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Short Communication

The Post-COVID 19 long term surveillance study sequel to an add-on Ayurveda regimen

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ABSTRACT

It has been 18 months now since the world-wide outbreak of COVID 19 (Corona Virus Disease 19) and still the ongoing research is being done for disease specific medicines. During June 2020 to August 2020, an attempt was made to explore if an add-on Ayurveda regimen comprising of *Dasamoolkadutrayadi Kashayam* and *Guluchyadi Kwatham* in tablet forms can be prescribed along with standard of care; which has established the clinical evidence that there is advantage of accelerated symptomatic recovery, early discharge from hospital, reducing the duration of hospital stay. After informed consent the patients were followed up over 9 months after discharged from hospital. The purpose of the present extended study was to find the impact of disease even though patients were discharged after appropriate treatment and if there were any late effects in the add-on Ayurveda treatment group after 9 months as it was one of the first few formal studies world-wide; since there was no long term follow up data available.

The study concluded that no additional late effects or symptoms or complications which were known in Post COVID phase; were observed in study group who received the add-on Ayurveda regimen as compared to the control group with conventional standard of care.

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1. Introduction

SARS CoV 2 virus, known as COVID 19 pandemic had an outbreak in India since March 2020 and a peak in conducting exploratory clinical trials across the nation was reported [1]. As updated on 1st November 2021, total number of infected people across the globe were over 24 crores and more than 50 lakhs (around 2.0%) of the total infected population succumbed to death. Of these 24 crores, 3.42 crores people were infected in India with 4.5 lakhs deaths reported [2]. Still, there is lack of effective medicine for COVID 19 infection [3]. There has been always a need for modern system of medicine (Allopathy) and Indian system of medicines (Ayurveda) experts to sit together, explore and join hand in treatment of certain diseases [4].

An open label prospective randomized clinical trial was conducted with an add-on Ayurveda regimen comprising of

Dasamoolkadutrayadi Kashayam and *Guluchyadi Kwatham* in tablet forms prescribed for COVID 19 patients admitted in our hospital; during June 2020 to August 2020 [5]. As an extension of the same research question, the patients who participated in the above-mentioned clinical trial were followed over 9 months, to understand the long-term consequences, if any.

This study was planned to gather the evidence after the study conducted through integrative approach; and the data was lacking on post COVID 19 recovery/long term adverse events if any; among those who were treated with add-on Ayurveda regimen to the conventional standard of care [6].

The objectives of the surveillance study were; to record the and to analyze the impact of the add-on Ayurveda regimen in terms of any prolonged after post COVID symptoms and/or illnesses after 9 months.

2. Methodology

This is an extension phase study, conducted in the dedicated COVID Hospital in Pune, Maharashtra, India. All 99 patients who

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participated in the add-on Ayurveda Clinical trial, were interviewed after obtaining the informed consent.

The follow up study was conducted over 9 months period of time after their discharge from the hospital. The subjective questionnaire has been provided in Annexure 1. The interview was conducted by one of the investigators in detail as per the chart.

long term surveillance was defined as any patient who developed any of the after effects after minimum 3 weeks from the date of discharge to the completion of 9 months duration after discharged from this dedicated COVID Hospital.

3. Observations and results

Median duration of post COVID symptoms/illness in study group was 25 days (range of 7 days–60 days) while in the control group the median was 30 days (range 15 days–180 days).

Incidental diagnosis of Connective Tissue Disorder was reported in the study group whereas Diabetic Ketoacidosis, Chronic Myeloid Leukemia, COPD, ARF, TIN were observed in control group though patients with any such co-morbidity were in excluded as per pre-defined inclusion and exclusion criteria of the study [5].

4. Discussion

This study was undertaken to analyze the long term outcome of COVID 19 patients treated with an add-on Ayurveda regimen as till date limited researches were carried out with Ayurveda and Modern medicine treatments together with an integrative approach.

The consequences observed during the present follow up study over 9 months period of time cannot be attributed exclusively as post COVID events; but there are similar case reports published as discussed here.

The disease reported were Connective Tissue Disorder, Diabetic Keto-acidosis, Chronic Myeloid Leukemia, COPD, Acute Renal Failure, Tubulo Intestinal Nephritis as shown in Table 1.

Fatigue is one of the common symptoms in patients who had symptomatic COVID 19. Fatigue and severity of COVID 19 through symptoms or markers could not be substantiated. There is hardly any association between the post COVID 19 fatigue and routine informatory markers like Total Leukocyte count, neutrophil or lymphocytes, lactate de-hydrogenase, C- reactive protein, Interleukin-6 [7].

Fatigue, cough, chest congestion, breathlessness, palpitations, myalgia and difficulty to focus are symptoms reported in long COVID [8]. Fatigue reported in the present study was observed as Post Viral symptom than any critical event after discharge from hospital like organ damage or critical illness after COVID 19.

COVID 19 disease etio-pathogenesis has been referred to *Pranavaha Srotas* and *Annavaaha srotas* and *Tridosha* attribution as Vata & Kapaha predominant disease [9].

Anxiety, though was frequently documented in COVID 19 patients [10] during and after COVID 19 illness, which was observed only in the control group.

In a published study of 112 hospitalized patients and 2001 non-hospitalized patients, fatigue and dyspnea were highly prevalent symptoms during COVID 19 infection as well as during follow up period of 3 months [11].

Persistent fatigue, breathlessness, mental distress and reduced quality of life were reported at the end of one to two months after discharge [12]; while even at six months persistent fatigue and muscle weakness were observed [13].

The consistent data indicating association of neuropathic pain and COVID 19 infection is yet to evolve. Neurological complications of COVID 19 when reviewed in regard to the chronic neuropathic pain, was higher in patients with mild to moderate symptoms than the severe symptoms [14].

The lower leg pain was observed in 3.33% patients in the study group. Rhabdomyolysis has been reported as COVID 19 associated symptom. [15]; but it can be explored if reported by more studies with long term follow up.

It seems that multiple factors could be contributing in pathophysiology and mechanism of Acute Kidney Injury (AKI) in COVID 19 [16].

Hyperglycemia has high prevalence in COVID 19 patients.

Insulin resistance, alteration in glyco-metabolic control and derailed cytokine profile were reported even in normo-glycemic patients. High glycemic indices were reported over two months after COVID 19 recovery [17].

COVID-19 infection triggers glycemic control and provokes acute hyperglycemic crises. A case series reportedly demonstrated that COVID-19 infection can trigger Diabetic Keto Acidosis (DKA) [18].

There are reports on granulomatous interstitial nephritis in a patient with COVID-19 [19]. The co-morbidities like hypertension, diabetes and Chronic Kidney Disease (CKD) have contributed to higher incidence of AKI in North America contradicting to the initial Chinese reports of lower incidence [20].

The attempts were made to revisit the concept of *Nidanarthakararoga Jwara* (consequences of Fever Etio-pathogenesis) leading to *Raktapitta* (Bleeding disorders) by thorough evaluation of Ayurvedic classics (*Bruhatrayee* and *Madhava Nidana*) and understanding them through contemporary science. Fever leading to bleeding disorders may have involvement of increased pro-inflammatory cytokines which causes platelet dysfunction, vascular abnormality, coagulation defects and fibrinolytic defects [21].

Table 1
9 months Post COVID symptoms/illness observations.

Diseases/Prolonged symptoms	Study group (n = 60)		Control group (n = 39)	
	Number	Percentage	Number	Percentage
Fatigue	7	11.66%	5	12.82%
Exertional Dyspnea	2	3.33%	5	12.82%
Lower Leg Pain	2	3.33%	0	0
Intermittent Fever	0	0	1	2.56%
Connective Tissue Disorder	1	1.66%	0	0
Diabetic Keto-acidosis (DKA)	0	0	1	2.56%
Chronic Myeloid Leukemia (CML)	0	0	1	2.56%
Chronic Obstructive Pulmonary Disease (COPD)	0	0	1	2.56%
Acute Renal Failure (ARF)	0	0	1	2.56%
Tubulointestinal Nephritis (TIN)	0	0	1	2.56%
Anxiety	0	0	1	2.56%
Total	12	20%	17	43.58%

Table 2
Ayurveda perspective of Post COVID symptoms & diseases observed.

Diseases/Prolonged symptoms	Attribution to the system (<i>Srotas</i>)
Fatigue	<i>Rasavaha Srotas</i>
Exertional Dyspnea	<i>Rasavaha Srotas</i>
Lower Leg Pain	<i>Rasavaha Srotas</i>
Intermittent Fever	<i>Rasavaha Srotas</i>
Chronic Myeloid Leukemia	<i>Raktavaha Srotas</i>
Connective Tissue Disorder	<i>Mamsavaha Srotas</i>
Diabetic Keto-acidosis	<i>Medovaha Srotas</i>
Chronic Obstructive Pulmonary Disease	<i>Pranavaha Srotas</i>
Acute Renal Failure	<i>Medovaha Srotas</i>
Tubulointestinal Nephritis	<i>Medovaha Srotas</i>
Anxiety	<i>Rasavaha Srotas</i>

In Ayurveda, the *Jwara* (Fever) has been mentioned as response of the body in terms of inflammatory reaction and if remained under treated or ill-treated has further clinic-pathological consequences as affecting sequential tissues.

The hospitalized COVID 19 patients enrolled in add-on Ayurveda treatment group received the Ayurveda regime that was a combination of two tablets -Tab. *Dasamoolkaduthrayadi Kashaya* + Tab. *Guluchyadi Kwatham*. Two tablets of each were administered 12 hourly after meals. The duration of treatment was 7 days [5].

The results from present analysis of data indicate that the combination of *Dasamoolkaduthrayadi Kashayam* and *Guluchyadi Kwatham* [5], might have reduced inflammatory pathogenesis during the treatment of COVID 19, without any Herb-Drug Interaction (HDI) with the conventional standard of care. Further studies with reverse pharmacology approach may reveal scientific aspects of the present clinical results based on the Ayurveda principles.

By understanding the principles of Ayurveda patho-physiology; the correlation of symptoms and illness in Post COVID phase can be attributed to the respective *Srotas* (see Table 2).

5. Conclusion

The add-on Ayurveda regimen group was found to have better clinical outcome measured in terms of post COVID illness along with conventional standard of care.

The add-on Ayurveda regimen group had lesser incidences of post COVID symptoms or occurrence of world-wide reported post COVID diseases, even after 9 months of discharge from hospital.

6. Learning from this study

The present study with 9 months long follow up, indicates a potential to explore a nation-wide integrative approach for the treatment of COVID 19; which can be further explored for other infectious diseases of Viral origin.

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Institutional Ethics Committee approval

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Declaration of competing interest

No.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jaim.2022.100575>.

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