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### Research

## CORRELATION BETWEEN PHYSIOLOGICAL CONCEPTS OF AMA CAUSING PRANAHA STROTO DUSHTI VIKARA WITH REFERENCE TO GUT RESPIRATORY AXIS- A CRITICAL REVIEW

<sup>1</sup>\*Dr. Brinda G M, <sup>2</sup>Dr. Govardhan Belaguli, <sup>3</sup>Dr. Shahul Hameed M

<sup>1</sup>Associate Professor, Department of Kriya Sharira, Rajeev Institute of Ayurvedic Medical Science and Research Center, Hassan.

<sup>2</sup>Associate Professor, Department of Kayachikitsa, Rajeev Institute of Ayurvedic Medical Science and Research Center, Hassan.

<sup>3</sup>Professor, Department of Kriya Sharira, Rajeev Institute of Ayurvedic Medical Science and Research Center, Hassan.

\*Corresponding Author: Dr. Brinda G.M

E.mail : dr.brindagm@gmail.com

	<h3>Abstract</h3>
<p>Published on: 07.03.2026</p>	<p><b>Introduction:</b> In Ayurvedic physiology, the integrity of Agni (digestive fire) is essential for maintaining health. Impairment of Jatharagni leads to the formation of Āma, a toxic and incompletely metabolized substance characterized by guru (heavy) and picchila (sticky) properties. Āma accumulates in Dhatus (tissues) and obstructs Srotas (body channels), resulting in Srotodushti. When this pathology affects Pranavaha Srotas (respiratory channels), it manifests as respiratory disorders such as Tamaka Shwasa (bronchial asthma). Modern biomedical research describes a similar interaction through the gut–lung axis, where gut microbial imbalance influences pulmonary immunity and inflammation.</p>
<p>Published by: Futuristic Publications</p>	<p><b>Materials and Methods:</b> A narrative literature review was conducted following PRISMA-ScR guidelines. Electronic databases including PubMed and Google Scholar were searched along with classical Ayurvedic texts such as Charaka Samhita and Sushruta Samhita. Keywords included <i>Ama</i>, <i>Jatharagni</i>, <i>Pranavaha Srotas</i>, <i>Srotodushti</i>, and <i>gut–lung axis</i>. Relevant peer-reviewed studies, reviews, and Ayurvedic conceptual analyses were selected.</p>
<p>2026  All rights reserved.</p>  <p><a href="https://creativecommons.org/licenses/by/4.0/">Creative Commons Attribution 4.0 International License</a>.</p>	<p><b>Results:</b> Classical Ayurvedic literature attributes respiratory disorders to systemic spread of Āma arising from impaired digestion, leading to obstruction of Pranavaha Srotas and symptoms like dyspnea, wheezing, and cough. Modern studies show that gut dysbiosis alters immune responses via microbial metabolites such as short-chain fatty acids, affecting cytokine production, T-cell differentiation, and airway inflammation. Increased intestinal permeability and endotoxemia further promote pulmonary inflammation.</p>

	<p><b>Discussion:</b> The Ayurvedic concept of Āma-mediated Srotodushti parallels the modern gut–lung axis model. Both frameworks highlight digestive dysfunction as a contributor to systemic immune imbalance and respiratory pathology. Integrating these perspectives may aid in identifying biomarkers of Āma, gut dysbiosis, and inflammatory mediators, encouraging future interdisciplinary research and integrative therapeutic approaches.</p>
	<p><b>Keywords:</b> <i>Ama, Pranavaha Strotas, Srotodushti, gut respiratory axis, Tamaka Shwasa, Agni.</i></p>

## INTRODUCTION

In the classical Ayurvedic texts such as the *Charaka Samhita* and *Sushruta Samhita*, *Agni* is regarded as the fundamental determinant of health, governing digestion, metabolism, and tissue transformation. Among its types, *Jatharagni* plays a central role in converting ingested food into nutritive essence (*Ahara Rasa*). When *Agni* becomes *manda* (hypofunctional), incomplete digestion results in the formation of *Ama*, described as *guru* (heavy), *Picchila* (sticky), and *Srotorodhakara* (channel obstructing). Āma circulates systemically, vitiates *Doshas*, and lodges within vulnerable *Srotas*, leading to *Srotodushti*. The *Pranavaha Strotas*, rooted in *Hridaya* and *Mahasrotas*, governs respiration and oxygenation. Its obstruction by *Ama* manifests clinically as *Tamaka Shwasa* (bronchial asthma) and *Kasa* (cough), characterized by breathlessness, airway constriction, and inflammatory changes. Contemporary biomedical research describing the gut lung axis parallels this understanding. Intestinal dysbiosis alters microbial metabolites such as short chain fatty acids, modulating systemic immunity, cytokine profiles, and T-cell differentiation. These immune mediators influence airway inflammation and hyper responsiveness, contributing to asthma and chronic respiratory disorders. Thus, the Ayurvedic concept of *Ama* induced *Strotorodha* conceptually aligns with microbial dysbiosis mediated immune dysregulation. Integrating these frameworks offers a translational model linking impaired digestion, systemic inflammation, and respiratory pathology, potentially guiding holistic preventive and therapeutic strategies.

## MATERIALS AND METHODS

This review adopted a scoping methodology in accordance with the framework outlined by the

Preferred Reporting Items for Systematic Reviews and Meta Analyses extension for Scoping Reviews (PRISMA-ScR), ensuring transparency, methodological rigor, and comprehensive mapping of the available evidence. The objective of employing a scoping review design was to systematically explore and synthesize dispersed literature pertaining to the Ayurvedic concept of *Ama*, its role in *Pranavaha Srotodushti*, and its possible correlation with the contemporary understanding of the gut lung axis. A structured literature search was conducted for peer-reviewed original research articles, review papers, and conceptual studies published between January 2000 and February 2026. Electronic databases searched included PubMed, Google Scholar, and the AYUSH Portal. The search strategy employed combinations of keywords such as “*Ama* and *Pranavaha Strotas*,” “*Ama* respiratory *Stroto Dushti*,” “gut lung axis and respiratory disease,” and “*Ayurveda* and gut lung axis.” Boolean operators (AND/OR) were applied to refine the search and ensure inclusion of relevant interdisciplinary literature bridging classical Ayurvedic concepts and modern biomedical perspectives. In addition to contemporary scientific databases, authoritative classical Ayurvedic compendia were examined to extract foundational descriptions and pathophysiological explanations. These included the *Chikitsa Sthana* of the *Charaka Samhita*, the *Sutra Sthana* of the *Sushruta Samhita*, and relevant chapters of the *Ashtanga Hridaya*. These texts were analyzed to understand the classical definitions of *Agni*, *Ama*, *Strotas*, and specifically *Pranavaha Strotas*, along with their etiological and pathological correlations. The collected literature was screened based on relevance to the conceptual linkage between impaired *Agni*, *Ama* formation, *Pranavaha Srotodushti*, and respiratory manifestations, particularly in the context of the gut respiratory axis. Data were charted and thematically categorized to identify conceptual parallels, mechanistic insights,

and research gaps, thereby providing an integrative understanding of traditional Ayurvedic doctrine in light of emerging biomedical evidence.

**Inclusion Criteria-** Studies considered for this review encompassed;

- Classical Ayurvedic texts and peer reviewed scholarly reviews that delineate the concepts of *Ama* and *Pranavaha Stroto Dushti*.
- Peer reviewed scientific literature investigating the gut lung axis and the immunological mechanisms underlying respiratory pathologies.

**Exclusion Criteria-** Publications were excluded if they;

- Were unrelated to respiratory pathology or gut lung interactions.
- Comprised case reports lacking mechanistic insight.
- Were published prior to the year 2000.

**Data Extraction and Synthesis-** Extracted data emphasized;

- Pathophysiological mechanisms associated with *Ama* formation.
- Clinical manifestations indicative of respiratory involvement.
- The influence of gut micro biotadysbiosis on respiratory health.
- Relevant immune pathways implicated in gut lung crosstalk.
- Documented therapeutic interventions targeting these mechanisms.

Due to heterogeneity across study designs, methodologies, and experimental models, evidence was synthesized using a qualitative, narrative approach.

## RESULTS AND DISCUSSION

### Genesis of *Ama* and *Strotodushti* in *Ayurveda-*

- In Ayurvedic physiology, *Agni* is the central regulator of digestion, metabolism, and systemic transformation. Impairment of *Agni*, particularly *Jatharagni (Agnimandya)*, leads to incomplete digestion of *Ahara* (food), resulting in the formation of *Ama* a pathological, incompletely metabolized substance characterized by heaviness (*Guru*), stickiness (*Picchila*), sluggishness (*Manda*), and improper digestion (*Avipaka*). *Ama*

primarily compromises the quality of *Rasa Dhatu*, the first tissue formed post-digestion, which nourishes subsequent *Dhatu*s.

- Contamination of *Rasa* with *Ama* (*Ama Rasa*) impairs its nutritive and circulatory functions. Owing to its viscous and dense properties, *Ama* adheres to the inner linings of *Strotas* (micro and macro channels of transport), leading to obstruction and impaired physiological flow a condition termed *Strotodushti*.
- *Strotodushti* may manifest as; *Sanga* (obstruction) *Atipravritti* (excessive flow) *Siragranthi* (structural deformity or nodular changes) *Vimargagamana* (misdirected flow). Among these, *Sanga* is most directly linked to *Ama* due to its obstructive nature, representing the primary pathological consequence of impaired digestion and metabolic derangement.

### *Ama* and *Pranavaha Strotodushti- Pranavaha Srotas-*

- **Pathophysiology of *Ama-*** Accumulation The *Pranavaha Strotas* is described in classical Ayurvedic texts as the channel responsible for the transport and regulation of *Prana Vayu*, the vital force essential for respiration and overall life sustenance.
- Anatomically, its *Mula* (root) is identified as the *Hridaya* (heart) and *Mahasrotas* (interpreted as the respiratory tract and thoracic structures), functionally corresponding to the cardiopulmonary system.

When *Ama* accumulates within the *Pranavaha Strotas*, it induces;

- ***Sanga* (obstruction)-** Analogous to airway blockage due to mucus plugging or inflammatory exudates.
- ***Pratiloma Gati* of *Vata* (retrograde/abnormal movement of *Vata*)-** Clinically correlates with bronchospasm or episodes of dyspnea.
- ***Avarana* of *Prana Vayu* (impediment of vital air movement)-** Results in reduced respiratory efficiency and impaired gas exchange

### Clinical manifestations include-

- ***Alpashwasa-*** Shortness of breath (dyspnea),
- ***Kasa-*** Cough,

- **Shabda Shwasa-** Audible wheezing,
- **Abhikshna Kupita Shwasa-** Recurrent paroxysmal dyspnea. From a modern pathophysiological perspective, *Ama* induced obstruction in the *Pranavaha Strotas* parallels mechanisms observed in airway inflammation, hyper responsiveness, and mucus hypersecretion.
- **The Guru (heavy) and Picchila (viscous) qualities of Ama** resemble thickened bronchial secretions that reduce airway lumen diameter, impair airflow dynamics, and contribute to respiratory distress.

#### Integrated Pathogenesis and the Gut Respiratory Axis-

- The *Ayurvedic* sequence of pathogenesis in respiratory disorders can be summarized as- *Agnimandya - Ama formation - Ama Rasa Dushti - Strotorodha* (channel obstruction) - *Pranavaha Strotodushti* - Respiratory manifestations. *Ayurveda* thus conceptualizes respiratory disorders not merely as localized pulmonary events but as systemic metabolic disturbances originating from impaired digestion and metabolism.
- This holistic understanding emphasizes correction of *Agni* (digestive/metabolic fire) and elimination of *Ama* through *Deepana*, *Pachana*, and *Shodhana* as primary therapeutic strategies in managing *Pranavaha Strotodushti Vikara*.

#### Gut Respiratory Axis in Modern Science-

- The concept of the gut lung axis has gained increasing attention in contemporary biomedical research, demonstrating that the intestinal microbiota exerts a profound influence on pulmonary immunity and respiratory homeostasis. The human gut harbors trillions of microorganisms whose collective genome and metabolic output function as an endocrine immune organ. These microbes produce bioactive metabolites that enter systemic circulation and modulate distant organs, including the lungs.
- Among the most extensively studied mediators of gut lung communication are short-chain fatty acids (SCFAs) primarily acetate, propionate, and butyrate produced through microbial fermentation of dietary

fibers. SCFAs interact with G-protein coupled receptors such as GPR41 and GPR43 (also known as FFAR3 and FFAR2) on immune cells. Activation of these receptors enhances regulatory T-cell (Treg) differentiation, promotes anti inflammatory cytokine production (e.g., IL-10), and suppresses pro-inflammatory pathways, including NF-κB signaling. These mechanisms reduce airway hyper responsiveness and mitigate allergic airway inflammation.

- Conversely, gut dysbiosis an imbalance in microbial composition alters metabolite production and disrupts immune regulation. Reduced SCFA levels and increased endotoxin (lipopolysaccharide) translocation may promote systemic inflammation. Dysbiosis has been associated with a Th2-dominant immune profile, contributing to allergic conditions such as asthma.
- Early-life microbial perturbations, including antibiotic exposure or cesarean delivery, further increase susceptibility to respiratory disorders, highlighting the developmental importance of gut microbiota in shaping pulmonary immunity.
- Beyond SCFAs, gut microbes influence lung health through additional metabolic and immunological pathways. Tryptophan metabolites produced by intestinal bacteria activate aryl hydrocarbon receptors (AhR) on immune cells, regulating mucosal barrier integrity and inflammatory responses.
- Microbial modulation of serotonin precursors and other neuroimmune mediators also impacts pulmonary epithelial function and cytokine signaling. Furthermore, microbial components such as peptidoglycans and lipopolysaccharides can enter circulation in small quantities, priming systemic innate immune responses and influencing alveolar macrophage activity. Collectively, these findings highlight a complex biochemical network linking intestinal ecology with respiratory physiology.

#### Ayurvedic Perspective and Modern Correlation-

- *Ayurveda* describes impaired digestive fire (*Agni*) as the root cause of systemic disease. Incomplete digestion results in improperly metabolized substances termed *Ama*,

characterized by heaviness (*Guru*), stickiness (*Picchila*), and obstructive tendencies, leading to *Strotodushti* (channel obstruction). In conditions affecting the respiratory system particularly *Pranavaha Srotodushti Ama* is considered a primary pathogenic factor.

- Conceptually, the formation of *Ama* parallels modern descriptions of gut dysbiosis and metabolic endotoxemia. Just as *Ama* circulates and obstructs physiological pathways, microbial metabolites and inflammatory mediators derived from a disturbed gut environment circulate systemically and influence distant organs, including the lungs. While *Ayurveda* describes these processes qualitatively and functionally, contemporary science identifies molecular mediators SCFAs, cytokines, AhR ligands, and microbial products that explain how gut dysfunction translates into respiratory pathology.
- Thus, *Ama* can be interpreted as a functional correlate of systemic inflammatory metabolites and immune dysregulation arising from impaired digestion and altered microbial ecology. The classical description of *Strotorodha* (microchannel obstruction) aligns conceptually with inflammatory edema, mucus hypersecretion, immune cell infiltration, and airway remodeling observed in chronic respiratory disorders. Integrating Ayurvedic insights with modern immunometabolic research offers a holistic framework for understanding and managing respiratory diseases through both digestive/metabolic correction and microbiota targeted interventions.

#### Therapeutic Implications-

- ***Agnidipana* and *Pachana* drugs-** Herbs that stimulate digestive metabolism and enhance proper transformation of nutrients.
- ***Ama Pachana* therapy-** Interventions aimed at metabolizing and eliminating accumulated *Ama*.
- ***Panchakarma* procedures-** Bio-purificatory therapies designed to expel morbid doshas and restore systemic balance.
- ***Pathya Apathya* (dietary regulation)-** Personalized dietary modifications to maintain digestive integrity.

These interventions conceptually parallel modern strategies aimed at restoring gut microbiota balance, such as; Probiotic and prebiotic supplementation, High fiber diets promoting SCFA production, Avoidance of unnecessary antibiotics, Targeted microbiome-modulating therapies Both systems emphasize the centrality of digestion in systemic health. *Ayurveda* approaches it through regulation of *Agni* and elimination of *Ama*, whereas modern medicine focuses on microbiome restoration and immune metabolic balance. Despite differences in terminology and methodology, both paradigms recognize that maintaining intestinal homeostasis is critical for preventing inflammatory respiratory diseases such as asthma and chronic airway disorders.

#### Discussion on Conceptual Correlation between *Ama* and the Gut Lung Axis-

- This review highlights meaningful conceptual parallels between the Ayurvedic description of *Ama* induced *Pranavaha Srotodushti* and contemporary scientific understanding of the gut lung axis. In *Ayurveda*, impaired *Agni* particularly *Jatharagni* results in the formation of *Ama*, an incompletely metabolized, heavy (*Guru*), and sticky (*Picchila*) substance. *Ama* obstructs *Strotas* (microchannels), disrupting physiological flow and homeostasis. When such obstruction occurs in the *Pranavaha Strotas*, respiratory disorders characterized by dyspnea, inflammation, excessive mucus production, and airway constriction manifest. Modern biomedical research describes a comparable phenomenon through the gut–lung axis, wherein gastrointestinal dysfunction and microbial imbalance influence pulmonary health. Gut dysbiosis alters immune signaling pathways, systemic inflammatory mediators, and epithelial barrier function. These mechanisms provide molecular insight into how digestive disturbances can precipitate or exacerbate respiratory pathology, reflecting a convergence with classical Ayurvedic theory.

#### Pathophysiological Parallels-

- **Qualitative and Molecular Perspectives-** *Ayurveda* explains systemic disease progression through qualitative frameworks involving *Agni* impairment, *Ama* formation, *Dosha* vitiation, and *Srotodushti*. In contrast,

modern science elucidates molecular mechanisms such as cytokine dysregulation, immune cell modulation, endotoxemia, and microbial metabolite imbalance.

- Despite differing epistemologies qualitative functional versus molecular biochemical both paradigms recognize digestive dysfunction as a root contributor to systemic inflammatory disorders. Research demonstrates that gut microbial dysbiosis influences short-chain fatty acid (SCFA) production, T-regulatory cell activity, and pro inflammatory cytokines such as IL-6, TNF- $\alpha$ , and IL-17. These mediators play a significant role in chronic respiratory diseases including asthma and chronic obstructive pulmonary disease (COPD). Conceptually, *Ama*'s obstructive and inflammatory properties correspond to systemic inflammatory cascades and immune dysregulation described in contemporary immunology.
- Thus, the *Ayurvedic* concept of *Strotodushti* can be interpreted as functional analogues of barrier dysfunction, inflammatory infiltration, and altered systemic signaling identified in biomedical research.

#### Therapeutic Convergence-

- Therapeutically, both systems emphasize restoration of digestive balance to improve systemic outcomes. Ayurvedic management prioritizes- *Deepana* and *Pachana* (enhancement of digestive fire), *Amapachana* (metabolic correction and detoxification), *Shodhana* therapies, including Panchakarma, to clear obstructed Srotas, Use of digestive and immunomodulatory herbal formulations.
- These approaches aim to re establish *Agni*, eliminate *Ama*, and restore physiological channel integrity. Similarly, modern medicine increasingly recognizes the therapeutic significance of gut microbiota modulation. Probiotics, prebiotics, dietary fiber, and microbiome targeted nutritional strategies are being explored to regulate immune responses and reduce pulmonary inflammation. Evidence suggests that enhancing SCFA production and restoring microbial diversity may attenuate airway hyper responsiveness and systemic inflammatory burden. This therapeutic

convergence reinforces the relevance of digestive health in respiratory disease management.

#### Limitations of Current Evidence-

- Despite compelling conceptual parallels, significant gaps remain. There is limited clinical research directly correlating Ayurvedic biomarkers of *Ama* with objective measures such as gut microbiota composition, SCFA levels, inflammatory cytokines, or pulmonary function indices. Additionally.

#### Diagnostic criteria for *Ama* lack standardized biomedical correlates-

- Variability in herbal formulations and *Panchakarma* protocols limits reproducibility. Few randomized controlled trials integrate microbiome profiling with Ayurvedic interventions. Translational models bridging classical Ayurvedic assessment and laboratory-based biomarkers remain underdeveloped. These limitations highlight the need for rigorous interdisciplinary research.

#### Future Research Directions-

- Future investigations should aim to operationalize Ayurvedic constructs in measurable biomedical terms. Potential research strategies include: Metagenomic and metabolomic analysis correlating *Agni* status with gut microbial diversity. Quantification of SCFAs, cytokine profiles, endotoxin markers, and gut permeability indices in patients with features of *Ama*. Randomized controlled trials assessing the impact of Ayurvedic interventions on microbiome composition and pulmonary outcomes.
- Development of integrative diagnostic frameworks combining classical parameters (*Agni Bala*, *Ama Lakshana*, *Strotodushti* signs) with molecular biomarkers. Collaborative research involving Ayurvedic clinicians, pulmonologists, immunologists, and microbiome scientists could generate translational models for chronic respiratory disorders such as asthma and COPD.

### Integrative Implications-

- The conceptual alignment between *Ama* induced *Pranavaha Srotodushti* and the gut lung axis underscores a shared recognition of systemic interconnectedness. Both frameworks acknowledge that digestive impairment can produce remote inflammatory consequences, particularly affecting respiratory function.
- While *Ayurveda* provides a holistic functional model and modern science offers mechanistic precision, integration of these perspectives may facilitate innovative preventive and therapeutic strategies. Strengthening gut homeostasis whether described as restoration of Agni or modulation of microbial ecology emerges as a central theme in optimizing respiratory health.

### CONCLUSION

The Ayurvedic concept of *Ama* obstructing *Pranavaha Srotas* demonstrates clear conceptual coherence with contemporary scientific models of the gut lung axis. *Ayurveda* describes impaired Agni leading to the formation of *Ama*, which disrupts

systemic homeostasis and precipitates respiratory dysfunction through *Srotodushti*. Modern research similarly establishes that gut dysbiosis influences pulmonary immunity via immune modulation, microbial metabolites, inflammatory cytokines, and barrier integrity. Although the explanatory frameworks differ qualitative and functional in *Ayurveda* versus molecular and mechanistic in biomedical science the underlying principle of digestive dysfunction contributing to respiratory pathology remains consistent across both systems. This convergence supports the plausibility of interpreting classical *Ayurvedic* observations through the lens of immunology and microbiome science. Integrative perspectives not only enhance theoretical understanding of chronic respiratory disorders but also open avenues for translational research. Future interdisciplinary studies incorporating microbiome analysis, inflammatory biomarkers, and controlled clinical trials are essential to scientifically validate Ayurvedic constructs such as *Ama* and *Srotodushti*. Such collaborative efforts may ultimately contribute to the development of comprehensive, gut centered strategies for the prevention and management of chronic respiratory diseases.

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