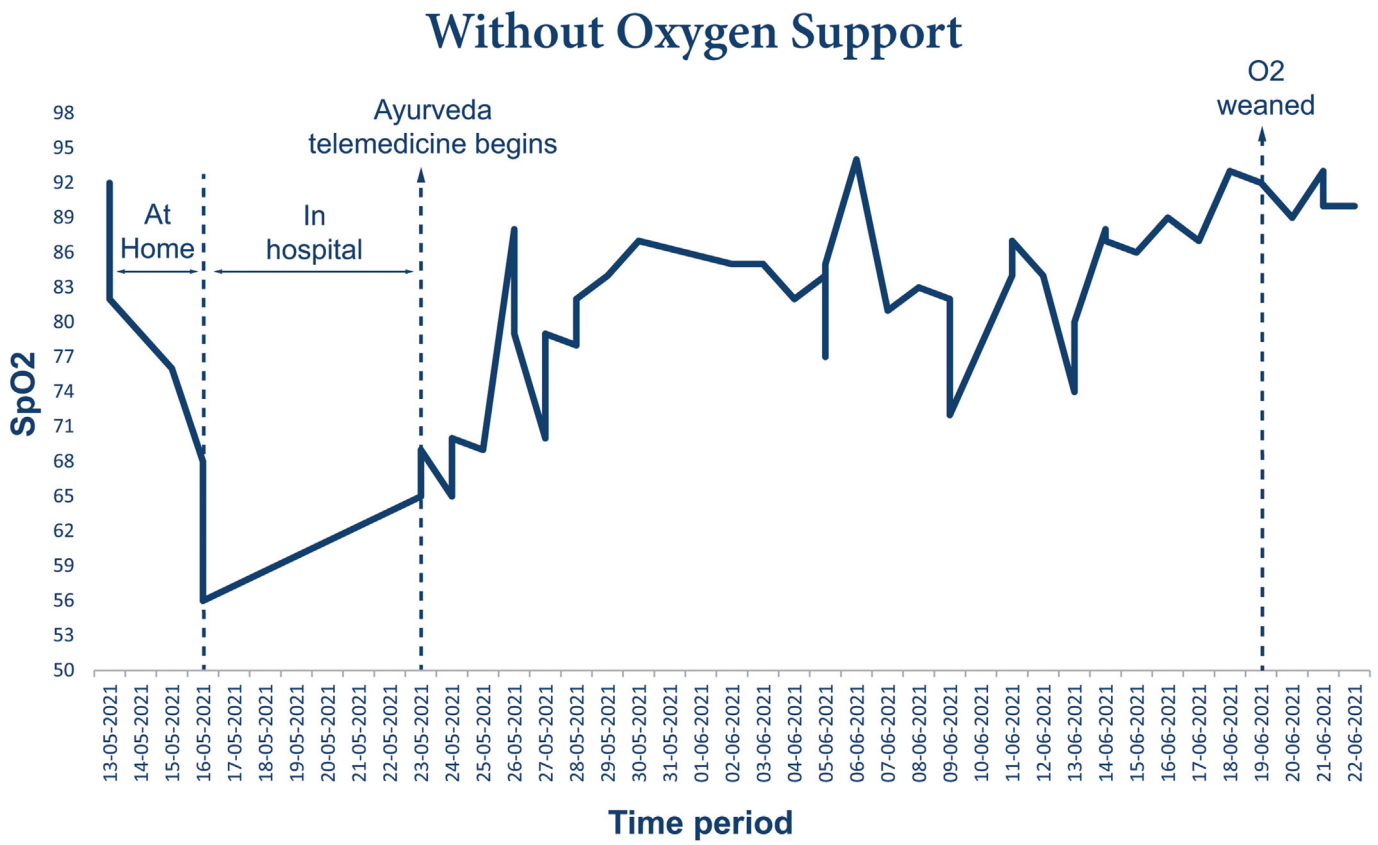

Fig. 1. SpO_2 progress.

patient complained of urinary stranguary, decoctions of *Gokshura* 100 ml-to remove the *pitta*/the heat produced from administering herbo-minerals, *Punarnavadi mandooram* [19] 500 mg - an iron preparation-to assist urinary production and excretion, *Sankha bhasma* [20] 500 mg, *Kalyanaka kshara* [21] 375 mg - to reduce acidity, *Liv.*52 750 mg, Papaya leaf juice 30 ml-to support the altered liver function, *Vastyamayantaka ghritam* [22] 20 ml - to clear the urinary channels.

Protocol IV

Patient status- SpO2 84–86; Without O2; RR34.

Period of Administration- 12th June 2021 to 30th June 2021.

Priority- To wean from oxygen support by healing deep tissue damages.

Frequency of medicine- 2/3 times a day.

Medicines and dosage administered per day- *Indukanta kashayam* [23] 75 ml– poly herbal decoction to strengthen GIT, *Drakshadi kashayam* [24] 75 ml - poly herbal decoction to correct *pandu*/deep tissue tiredness, *Prabhakara vati* [25]- 250 mg - organo metallic to strengthen heart, *Siddha makaradhwaja* [26] 125 mg - organo metallic to increase *ojus*, *Vasakantakari lehyam* [27] 10 gm-poly herbal linctus to strengthen respiratory apparatus, *Agastya rasayana* [28] 5 g - poly herbal linctus to remove remnant mucus from the respiratory channels, *Indukanta ghritam* [29] 15 ml - ghee to prevent relapse of fever, *Guggulu* 750 mg-to rejuvenate respiratory channels.

2.1.9. Observation

The IL6 was raised throughout the covid course reflecting the risk of complications that could have set in to cause threat to life [30,31]. D-dimer values greater than 1 μ gm/ml reflected the poor prognosis of the patient [32]. Studies report that in the early stage of COVID-19, CRP levels are positively correlated with lung lesions and reflect disease severity [33]. Similarly in this case too raised CRP was observed and the total lung showed covid affection. Raised Ferritin levels is associated with diabetes (although the patient in this case was pre diabetic), and there was a higher probability to experience serious complications from COVID-19 [34,35]. ESR was consistently high. The Neutrophil Leucocyte-NL ratio was very high at 9 on 21st May 2021 on the day of admission to the hospital-an indicator of bad prognosis [36]. Although the patient was on the Ayurvedic prescription since 23rd May 2021 the medicines administered for 10 days did not show considerable improvement in NL ratio as it became 8.6 on 3rd June 2021. The ratio reduced to 3 on 17th June 2021. The WBC was a little higher than normal levels and later within limits though with ups and downs. RBC, Haemoglobin were well within limits but showed a slight downfall during and after the recovery from abdominal pain. Platelets remained in limits throughout the treatment. The Random blood sugar and the Hba1c that were off mark by a mild range were brought under control.

The elevated biomarkers for liver functioning reflect critical hepatitis; Bilirubin direct, Bilirubin indirect, SGOT (AST), SGPT (ALT), Alkaline Phosphatase all reached normalcy after the Ayurveda prescription from 23rd may 2021 to 17th June 2021. SGPT (ALT) (<49) U/L which was at 118.5, although got halved to 60 on 17th June 2021 was still not within limits. On 5th July 2021 the SGPT returned to within limits at 15. Urea which was at 78.96 mg/dl, dropped down to 22 mg/dl and was at 30 mg/dl on- 17th June and 5th July 2021 respectively.

On 16th May 2021 Evidence of confluent sub-pleural patchy ground glass opacities in bilateral lung fields with covid pattern, 70 percent lung involvement implying CT score of 18/25 and corads 6 was reported in the CT Chest scan.

After treatment on 17th June 2021 features were consistent with late phase of covid 19 infection and interstitial fibrosis. Bilateral lungs fields showed diffuse predominant peripheral sub-pleural patchy and ill-defined peri bronchovascular patchy areas of reticular interstitial thickening with minimal ground glass density with associated intra-lobular and interlobular lines involving all the lobes of bilateral lungs (lower lobes > upper lobes), associated areas of fibrotic strands and mild traction bronchiectasis, mild left pleural effusion and bilateral posterior pleural thickening noted; The supervising doctor felt a CT score of 12/25 would suit the scan (although lungs in post covid recovery phase are not scored Table 3).

3. Discussion

According to western medical science or Allopathy as it is widely known, the primary cause of covid disease is a virus identified as SARS COV2 19 or Corona virus. Stage I of covid is the early infection or viral response phase during which symptoms of upper respiratory tract infection dominate. Stage II is the pulmonary phase when the patients develop full-blown pneumonia with all its associated symptoms. Stage III: The hyper inflammation phase-the cytokine storm caused by SARS-CoV-2 is the key reason for deterioration within a short time-span in COVID cases and subsequent development into acute respiratory distress syndrome (ARDS), leading to respiratory failure, sepsis and eventual death from (MODS)multiple organ failure [37]. This patient was in Stage III- the hyper inflammation phase when he reported to us.

Scientists around the world are working to find and develop treatments for COVID-19. WHO states that it is coordinating efforts to develop treatments for COVID-19 and will continue to provide new information as it becomes available. Results from the WHO's Solidarity Trial indicate that remdesivir, hydroxychloroquine, lopinavir/ritonavir and interferon regimens appear to have little or no effect on 28-day mortality or the in-hospital course of COVID-19 among hospitalized patients [38].

This case of covid is classified as a *vatakapha pradhana sannipata jwara* caused by *Janapadodhwamsa*/epidemic [39]. The covid patient had consumed daily sweetened juices and cold milk for a month; the sweet, sour, cold liquids increased and deranged the *kapha*/'fluid' humour. The age of the patient was favourable for the *vayu*/'activity' humour to get increased in the body. These increased *doshas*/humours-in turn reduced the *agni*/digestive capacity and blocked the channels that carry the firstly formed tissue *rasa dhatu*/chyle in the body. This pushed the *pitta*/'heat' humour to the extremities causing fever. In which time frame was the covid patient exposed to *dushita vayu* i.e. air containing covid virus or *dushita asaya* i.e. object containing covid virus one is unable to ascertain. When this *agantu dosha*/virus found the fertile deranged human body-when apt, further vitiated the *7 dhatus*/basic elemental tissue namely-*rasa, rakta, mamsa, medas, asthi, majja, sukra* (chyle, blood, muscle, adipose, bone, bone marrow, reproductive tissue) and the

Table 3

Spo2	>95	65	85–87	87		90	98
Haematology	Reference value	21/05/21	03/06/21		17/06/21	05/07/21	27/7/21
D dimer	(0.0–0.5) μ gm/ml (FEU)	0.75	1.66		0.93	Not tested	0.62
Ferritin	(21.81–274.66) ng/ml	936.6	1723		1723	1522	792
IL6	(0.00–7.00) pg/mL		91.5		70.75	17.41	7.80
CRP	(<5) mg/L	14.55	70		77.35	51	26
CBC							
WBC	(4000–11,000)/cu.mm	17,120	14,300		12,500	13,500	NT
Differential count							
Neutrophil	40–70%	84.8%	86%		72%	71	NT
Lymphocyte	20–45%	9.30%	10%		23%	25	NT
Eosinophil	0–5%	3%	4%		4%	4	NT
Monocyte	1–6%	2.90%	0%		1%	0	NT
Basophil	0–2%	0%	0%		0%	0	NT
RBC							
Haemoglobin	13–17	13.8	12.8		11.9	12.4	12.5
Total RBC	4–5.5 million/cu.mm	4.54	4.41		3.96	4.37	NT
PCV	36–45	38.1	36.1		34.1	34.9	NT
MCV	75-98 fl	83.9	81.9		82.5	79.9	NT
MCH	26–32 pg	30.4	29		28.7	28.4	NT
MCHC	31-36 gm/dl	36.2	35.5		34.9	35.5	NT
Platelet count	1.5–4.5 lacs/cu.mm	2.58	2.8		4.44	3.65	NT
ESR	<10 mm/h	NT	72		53	40	40
RBS	80–120	151.3	142.72		105	101	NT
HbA1c		6.9	6.6		NT	NT	NT
LFT							
Bilirubin total	(0.2–1.2)mg/dl	1.52	NT		0.81	0.7	NT
Bilirubin direct	(<0.3) mg/dl	0.48	NT		0.3	0.3	NT
Bilirubin indirect	(<0.7) mg/dl	1.04	NT		0.51	0.4	NT
SGOT (AST)	(<40) U/L	113.2	NT		27	29	NT
SGPT (ALT)	(<49) U/L	118.5	NT		60	15	NT
Alkaline Phosphatase	(35–104) U/L	90.25	NT		86	96	NT
Protein total	(6.0–8.0) g/dl	6.92	NT		6.8	7.8	NT
Albumin serum	(3.5–5) g/dl	4.12	NT		3.7	4.3	NT
Globulin	(1.8–3.5) g/dl	2.8	NT		3.1	3.5	NT
A/G ratio	(1.2–2.5)	1.32	NT		1.2	1.2	NT
RFT							
Urea	(7–20 mg)/dl	78.96	NT		22	30	NT
Creatinine	(0.9–1.3)mg/dl	1.25	NT		1.1	1.2	NT
Uric acid (serum)	(3.4–7.0)dl	NT	NT		4.3	5	NT

NT- Not tested.

extract of the seven tissues called *ojus*/life force-the repository of life. During the first twenty days covid set as *kasa, svasa, jwara, anga marda, arati* (cough, wheezing, fever, body pain, tiredness). As the patient did not seek treatment in the first 20 days and as he continued with his daily consumption of *kapha*/mucus increasing foods, the unattended fever led to *dhatu kshaya* (tissue damage) and *mano buddhi indriya hani*/affection of higher centers as mind, senses and intellect-resulting in incoherent thoughts, loss of focus. When the patient reached for Ayurveda treatment his *ojus*/life force was already in a state of imbalance either by delayed or improper handling of the primary disease (covid 19) or as a complication produced because of prolonged covid fever or as the patient's strength was lower than the disease strength or as a result of permutation of all these factors.

Prolonged covid fever leads to depletion of tissues (*kshaya*) and dryness (*rookshata*) which in turn leads to *pranavaha sroto dushti*. Oxygenated blood (*rasa dhatu*) that produces nourishment to all the tissues of the body is impaired by the vitiation in the *pranavaha srotas*. This is manifested as hypoxia with symptoms of difficulty in breathing of varied manifestations (*ati srushta swasam, ati baddham, kupita swasam, alpa alpam swasam, abheekshnam swasam, sa shabdha swasam, sa shula swasam*) (Ref: *Caraka Samhita, Vimana sthana* 5/7). Thus in Covid, hypoxia is not unavailability of oxygen but is the inability to bind oxygen in to the blood. Treatment of *pranavaha srotas* should be managed on lines of *hrudroga, kasa* and *swasa* also considering the *agni* and treating the *ama* in the *rasa dhatu*.

Ayurveda clearly enlists the emergencies that arise due to Respiratory distress/*svasa roga*. Herbo mineral and metallic preparations/*Rasa aushadhi* are hence the first choice in situations of respiratory distress as in covid, since when administered even in minute dosages they are very quick in action/*asukari*, and are life-saving. A very important point to note here is that herbo-mineral drugs are always administered with suitable herbal adjuvants and specific foods which parallely could act as chelants so that the chemicals act in the body appropriately without causing any adverse effects and are excreted comfortably (Table 2). Such medicines rejuvenate tissues damaged by the lack of oxygen/*prana* not reaching them, corrects *agni*/digestive processes, increases *ojus*/life force, clears the lungs of the accumulated mucal plugs, blood clots and fluids. Medicines for respiratory distress are to be administered frequently in small doses according to Ayurveda. Hence the dosage was split and administered once in every 4 h. The medicines in Ayurveda texts are already documented to act on a specific tissue/organ/symptom/*dosha*/age/state of a patient/gender/disease/type of human constitution in detail. Hence such medicines that suited the imbalance due to the *doshas*/humours in the terrain which was expressed through the spectrum and intensity of the symptoms, which reflected the organs and the tissues affected were selected. Never during the diagnosis or treatment were the covid biomarkers or the covid virus variants considered as the primary criteria to frame the treatment protocol. The actions of these medicines have been observed to be consistent on the human body through at least two thousand years. Parallely it so happens that many of these herbs as *Withania somnifera- Tinospora cordifolia* [40], *Adathoda vasica* [41], also exhibit anti-covid viral activities in researches that were done in India. Till and after conclusive western medical scientific researches reach humanity, countries like India can always be encouraged to continue with Ayurvedic medical approaches that have been in practice since few millennia.

3.1. Treatments done

Hot water bag application to chest - It is a supportive treatment done after rubbing a thin film of mustard oil on the chest and the back of the patient, frequently. If the patient suffers from high fever, has *pitta* constitution or is heat sensitive this procedure is done at a comfortable temperature and frequency. We hypothesise that fomentation dilates minute air sacs, brings about loosening of mucus and blood clots, promotes resorption of excess fluids and dead cells thus enabling reduction of inflammation and early recovery of the lung tissue. We also hypothesise that this could be a supportive treatment that can transfer heat to the air in the alveoli and can enable increased perfusion of gases-as the patients developed a sense of well-being after the procedure and requested for more sessions. Further researches are warranted in this direction; the procedure could be a revolutionary contribution of Ayurveda to the medical world in reviving respiratory distress. This is also a regular practice in many households in India since ages. Whenever the patient suffers from asthmatic attacks, hot fomentation with bundles of sand or sea salt is done periodically along with administration of Ayurveda/allopathic medicines till breathing difficulties subside (Table 2).

Eye application/*Anjanam*- The ophthalmic route of administering medicines is very unique to Ayurveda and is advocated in times when the patient is unconscious/in semiconscious states and is unable to consume medicines through the oral route. It is worth mentioning that a temporary increase in SpO2 by 6–10 ten points after eye application was also noted in other covid hypoxic patients while in this case it was by 10–37 points. This can be the first paper to document such an observation. The pathways triggered by the eye applications-to show a raise in the pulseoxymeter readings need to be further researched upon. Ayurveda eye applications in cases of borderline hypoxia of recent onset with less or no deep tissue damage or when the covid is in the first stage could help stabilise the patient along with appropriate internal medicines. Caution has to be executed as this cannot be a primary mode of treatment of moderate – severe covid. When properly researched upon-the concept of ophthalmic instillation of medicines to revive hypoxia, could be yet another contribution of Ayurveda to the world that shall set a precedent in emergency medicine (Table 2).

This case study is vital for the humanity as-doctors, covid patients and family feel compelled to use oxygen support even when the pulseoxymeter shows a few points lesser than 94 and are also afraid to wean from oxygen support. This patient, through the course of ARDS had totally been off oxygen support for at least 6 days. The WHO can organise for an expert's panel to understand if it can lower the blood oxygen levels necessitating hospitalisation to SpO2 $\leq$ 88–90 or to direct such cases to AYUSH doctors in turn lessening the burden on Allopaths in India. In covid-the necessity to support the immunity and correct such conditions that lead to hypoxia bears equal priority, with suitable immuno-supportive medicines-be it Ayurveda or Allopathy-along with the rush to put the patient on oxygen or ventilator support. This was the lowest critical covid hypoxia managed by us through telemedicine and the complete sequence of events is presented here. As of now there is no known medicine for hypoxia that can increase SpO2 levels immediately after internal administration. But the observation in this case has made a point clear that-internal administration of Ayurveda preparations and external ophthalmic instillation of Ayurveda medicines can cumulatively bring about steady correction in SpO2 levels, that possibly can behave as an impetus to guide the body's inner intelligence to correct hypoxia permanently, if supported continuously with appropriate medicines, food and treatments. These medicines can also contribute to correction of deep tissue hypoxia and bring in reduction in covid bio markers while also acting as antivirals and immuno-modulators.

In the hypoxia case presented by Jyoti Joshi et al. [42] the 75-year COVID-19 with CO-RADS 6, 18/25 who underwent ICU care for 16 days with SpO2 between 80 and 85 oxygen dependent even

after discharge with increased covid biomarkers-the oxygen saturation improved to 95 in 12 h of initiating ayurvedic treatment, oxygen support was weaned off on the third day. Complete clinical recovery along with reversal of most biomarkers related to the disease severity within 19 days of initiation of Ayurveda intervention; totally 35 days of treatment was required.

In another case reported by Sanjeev rastogi [43] the 52 year old male having severe breathlessness with COVID CT score 18/25, CORADS-6 the patient was admitted to ICU with SPO2 at 64 and declared to have poor prognosis. On the first 16 days allopathy medicines were administered, followed by 17 days of additional Ayurveda medicine with ICU care; improvement was visible in three days of starting Ayurveda, he was able to breath in his own without any supplemental oxygen need for as long as 45 min. On 6th day of initiation of Ayurveda medications, he was able to breathe without additional oxygen support and patient discharged with normal blood parameters and oxygen levels on 33rd day.

In the current paper the case presented is a 70 year old male having severe breathlessness with COVID CT score 18/25, CORADS-6, MODS, who was admitted to ICU with SPO2 at 56 and declared to have poor prognosis. He was discharged against medical advice at SPO2 65, RR40, as the patient was non cooperative. The patient was treated at home through telemedicine with minimum oxygen support. He showed clinical improvement within a day and the SpO2 steadily raised to reach 94 in 27 days and oxygen support removed.

The organic systems of human beings and all other species tend to adapt to any environmental change and circumstance with an optimal period of time, and never tend towards regression which would inevitably lead to death- Prof. Dr. Gustavo Zubieta- Castillo Sr (1926–2015) [44]. Hence what the human body needs is-appropriate adaptogenic interventions to any disease including covid, which repurposed Ayurveda medicines provide effectively. In this case the patient was weaned from oxygen even before the covid-kidney-liver biomarkers reached normalcy. The blood sugar never increased at the end of treatment showing that the Ayurveda medicines did not create hyperglycaemia as a side effect. The patient did not develop any sign as drowsiness or any other new disease as a complication of the Ayurvedic treatment. The patient's blood picture-namely count of RBC, Haemoglobin, WBC, Platelets were maintained within limits from the beginning-a probable reason that led to his good prognosis. This paper could be the first to report that the reduction in the urea levels and the controlled creatinine, uric acid levels show that the prescription containing arsenic, mercury, sulphur, mica, gold, silver, copper, lead, tin, iron supported the patient in recovery from covid and did not create any untoward effects to kidney or liver function.

3.2. Limitation

This is just a single covid case study in ARDS and MODS. We did not meet the patient personally to assess him or do a Pulse diagnosis/*nadi pariksha*. The course of the treatment was decided based on the son's observations and the video messages. We had to supervise the patient through the family-giving directions to them in explaining preparation of medicines or doing the fomentation or eye application with no nurse to supervise through phone.

To what extent the patients' habit of consuming OTC painkillers was responsible for the hepatitis or nephritis along with the covid disease one is unable to ascertain. Conclusive statements cannot be made as to whether the initial 5 days of allopathic prescription had any bearing on the improvement in SpO2 parameters or on covid markers observed after 3 days of Ayurvedic prescription. On the day when the Ayurveda telemedicine began, blood test was not taken and hence the starting point of the covid bio markers, when the Ayurvedic protocol began cannot be confirmed. Also the blood markers could not be obtained every day to check for the change in parameters with respect to - disease progression or prescription change. The absorption, blood concentration and excretion of the *Rasa aushadhis*/heavy metal medicines could not be studied with the available resources. A single active principle cannot be isolated from this study to have anti-covid activity. This is documentation of a case in unique circumstances and and hence medicines were not sent for analysis. Prescribed Medicines were procured by the patient's themselves from pharmacies supplying GMP certified medicines. The existing results' reproducibility on another covid patient in ARDS could be influenced by age, gender, health status, disease status, increased co-morbidities, food consumed, nature of the body, nature of the mind and alteration of prescription.

3.3. Strength

This case study introduces Ayurvedic Arsenic preparations as potent life savers that can recover patients from covid hypoxia. The success of Ayurvedic treatments in emergencies could be attributed to the poly-pharmacological properties of the *rasa oushadhi*/herbominerals that act synergistically on the three doshas. The utility of the heavy metal preparations during emergencies as in covid ARDS and MODS, could have been the intent of listing them in the Ayurvedic medicinal compendium since more than at least two millennia. For the second most populous nation in the world such emergency medicines' usage in life threatening situations for a short term seems to be inevitable then and even now to address the needs on a quick scale serving a larger purpose.

The patient was strong minded who did not yield to fears of the society to feel being admitted to a hospital to recover from covid even during his respiratory distress. The patient co-operated to consume the restricted diet and the completely new set of Ayurveda medicines although he had never consumed them all through his life.

3.4. Consent

Informed teleconsent from the patient was obtained during the process of documentation.

3.5. Patient perspective

After the breathing discomfort reduced the patient told his son that he neither knew that he was hospitalised nor that he changed hospitals or that he was brought home. He recalled that the ambulance journey through empty roads felt unending and felt terrified to see PPE kit laden team. He refused to sit in beds as he felt the beds appeared too shaky (though they were not) and that he had a sensation of being pushed in to a dark pit. After being discharged from hospital he imagined being taken to a home in a town where his grandchild was (though not). He regained memory after four 5 day at home and for few more days kept searching for the grandson (not at home). He felt like consuming the Ayurveda medicines after overcoming the initial hesitation as he developed a sense of comfort after intake. During the follow up after covid recovery the patient was very thankful that he recovered from the comforts of home.

4. Conclusion

The preface of WHO document 2010 states that - Ideally, countries would blend traditional and conventional ways of providing care in ways that make the most of the best features of each system and allow each to compensate for weakness in other (page x). The

survival of the 70 year old covid patient in ARDS and MODS, with Ayurveda telemedicine, whom the hospital warned could die in three days suggests-that if the above WHO s vision had been implemented in India and other countries in reality many a covid lives could have been saved. There is a need to realise importance of Ayurvedic medicines and treatments in emergency conditions. Similar case studies on bigger sample size can provide constructive clinical data on covid 19 patients with ARDS/MODS stages.

Author contribution

Sudheer. A; **Meera. G**: Conceived and designed the analysis, Collected the data, Contributed data or analysis tools, Performed the analysis, Wrote the paper.

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Appendix A. Supplementary data

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