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Decoding Nipah Virus Infection Through Ayurveda: A Pathophysiological and Therapeutic Insight

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Nipah virus (NiV) infection, a highly fatal zoonotic disease, presents with acute encephalopathy, respiratory distress, and multi-organ failure. Ayurveda classifies it under Agantuja Jwara, Vishajanya Vyadhi, and Oja-Kshaya conditions, involving Pranavaha, Raktavaha, and Majjavaha Srotas. Management integrates Shodhana (detoxification), Sanshamana (palliative care), and Rasayana (immune restoration) to enhance Vyadhikshamatva (disease resistance). Ayurvedic Vishaghna and Krimighna herbs exhibit antiviral and neuroprotective potential. This short communication highlights the pathophysiological correlation, Ayurvedic treatment approach, and scope for integrative virology research in NiV management. Ayurveda's time-tested principles can contribute to novel pandemic strategies.

Keywords: Nipah virus, Agantuja Jwara, Vishachikitsa, Ojakshaya, Rasayana Therapy

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Introduction

Nipah virus (NiV) is a highly virulent zoonotic pathogen classified under *Agantuja Vyadhi*. It exerts a profound impact on *Pranavaha, Raktavaha*, and *Majjavaha Srotas*. The disease progression is characterized by *Dushita Vata-Kapha Sannipata*, leading to Septicaemic *Vishama Jwara*, with predominant involvement of *Shiras* (brain), *Sira* (blood vessels), and *Urah* (lungs). Ayurvedic texts elaborate on interplay of *Bahya Hetus* (external factors) and *Sharirika Dosha Vikriti*, resulting in *Vishakta Jwara* (febrile condition due to vitiated Rakta and Pitta).**[1]** Hallmark clinical manifestations of NiV—encephalopathy, pneumonitis, and vascular inflammation—align with *Krimija Jwara* and *Agantuja Abhishangaja Jwara*, further complicated by *Ojovyapat* and *Srotodushti,* particularly *Sira Granthi* and *Stambhana* in *Majjavaha* and *Pranavaha Srotas*.**[²]** Given high fatality rate and absence of definitive antiviral therapy, Ayurveda provides a holistic model of pathogenesis (*Samprapti*) and therapeutic interventions, particularly through Rasayana Chikitsa, *Krimighna Dravya Prayoga*, and *Shodhana Upakrama*.**[3]** This article aims to establish pathophysiological correlation & explore Ayurvedic management principles to combat NiV infection effectively.

Samprapti (Pathogenesis) of Nipah Virus in Ayurveda

The pathogenesis of Nipah virus (NiV) infection can be understood through the Ayurvedic lens of *Agantuja Vyadhi*, wherein an external pathogenic factor (virus) initiates the disease process.

Samprapti Ghataka (Pathophysiological Components)

Component	Ayurvedic Correlation with NiV
Nidana (Etiology)	Agantuja Karana (Viral invasion via Kapota-Sparsha Samsarga)[4]
Dosha	Vata-Kapha Pradhana, with secondary Pitta Dushti
Dushya	Rasa, Rakta, Majja
Srotas Pradosha	Pranavaha, Raktavaha, Majjavaha Srotas
Adhisthana	Shiras (brain), Hridaya (heart), Kloma (lungs)
Srotodushti Type	Sanga (obstruction), Vimarga Gamana (aberrant flow), Atipravritti (hyperfunction)
Vyaktasthana (Manifestation site)	Urah (lungs), Mastishka (brain), Raktavaha Sira (vascular endothelium)
Upadrava (Complications)	Ojovyapat, Ojokshaya leading to multi-organ failure

Sequential *Dosha* Involvement in NiV

1. Primary Agantuja Jwara Stage:

A. The virus enters via the respiratory tract (*Pranavaha Srotas*), initiating a *Vata-Kapha Dushti*.
B. Symptoms: *Gala Sotha* (throat inflammation), *Kasa* (cough), *Swarabheda* (hoarseness), *Jwara* (fever).

***2. Raktavaha* & *Majjavaha Srotas* Involvement:**

A. Viral replication in endothelial cells triggers *Pitta Dushti*, leading to *Vishakta Rakta Lakshanas* (vasculitis, thrombocytopenia).**[5]**
B. Symptoms: *Mukhapaka* (oral ulcers), *Raktastambhana* (clotting abnormalities), *Angamarda* (body pain).

***3. Ojovyapat* & Neurological Phase:**

A. Majjavaha Srotodushti leads to *Vata-Prakopa*, causing *Mastishka-Gata Jwara* (brain fever) and *Sankochana* (seizures, encephalitis).**[6]**
B. Symptoms: *Bhrama* (vertigo), *Manas Mandata* (mental confusion), *Smriti-Hani* (memory loss), *Murcha* (coma-like state).

Ayurvedic *Chikitsa Siddhanta* for Nipah Virus (NiV) Infection

As NiV primarily disrupts *Pranavaha, Raktavaha*, and *Majjavaha Srotas*, a well-structured *Trividha Chikitsa Krama* (*Shodhana, Sanshamana, Rasayana*) must be employed for comprehensive *Dosha*, *Dushya*, and *Srotas* stabilization.

***1. Shodhana Chikitsa* (*Panchakarma* Detoxification Therapy)**

Poorva Karma:

- *Deepana-Pachana: Laghu Ahara, Shunthi, Pippali, Maricha, Chitraka* to reduce
- *Snehapana: Panchatikta Ghrita, Mahatikta Ghrita* for *Vata-Pitta Prashamana.*
- *Swedana: Nadi Sweda* with *Dashamoola Kwatha* to pacify *Kapha* and reduce *Pranavaha Srotorodha.*

Pradhana Karma:

- ***Vamana Karma* (*Shodhana* for *Pranavaha Srotas*) -** Indicated in *Kapha-Pitta Pradhana* stage, for viral clearance from *Urdhwabhaga Srotas. Yashtimadhu Kwatha, Saindhava Lavana, Madana Phala Yoga* in the early morning on empty stomach.

- ***Virechana Karma* (*Pitta-Kapha Shodhana* for *Raktavaha Srotas*) -** To eliminate *Rakta Dushti, Srotas Sanga*, and *Ama-Visha. Avipattikara Churna, Trivrit Leha, Aragwadha Phala* in *Sukhoshna Jala.*
- ***Nasya Karma* (*Mastishka Shodhana* for *Majjavaha Srotas*) -** Essential for *Manovaha Srotas Vikara,* neural inflammation, and encephalopathy. *Shadbindu Taila, Brahmi Ghrita, Anu Taila Nasya* (3-5 drops per nostril).
- ***Raktamokshana* (*Vishagna* for *Raktavaha Srotas*) -** Recommended for *Srotas Shuddhi* and *Vishakta Pitta Nirharana. Siravyadha* (Jugular Vein) or *Alabu Prayoga* on *Lalata* and *Skandha Pradesh.*

***2. Sanshamana Chikitsa* (Palliative Therapy)**

After *Shodhana, Sanshamana Aushadhi* should be employed for *Dhatwagni Deepana, Jwara Nigrahana, Krimighna*, and *Mastishka Shuddhi.*

- ***Jwara Prashamana:***
  - *Guduchi Satva, Chandrakala Rasa, Sudarshan Ghana Vati* (for *Santata Jwara*).
  - *Shadangapaniya Kwatha* + *Yashtimadhu Churna* (for *Daha, Trishna*).
- ***Krimighna* (Antiviral Effect):**
  - *Indukanta Ghrita, Nimbadi Churna, Vidangarishta* (for *Agantuja Krimi*).
  - *Haridra Khanda, Pippali Churna* + *Madhu* (for *Vishakta Rakta*).
- ***Majja-Vata Kapha Shamaka:***
  - *Brahmi Ghrita, Saraswatarishta, Kalyanaka Ghrita* (for neural recovery, speech disturbances).
  - *Vacha Churna, Ashwagandha Avaleha* (for *Smriti-Hani* and *Manas Mandata*).

***3. Rasayana Chikitsa* (Rejuvenation & *Ojas Sthapana*)**

Since NiV leads to *Ojokshaya* and *Srotas Stambhana, Rasayana* therapy is critical for neuro-immunomodulation and organ repair.

- ***Rasayana* for *Ojas Vriddhi* & *Vyadhikshamatva:***
  - *Chyavanprasha Avaleha, Amritaprasha Ghrita, Guduchi Satva* for systemic rejuvenation.
  - *Rasayana Ghana Vati, Ashwagandharishta* for immune restoration.
- ***Majjavaha Rasayana:***
  - *Vardhamana Pippali Rasayana, Brahmi Ghrita, Kalyanaka Ghrita* to restore neural health.
  - *Vacha Churna* + *Madhu* + *Ghrita* for cognitive enhancement.
- ***Vata-Kapha Hara Brimhana:***
  - *Dashamoola Rasayana, Shatavari Ghrita* for *Dhatu Poshana.*
  - *Bala Taila Abhyanga, Ksheera Vasti* for *Snayu Bala Vriddhi.*

Discussion

The Ayurvedic approach to Nipah Virus (NiV) infection aligns with the principles of *Agnantuja Jwara, Krimi-Prabhava Vishakta Vyadhi,* and *Ojas-Vyapat.* The systemic involvement of *Pranavaha, Raktavaha,* and *Majjavaha Srotas* explains the multi-organ dysfunction and neurological complications observed in modern medicine.

Ayurveda vs. Modern Medicine in NiV Management

Modern medicine relies on supportive care, with no specific antiviral treatment for NiV. Ribavirin, an antiviral, has shown limited effectiveness, and monoclonal antibody therapies are still experimental. The mortality rate remains high due to rapid encephalopathy and respiratory failure. Ayurveda's holistic approach integrates *Shodhana* (biopurification), *Sanshamana* (palliative care), and *Rasayana* (immunomodulation) to detoxify the body, support systemic healing, and enhance *Vyadhikshamatva* (immune resistance).

Relevance of Ayurvedic Virology (*Vishachikitsa* & *Agantuja Vyadhi*)

- Ayurvedic texts describe viral infections as *Agantuja Vyadhi* with *Krimi* and *Vishakta* The classical description of *Sannipataja Jwara* with *Vishajanya Prabhava* correlates with NiV-induced hemorrhagic fever, encephalopathy, and immune dysregulation.
- *Vishachikitsa* & *Krimighna Chikitsa* principles suggest that *Ama-Visha* and *Dhatugata Krimi* need to be eliminated through *Shodhana* (*Panchakarma*) and *Sanshamana* herbs with *Tikta-Katu-Rasatmaka Vishaghna* properties.

- The role of *Rasayana* therapies is critical, as *Ojas* depletion (*Ojokshaya*) leads to severe neuroinflammation, immune collapse, and death in NiV infection.

Bridging Ayurveda & Modern Research

- Emerging research on Ayurvedic antivirals (*Guduchi, Pippali, Ashwagandha, Yashtimadhu*) highlights their immunomodulatory and neuroprotective potential, suggesting a role in post-viral neurological recovery.
- Clinical integration of *Ayurveda* in viral outbreaks is still underexplored but can be crucial for future pandemic preparedness.

Conclusion

The Ayurvedic management of Nipah Virus Infection (NiV) offers a comprehensive pathophysiological explanation and a structured treatment approach targeting *Dosha* imbalance, *Srotodushti*, and *Ojas* depletion. *Shodhana Chikitsa* (*Panchakarma*) aids viral clearance & *Srotas* detoxification *Sanshamana Chikitsa* (herbal therapy) manages inflammation & neurological effects. *Rasayana Chikitsa* restores *Ojas* & prevents long-term complications. Ayurveda's *Vishachikitsa, Krimi-Prabhava Jwara*, and *Ojas*-stabilizing principles can serve as a potential foundation for integrative virology and immune modulation strategies in severe viral infections. Future research should focus on Ayurvedic virology and *Rasayana*-based immunotherapy to bridge the gap between ancient wisdom and modern medicine.

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