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IMPACT OF SEVERE COVID-19 ON PULMONARY HEALTH: A FUNCTIONAL COMPARISON WITH HEALTHY SUBJECTS

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ABSTRACT

The COVID-19 pandemic has highlighted the need for a comprehensive understanding of respiratory pathophysiology and its long-term complications. In Ayurveda, the respiratory system is primarily governed by Pranavaha Srotas, which includes the lungs, bronchi, and associated structures responsible for oxygenation and life force (Prana). Post-COVID complications, such as pulmonary fibrosis, chronic fatigue, and neurological manifestations, exhibit similarities with Pranavaha Srotodushti (disorders of the respiratory channels) described in classical Ayurvedic texts. This review article aims to establish a correlation between Ayurvedic pathophysiology and modern post-COVID symptoms by analyzing classical descriptions, contemporary research, and possible therapeutic approaches. The paper explores the role of Vata and Kapha imbalance in persistent respiratory distress, the impact of Ojas Kshaya (immune depletion) in post-viral syndromes A comparative analysis of Ayurvedic and modern perspectives can provide integrative strategies for managing long-term respiratory complications, ultimately enhancing holistic patient care.

KEYWORDS: Pranavaha Srotas, COVID-19, Post-COVID Syndrome, Ayurvedic Pathophysiology, Respiratory Health, Ojas Kshaya.

INTRODUCTION

The COVID-19 pandemic has had a profound impact on global health, with millions of individuals experiencing lingering symptoms even after recovering from the acute infection. This condition, known as post-COVID syndrome or Long COVID, presents with a range of complications affecting multiple organ systems, primarily the respiratory, cardiovascular, neurological, and immune systems. The most commonly reported symptoms include persistent cough, breathlessness, fatigue, brain fog, anxiety, and musculoskeletal pain, resembling chronic inflammatory and immune-mediated disorders. Despite advancements in modern medicine, effective management of post-COVID complications remains a challenge, necessitating an integrative approach that incorporates traditional healing systems like Ayurveda.

Disorders of Pranavaha Srotas (Pranavaha Srotodushti) manifest as Shwasa (dyspnea), Kasa (cough), and chronic debility, conditions that closely resemble post-COVID respiratory complications. The primary pathological factors in post-COVID syndrome—chronic inflammation, fibrosis, and immune dysregulation—can be correlated with Vata-Kapha imbalance, Ojas Kshaya (immune depletion), and Ama (toxic accumulation) in Ayurveda. Furthermore, neurological symptoms such as cognitive dysfunction and anxiety may be associated with Vata vitiation affecting the Majja Dhatu (nervous system).

This review aims to explore the correlation between post-COVID complications and Ayurvedic pathophysiology by analyzing classical descriptions of Pranavaha Srotodushti in relation to modern biomedical findings.

PRANVAHA SROTASA: AYURVEDIC PERSPECTIVE

Pranavaha Srotas (Respiratory System)

Moolasthana (Root Structures)
(Primary Sites of Pranavaha Srotas)

Functions
(Physiological Roles)

Hridaya
(Heart)

Mahasrotas
(Lungs, Airways)

Respiration (*Shwasa*)
Energy Distribution
Voice & Speech (*VAK*)
Mind-Body Connection

Pranavaha Srotodushti (Disorders)

Aharaja (Diet)	Cold, heavy	foods (*Kapha*)	
Viharaja (Lifestyle)	Pollution	smoking	inactivity
Manasika (Mental)	Stress	grief	anxiety
Agantuja (External)	Viral	infections	allergens

Post-COVID Syndrome & Ayurveda

Correlation with Ayurvedic Pathophysiology

(Vata-Kapha Imbalance, Ojas Kshaya, Srotorodha)

Explanation of the Flowchart

Pranavaha Srotas: Represents the respiratory system in Ayurveda.

Moolasthana: The root structures (Hridaya and Mahasrotas).

Functions: Includes respiration, energy distribution, and mind-body connection.

Pranavaha Srotodushti: Disorders caused by diet, lifestyle, mental factors, and external infections.

Common Disorders: Conditions such as asthma (Tamaka Shwasa), chronic cough (Kasa Roga), and post-COVID lung fibrosis.

Post-COVID Syndrome: Correlation with Ayurvedic principles like Vata-Kapha imbalance, Ojas Kshaya, and Srotorodha.

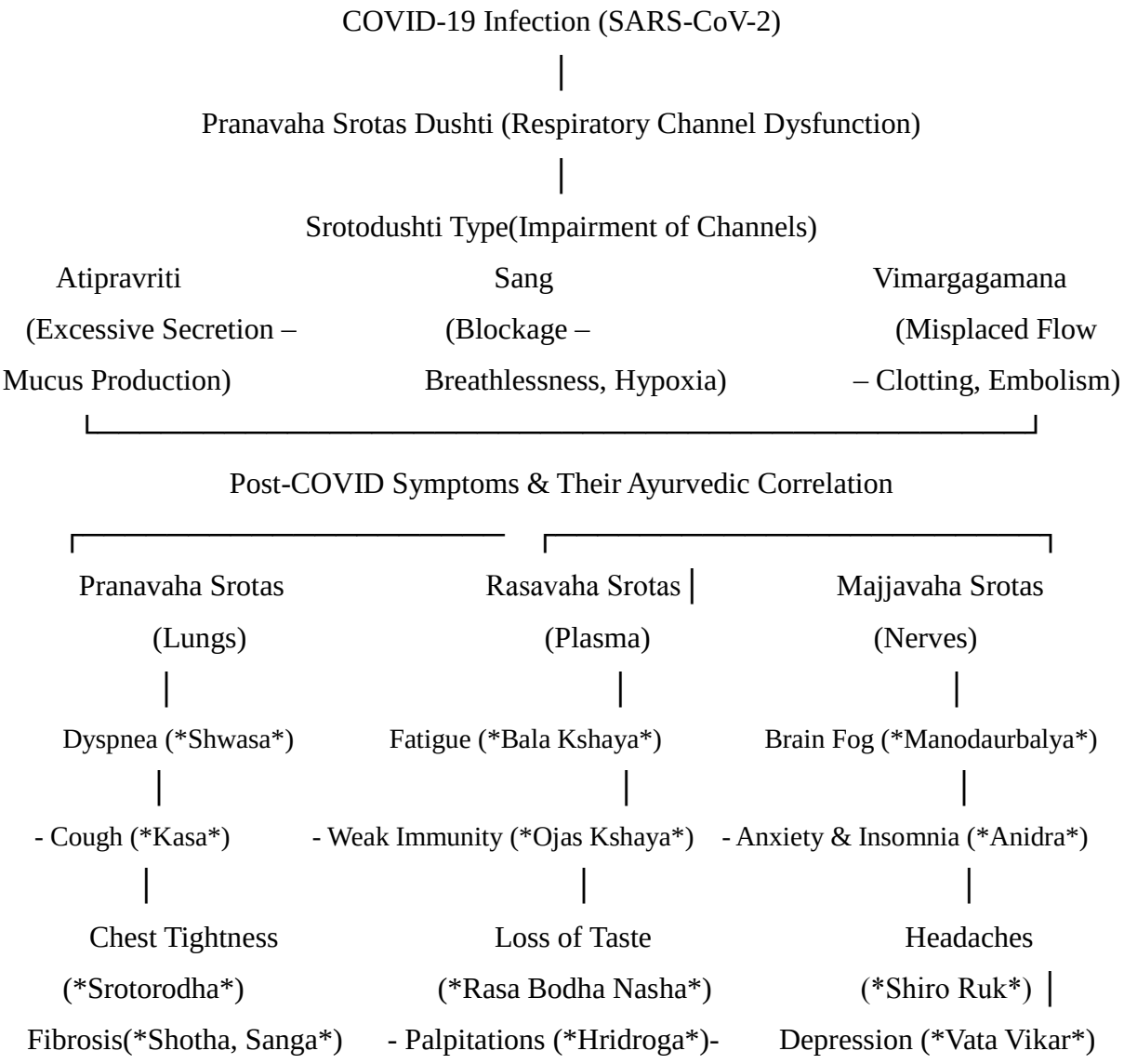
COVID-19: MODERN PERSPECTIVE

The modern perspective on COVID-19 recognizes it as an ongoing but manageable global health concern. COVID-19, caused by the SARS-CoV-2 virus, has a complex pathophysiology involving multiple organ systems. The virus primarily enters human cells via ACE2 receptors, which are highly expressed in the lungs, heart, kidneys, and intestines. The spike protein facilitates viral entry, leading to replication and immune evasion. This triggers an immune response characterized by excessive cytokine release, known as a cytokine storm, which can cause severe inflammation, acute respiratory distress syndrome (ARDS), and multiorgan failure. In the respiratory system, the virus damages alveolar cells, leading to pulmonary edema, endothelial dysfunction, and microthrombosis, contributing to hypoxemia. Additionally, cardiovascular complications such as myocarditis, arrhythmias, and thromboembolism arise due to endothelial injury and hypercoagulability. Neurological manifestations, including headaches, anosmia, and encephalopathy, are linked to

neuroinflammation and possible viral invasion of the central nervous system. The systemic impact of COVID-19 highlights its complex interplay between viral replication, immune dysregulation, and multiorgan involvement.

CORRELATION OF POST COVID SYMPTOMS WITH PRANVAHA SROTAS (RESPIRATORY SYSTEM IN AYURVEDA)

In Ayurveda, Pranavaha Srotas refers to the channel responsible for the transport and regulation of Prana (life force) and respiration. Post-COVID complications, especially respiratory, neurological, and systemic symptoms, can be understood in terms of Pranavaha Srotas Dushti (disorders of the respiratory system) along with related Srotas (channels) like Rasavaha, Majjavaha, and Udakavaha Srotas.



DISCUSSION

Post-COVID Syndrome presents a range of persistent symptoms affecting the respiratory, neurological, cardiovascular, and immune systems. From an Ayurvedic perspective, these complications can be understood as Pranavaha Srotas Dushti (respiratory channel dysfunction), Ojas Kshaya (immune depletion), and Tridosha imbalance (primarily Vata and Kapha aggravation).

Dosha Imbalance.

Vata Prakopa → Fatigue, brain fog, anxiety.

Pitta Aggravation → Inflammation, palpitations.

Kapha Aggravation → Mucus accumulation, heaviness.

Ojas Kshaya (Immune Weakness): Leads to prolonged fatigue, susceptibility to infections, and systemic weakness.

Future Scope.

Need for clinical studies to validate Ayurvedic therapies for Long COVID.

Development of standardized treatment protocols for integrative management

CONCLUSSION

The study establishes a strong correlation between Post-COVID Syndrome and Pranavaha Srotas Dushti, highlighting Ayurveda's holistic approach to understanding and managing long-term complications. While modern medicine focuses on symptomatic relief through medications, oxygen therapy, and physiotherapy, Ayurveda provides a systemic healing approach by addressing Srotodushti (channel dysfunction), Ojas Kshaya (immune depletion), and Dosha imbalances.

For effective post-COVID management, future clinical research and standardized integrative treatment protocols are needed. By combining the scientific advancements of modern medicine with the holistic healing of Ayurveda, a more comprehensive and personalized recovery strategy can be developed, benefiting patients globally.

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