

A Conceptual Continuum Model of Suppurative Otitis Media in the Ayurvedic Framework of Karnaroga

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Abstract

Background: Suppurative otitis media represents a progressive inflammatory disorder that may evolve from acute middle ear infection to chronic suppuration and destructive complications. Classical Ayurvedic literature describes several ear disorders under *Karnaroga*, including *Karnapaka*, *Karnasrava*, *Putikarna*, and *Krimikarna*, whose clinical features suggest possible stage-wise progression.

Objective: To critically evaluate whether selected Ayurvedic descriptions of *Karnaroga* represent a conceptual continuum corresponding to the modern progression of suppurative otitis media.

Methods: A structured textual analytical review of primary Ayurvedic sources, including *Charak Samhita*, *Sushruta Samhita* and *Ashtanga Hridaya*, was conducted. Disease descriptions were examined for etiological factors, *Doshika* involvement, symptomatology, discharge characteristics, and indicators of structural damage. Extracted features were comparatively analyzed and mapped against contemporary understanding of acute and chronic suppurative otitis media and related complications. A theoretical continuum model was constructed based on escalating inflammatory intensity and tissue involvement.

Results: The analysis demonstrated a progressive pattern from inflammatory maturation (*Karnapaka*) to purulent discharge (*Karnasrava*), chronic fetid suppuration (*Putikarna*), and advanced destructive pathology (*Krimikarna*), reflecting increasing severity and pathological complexity.

Conclusion: Ayurvedic descriptions of *Karnaroga* may represent a structured inflammatory–destructive continuum paralleling modern suppurative otitis media progression, warranting further interdisciplinary validation.

Keywords

Karnaroga; Suppurative Otitis Media; *Karnapaka*; *Karnasrava*; *Putikarna*; *Krimikarna*; Integrative Otolaryngology; Disease Continuum Model

INTRODUCTION

Suppurative otitis media represents a significant global health concern, particularly in pediatric and resource-limited populations, where delayed diagnosis and inadequate management may lead to chronic infection, structural damage, and potentially serious complications.¹ Contemporary biomedical understanding recognizes a progression from acute inflammatory middle ear infection to chronic suppurative states characterized by persistent discharge, mucosal degeneration, and, in advanced cases, destructive pathology involving adjacent

structures.^{2,3} Despite advances in antimicrobial therapy and surgical interventions, recurrent and chronic forms of the disease remain clinically challenging^{4,5}, underscoring the importance of early recognition and stage-specific management.^{6,7}

Classical Ayurvedic literature describes a spectrum of ear disorders under the broader category of *Karnaroga*.⁶ Among these, *Karnapaka*, *Karnasrava*, *Putikarna*, and *Krimikarna* are characterized by inflammatory changes, suppuration, discharge, fetor, and tissue destruction.⁶ While traditionally interpreted as distinct clinical entities, a close textual examination reveals potential internal coherence suggestive of pathological progression. Descriptions of inflammatory maturation (*Paka*), purulent discharge (*Srava*), fetid chronic suppuration, and destructive processes involving tissue degeneration indicate a possible stage-wise escalation of disease severity.

However, existing scholarship has largely approached these conditions descriptively, without critically evaluating whether they represent isolated nosological categories or sequential manifestations within a unified inflammatory–destructive spectrum.^{8,9} There remains a gap in integrative otological research examining the structural parallels between classical Ayurvedic descriptions and modern models of suppurative otitis media progression.

The present study aims to critically analyze primary classical descriptions of *Karnapaka*, *Karnasrava*, *Putikarna*, and *Krimikarna* and to evaluate whether they can be interpreted as representing a conceptual continuum of suppurative otic pathology. By employing structured textual analysis and comparative pathological mapping, this work proposes a theoretical model bridging classical Ayurvedic nosology and contemporary otological understanding, while acknowledging the interpretative and methodological limitations inherent in cross-system analysis.

MATERIALS AND METHODS

Study Design

The present study was designed as a structured classical textual analytical review with conceptual model development. The objective was to critically evaluate whether selected *Karnaroga* entities described in classical Ayurvedic literature represent discrete disease conditions or sequential stages within a unified inflammatory–destructive continuum corresponding to suppurative otitis media.

Data Sources

Primary classical Ayurvedic texts were used as source material, including: *Sushruta Samhita*¹⁰, *Ashtanga Hridaya*¹¹, *Charaka Samhita*¹² (where relevant references were available). Standard Sanskrit editions with validated commentarial interpretations were consulted to ensure terminological accuracy and contextual integrity.^{13,14}

Selection Criteria

Inclusion Criteria

Descriptions were included if they:

1. Belonged to the category of *Karnaroga*.
2. Described inflammatory or suppurative pathology of the ear.
3. Contained clinical features relevant to discharge, tissue involvement, pain, or structural damage.

The following entities were selected for detailed analysis: *Karnapaka*, *Karnasrava*, *Putikarna*, *Krimikarna*

Exclusion Criteria

Conditions not primarily involving inflammatory or suppurative ear pathology, as well as secondary or purely symptomatic references lacking pathological detail, were excluded.

Data Extraction and Analytical Framework

For each disease entity, the following parameters were systematically extracted:

- Etiological factors (*Nidana*)
- *Doshika* involvement
- Description of inflammatory process
- Nature and characteristics of discharge
- Indicators of chronicity
- Tissue involvement and structural implications
- Markers of disease severity or complication

Terminological analysis focused on key pathological descriptors such as *Paka* (inflammatory maturation), *Srava* (discharge), *Puti* (fedor), *Kleda* (moist degeneration), and *Krimi* (organism-associated destruction).

Comparative Pathological Mapping^{2,3,4,5}

Extracted features were comparatively analyzed to identify patterns of:

- Escalation in inflammatory intensity
- Changes in discharge characteristics
- Increasing *Doshika* complexity
- Progression in tissue involvement
- Evidence of structural compromise

These parameters were then conceptually mapped against contemporary biomedical models describing the progression of acute suppurative otitis media to chronic suppurative and destructive stages.

Conceptual Model Construction^{8,9,15}

A theoretical continuum model was constructed based on sequential escalation in pathological severity, integrating classical descriptors with modern otological understanding. The model does not assert direct equivalence but proposes structural and functional parallels to generate hypotheses for interdisciplinary validation.

Ethical Considerations

As this study involved analysis of publicly available classical texts and did not include human or animal subjects, ethical approval was not required.

RESULTS

Critical Textual Analysis and Pathological Escalation within *Karnaroga*

Structured examination of classical descriptions reveals that *Karnapaka*, *Karnasrava*, *Putikarna*, and *Krimikarna* demonstrate not merely symptomatic variation but progressive pathological intensification. The escalation is identifiable across five domains: inflammatory dynamics, discharge evolution, *Doshika* complexity, tissue degradation, and structural compromise.

***Karnapaka*: Acute Inflammatory Maturation Phase**

Karnapaka is described as arising from aggravated *Pitta*, producing *Vikotha* (inflammatory disintegration) and *Vikleda* (moist degenerative change).¹⁰ The use of the term *Prapak*

indicates inflammatory maturation rather than established suppuration. Importantly, no persistent discharge or structural breakdown is emphasized at this stage.

Pathophysiologically, this suggests:³

- Hyperemic inflammatory response
- Exudative mucosal edema
- Early suppurative tendency

The dominance of *Pitta* aligns with acute inflammatory heat and vascular reactivity. The absence of chronic descriptors supports interpretation as an early inflammatory stage rather than an independent disease entity.

***Karnasrava*: Transition to Active Suppurative Discharge**

Karnasrava is explicitly described as discharge occurring “following suppuration” (*Prapakat*) or abscess formation (*Vidradhi*).¹⁰ This textual sequencing provides internal evidence of progression from inflammatory maturation to rupture and exudation.

The pathological shift includes:^{2,16}

- Release of purulent material
- Reduction in confined inflammatory pressure
- Emergence of overt drainage

The involvement of *Vata* (*Anilavrrita*) suggests structural disruption permitting outward flow. This stage reflects mechanical breach of containment, analogous to perforation following acute suppurative inflammation.

The explicit causal linkage to prior inflammatory maturation strengthens the continuum hypothesis.

***Putikarna*: Chronic Suppurative Degenerative Phase**

Putikarna is characterized by thick (*Ghana*), fetid (*Puti*), excessive (*Bahukleda*) discharge, frequently with *Kapha-Pitta* involvement.⁶ The presence of fetor implies sustained microbial activity and chronic stagnation. Unlike *Karnasrava*, where discharge follows acute inflammation, *Putikarna* describes established pathological persistence.

Key escalation markers include:^{4,5}

- Increased discharge density
- Fetid odor indicating chronic decomposition
- Mixed *Doshika* pathology reflecting inflammatory complexity
- Reduced acute pain in some descriptions (suggesting chronic adaptation)

The shift from *Pitta* dominance to *Kapha-Pitta* interaction indicates transition from acute inflammation to chronic exudative stagnation. This mirrors chronic suppurative otitis characterized by persistent drainage and mucosal hypertrophy.

***Krimikarna*: Advanced Destructive and Necrotizing Stage**

Krimikarna represents the most severe pathology, characterized by organisms (*Jantavaḥ*) consuming tissue (*Khadantah*), with severe pain and degeneration of moist necrotic tissue (*Mamsa-Asruk-Kleda*). This stage implies failure of containment and progressive tissue breakdown.

Pathological escalation includes:

- Structural tissue degradation
- Necrotic environment⁶

- Secondary organism proliferation
- Severe inflammatory pain

Unlike *Putikarna*, where chronic suppuration dominates, *Krimikarna* emphasizes destructive consumption, suggesting advanced infection with potential extension beyond mucosal layers.^{6,7}

Doshika involvement becomes more complex, reflecting systemic destabilization rather than localized inflammation.

Comparative Escalation Framework

Domain	<i>Karnapaka</i>	<i>Karnasrava</i>	<i>Putikarna</i>	<i>Krimikarna</i>
Inflammatory Dynamics	Acute inflammatory maturation	Suppurative rupture	Chronic inflammatory persistence	Necrotizing destructive inflammation
Discharge Evolution	Not dominant	Purulent exudate	Thick, fetid, persistent	Necrotic destructive exudate
Chronicity	Acute	Acute–subacute	Chronic	Advanced/neglected
Tissue Integrity	Mucosal edema	Breach of containment	Degenerative mucosal damage	Structural tissue destruction
<i>Doshic</i> Complexity	<i>Pitta</i> dominant	<i>Pitta</i> ± <i>Vata</i>	<i>Kapha</i> + <i>Pitta</i>	<i>Tridoshika</i> destabilization

Pathobiological Rationale for Continuum Model

Across these entities, a structured escalation is observable:

1. Acute inflammatory hyperemia and exudation (*Karnapaka*)
2. Mechanical rupture with purulent drainage (*Karnasrava*)
3. Persistent colonized suppurative state (*Putikarna*)
4. Necrotizing destructive pathology (*Krimikarna*)

The textual marker indicating discharge occurring after inflammatory maturation provides internal evidence of stage transition. Furthermore, progressive changes in discharge character -from absent to purulent to thick and fetid to necrotic - reflect increasing microbial burden and tissue breakdown.

The shift in *Doshika* predominance from primarily *Pitta* (acute inflammatory heat) to *Kapha–Pitta* (chronic moist suppuration) and eventually to complex multi-*doshika* involvement parallels increasing pathological instability.

This structured escalation supports interpretation of these conditions as sequential manifestations within an inflammatory–destructive spectrum rather than independent disease categories.

DISCUSSION

The present analysis suggests that *Karnapaka*, *Karnasrava*, *Putikarna*, and *Krimikarna*-traditionally categorized as distinct *Karnaroga* entities in classical Ayurvedic literature-may be more coherently interpreted as sequential manifestations within a progressive inflammatory-

destructive continuum of otic pathology. Rather than viewing these entities as isolated nosological classifications, the textual evidence indicates structured escalation in inflammatory intensity, discharge characteristics, chronicity, tissue involvement, and *Doshika* complexity.

Internal Textual Evidence of Progression

A critical observation supporting the continuum hypothesis is the explicit reference¹⁰ to discharge occurring “following inflammatory maturation” (*prapakat*) in the description of *Karnasrava*. This establishes a causal transition from *Karnapaka* (inflammatory maturation) to a suppurative drainage phase. Such internal sequencing strengthens the argument that these conditions represent pathological stages rather than independent diseases.^{2,4}

Furthermore, qualitative transformation of discharge across the entities—from absent or developing exudate (*Karnapaka*), to purulent drainage (*Karnasrava*), to thick and fetid discharge (*Putikarna*), and finally to necrotic destructive exudation (*Krimikarna*)—demonstrates a clear escalation in pathological severity. The increasing density, odor, and degenerative characteristics of discharge are consistent with prolonged infection and microbial colonization.

Doshika Escalation and Inflammatory Complexity

The shift in *Doshika* predominance across stages provides additional structural coherence. *Karnapaka* is primarily *Pitta*-dominant, consistent with acute inflammatory heat and vascular reactivity. *Karnasrava* introduces *Vata* involvement, suggesting structural disruption enabling drainage. *Putikarna* reflects *Kapha-Pitta* interaction, indicating chronic moist suppuration and stagnation. *Krimikarna* demonstrates complex *Doshika* destabilization, aligning with advanced tissue destruction and pathological breakdown.^{6,17}

When interpreted through a modern inflammatory lens, this *Doshika* escalation parallels progression from acute mucosal inflammation to chronic suppurative disease with tissue remodeling and necrosis. While *Doshika* theory and contemporary immunopathology operate within distinct epistemological frameworks, the structural pattern of escalation shows conceptual compatibility.

Correlation with Contemporary Otological Models^{2,3,5}

Modern biomedical models recognize progression in suppurative otitis media from acute inflammatory stages to chronic suppurative states and, in neglected cases, to destructive complications. Acute mucosal inflammation with exudate formation may progress to tympanic membrane perforation and purulent discharge. Persistent infection can result in chronic suppuration characterized by thick discharge, mucosal hypertrophy, and structural damage. Advanced untreated cases may lead to necrotizing pathology and tissue destruction.

The Ayurvedic descriptions mirror this trajectory at a phenomenological level. Notably, *Krimikarna*'s emphasis on tissue consumption and severe degeneration suggests advanced destructive pathology beyond simple chronic discharge. However, it must be emphasized that direct equivalence with specific biomedical entities such as mastoiditis or intracranial complications cannot be definitively asserted without anatomical confirmation within the texts.

Interpretative Caution

Despite structural parallels, several limitations must be acknowledged. First, classical descriptions are based on clinical observation without anatomical dissection in the modern sense; therefore, precise middle ear or mastoid involvement cannot be conclusively determined. Second, the term “*krimi*” may denote macroscopic infestation or broader microbial activity, and its exact pathological scope remains interpretative. Third, retrospective mapping across epistemological systems carries inherent risk of confirmation bias.^{9,18}

Accordingly, the proposed continuum model should be regarded as a conceptual and hypothesis-generating framework rather than a claim of historical diagnostic equivalence.

Implications for Integrative Otology

Reinterpreting *Karnaroga* through a continuum model may contribute to stage-based integrative therapeutic strategies. Recognizing inflammatory maturation, suppurative transition, chronic stagnation, and destructive escalation as sequential phenomena may enhance early-stage intervention approaches within integrative practice. Moreover, the model invites future interdisciplinary research exploring correlations with radiological findings, microbiological patterns, and clinical staging.

CONCLUSION

Critical analysis of classical Ayurvedic descriptions of *Karnapaka*, *Karnasrava*, *Putikarna*, and *Krimikarna* suggests a structured escalation of inflammatory and destructive otic pathology. The sequential transformation from inflammatory maturation to suppurative discharge, chronic fetid infection, and advanced tissue destruction supports interpretation of these entities as stages within a conceptual continuum rather than isolated conditions. While direct anatomical equivalence with modern disease categories cannot be definitively established, the observed pathological coherence demonstrates meaningful structural parallels with the progression of suppurative otitis media. This continuum model provides a foundation for future interdisciplinary validation and integrative otological research.

REFERENCES

1. WHO. Chronic suppurative otitis media: burden of illness and management options. Geneva: World Health Organization; 2004.
2. Monasta L, Ronfani L, Marchetti F, et al. Burden of disease caused by otitis media: systematic review and global estimates. *PLoS One*. 2012;7(4):e36226.
3. Schilder AGM, Chonmaitree T, Cripps AW, et al. Otitis media. *Nat Rev Dis Primers*. 2016;2:16063.
4. Verhoeff M, van der Veen EL, Rovers MM, Sanders EA, Schilder AG. Chronic suppurative otitis media: review. *Int J Pediatr Otorhinolaryngol*. 2006;70(1):1–12.
5. Mittal R, Lisi CV, Gerring R, et al. Current concepts in the pathogenesis and treatment of chronic suppurative otitis media. *J Med Microbiol*. 2015;64:1103–16.
6. Browning GG, Merchant SN, Kelly G, Swan IR, Canter R, McKerrow WS. Chronic otitis media. In: Gleeson M, editor. *Scott-Brown's Otorhinolaryngology*. 7th ed. London: Hodder Arnold; 2008.
7. Nadol JB Jr. Histopathology of chronic otitis media. *Ann Otol Rhinol Laryngol*. 1985;94:363–70.
8. Patwardhan B, Vaidya AD, Chorghade M. Ayurveda and natural products drug discovery. *Curr Sci*. 2004;86(6):789–99.
9. Patwardhan B. Bridging Ayurveda with evidence-based scientific approaches. *Evid Based Complement Alternat Med*. 2014;2014: ID 659239.
10. Sushruta. *Sushruta Samhita*. Uttara Tantra, Chapter 20 (*Karnaroga Adhyaya*). Ed. Acharya YT. Varanasi: Chaukhamba Orientalia; Reprint edition.

11. Vagbhata. *Ashtanga Hridaya*. Uttara Sthana, Chapter 17. Ed. Paradkar HS. Varanasi: Chaukhambha Orientalia; Reprint edition.
12. Charaka. *Charaka Samhita*. Chikitsa Sthana, Chapter 26. Ed. Prof. Ravidutta Tripathi. Varanasi: Chaukhambha Orientalia; Reprint edition.
13. Sharma PV. *Sushruta Samhita with English Translation*. Vol III. Varanasi: Chaukhambha Vishvabharati; Reprint edition.
14. Srikantha Murthy KR. *Ashtanga Hridaya (English Translation)*. Vol III. Varanasi: Chaukhambha Krishnadas Academy; Reprint edition.
15. Mittal R, Lisi CV, Gerring R, et al. Current concepts in the pathogenesis and treatment of chronic suppurative otitis media. *J Med Microbiol*. 2015;64:1103–16.
16. Bluestone CD, Klein JO. *Otitis Media in Infants and Children*. 4th ed. Hamilton: BC Decker; 2007.
17. Tilburt JC, Kaptchuk TJ. Herbal medicine research and global health. *BMJ*. 2008;337:a2718.
18. Hankey A. Establishing the scientific validity of tridosha theory. *J Altern Complement Med*. 2001;7(5):491–6.