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Necrotizing Fasciitis (Vrana / Dushta Vrana): An Integrative IMRAD Review with Modern and Shalyatantra References

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ABSTRACT:

Background: Necrotizing fasciitis (NF) is an aggressive, rapidly progressive soft-tissue infection of fascial planes and subcutaneous tissue that can lead to systemic toxicity and high mortality without prompt surgical intervention. Ayurveda describes severe, foul, destructive wounds under the rubric of Dushta Vrana; classical Shalyatantra prescribes surgical and para-surgical measures for cleansing and healing. Methods: Narrative IMRAD review integrating contemporary surgical literature (diagnosis, emergency management, outcomes) with classical Ayurvedic texts (Sushruta Samhita and related commentaries) and recent Ayurvedic case reports addressing wound management. Results: Modern management prioritizes urgent wide surgical debridement, broad-spectrum intravenous antibiotics and intensive supportive care. Ayurvedic Shalyatantra provides principles—cheda (excision), vrana-shodhana (cleansing), kshara and agni karma (chemical and thermal measures), and ropana (healing) therapies—that conceptually align with modern goals of source control and wound bed preparation. Evidence for Ayurvedic adjuncts in NF is limited to case reports and small observational series. Conclusion: In acute NF, modern surgical care is essential and non-negotiable. Ayurvedic measures may be considered as adjunctive local therapy after stabilization and adequate source control, in a multidisciplinary framework. Standardized clinical research is needed to establish safety, timing, and efficacy of Ayurvedic wound regimens in the post-debridement phase.

KEYWORDS: Necrotizing fasciitis, Dushta Vrana, Shalyatantra, Sushruta Samhita, debridement, Panchavalkala, wound management

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INTRODUCTION:

Necrotizing fasciitis (NF) is characterized by rapidly progressive necrosis of fascia and subcutaneous tissue with systemic toxicity. Early recognition and aggressive surgical debridement are key determinants of survival. Ayurvedic classical texts—primarily the Sushruta Samhita—describe a wide range of wounds (vrana), their causes, presentations and treatments. A subgroup termed Dushta Vrana describes contaminated, putrefactive and non-healing ulcers with features that overlap conceptually with severe necrotizing infections. This review juxtaposes modern clinical practice with Shalyatantra principles to propose integrative perspectives for wound management.

Methods

This narrative review integrates modern surgical literature (PubMed, StatPearls summaries, review articles) with classical Ayurvedic sources (Sushruta Samhita translations and commentaries) and contemporary Ayurvedic case reports. Emphasis was placed on clinical principles that can be safely integrated after modern stabilization and source control.

Ayurvedic View (Expanded)

Etymology and Definition

Etymology: 'Vrana' (Sanskrit) broadly denotes any wound, ulcer or breach in tissue integrity. 'Dushta Vrana' denotes a wound spoiled by morbid factors—characterized by putrefaction, foul discharge, pain, discoloration and delayed healing. In the context of severe fulminant soft-tissue infection, the term Dushta Vrana is used by modern authors to draw parallels to necrotizing soft tissue infections described in surgery texts. Definition (classical): Classical surgeons (Shalyacharyas) define Dushta Vrana as wounds in which the normal healing processes are thwarted by morbid dosha (vitiated Vata, Pitta and/or Kapha), resulting in sloughing, putrid discharge and progressive tissue destruction that resists simple measures of cleansing.

Nidana (Etiology) according to Classical Acharyas

Sushruta, Charaka and Vagbhata describe multifactorial causes for vrana development and dushta vrana formation. While classical etiologies are expressed in terms of doshas and external factors, they map to modern risk factors:

- External injury/trauma allowing microbial entry (Sushruta: external cause leading to vrana).
- Delay in cleansing and local care (leading to putrefaction and krimi—parasitic/pathogenic agents).
- Putrefactive contamination and exposure to noxious agents (Sushruta discusses exposure to pollutants and unclean materials causing dushta vrana).
- Predisposing systemic states that reduce host resilience (classical: mandha sharira, ojahani; modern parallels: diabetes, immunosuppression, malnutrition).

In short, nidana according to acharyas includes trauma, improper treatment, local contamination, and systemic debility—factors that correspond well with recognized modern NF risk factors.

Purvarupa (Prodromal features) and Roopa (Clinical features)

Purvarupa (prodromal signs as per Ayurvedic descriptions of impending severe vrana): localized pain, numbness, burning, foul smell from the wound, mild systemic disturbance (fever, weakness). These mirror early NF clues—severe pain often disproportionate to visible signs. Roopa (classical signs of Dushta Vrana): sloughing of tissue, foul discharge, discoloration (blackish/greenish), severe local pain, spreading of lesion, and systemic features such as fever and toxicity. In NF, clinical features include rapidly progressive

swelling, tender erythema, skin discoloration, crepitus (if gas-forming organisms), systemic sepsis and hemodynamic instability.

Samprapti (Pathogenesis) — Classical and Correlative Modern View

Classical samprapti describes vitiated doshas (especially Vata and Pitta with accumulated mala and krimi) causing tissue destruction and impaired healing. Morbid matter (dushta) spreads through channels, producing progressive tissue decay. Correlatively, modern pathogenesis of NF involves bacterial invasion of subcutaneous tissues and fascia, rapid spread along fascial planes aided by bacterial enzymes and host inflammatory response, leading to thrombosis of subcutaneous vessels, ischemia, and further necrosis—creating a vicious cycle. The Ayurvedic notion of spreading morbid matter aligns conceptually with the rapidly progressive microbial and inflammatory spread in NF.

Sadyasadhyatva (Treatability/Prognosis) in Ayurveda

Ayurvedic texts classify certain conditions as 'sadhya' (curable) and 'asadhya' (incurable). For vrana, the prognosis depends on early intervention, patient's strength (deha bala), and extent of tissue involvement. Dushta Vrana with extensive necrosis and systemic involvement is considered serious and may be difficult to cure if not treated early. This aligns with modern observations that early aggressive treatment improves survival, while delayed care increases mortality.

Chikitsa / Management — Classical Shalyatantra Procedures and Modern Correlates

Shalyatantra emphasizes three broad tasks in severe vrana: removal of morbid tissue (Chedata / excision/Bhedana), cleansing (Shodhana), and measures to promote healing (Ropana). Below are classical procedures and modern correlates:

1. Chedana / Bhedana (Surgical excision/incision):-

Classical: Excision of necrosed tissue and opening of collections.

- Modern correlate: Urgent wide surgical debridement, drainage of collections, fasciotomy when needed.

2. Kshara Karma and Agni Karma (Chemical cautery/caustic and thermal cautery):-

Classical: Use of alkaline pastes (kshara) and controlled cauterization to remove slough and control putrefaction.

- Modern correlate: Limited; these methods historically parallel modern local chemical debridement or use of topical agents; in acute NF, they should not delay surgical source control and are recommended only by experienced practitioners in specific contexts.

3. Vrana Shodhana (Cleansing):-

Classical: Irrigations with decoctions (e.g., Panchavalkala kwatha), internal medicinals to reduce putrefaction, and application of lepa (paste) or medicated taila.

- Modern correlate: Wound irrigation, antiseptic dressings, negative-pressure wound therapy (VAC) after adequate debridement; topical herbal dressings may be explored as adjuncts.

4. Ropana (Promoting healing):

- Classical: Application of Jatyadi taila, Yashtimadhu-based pastes and other ropana formulations to encourage granulation and epithelialization.

- Modern correlate: Use of dressings that promote moist wound healing, skin grafting when necessary, and agents that stimulate granulation.

5. Systemic therapy:-

Classical: Rasayana, strengthening therapies, and specific internal medicines to improve digestion, immunity and wound healing.

- Modern correlate: Broad-spectrum intravenous antibiotics, intensive support

(fluids, vasopressors), glycemic control, nutritional support.

Pathya-Apathya (Dietary and Lifestyle Guidelines)

Classical Ayurvedic management of vrana emphasizes restoring agni (digestive/metabolic fire), clearing ama (toxins), and avoiding aggravating foods and activities. Practical pathya-apathya for a patient recovering from NF (post-stabilization) may include:

Pathya (recommended):- Easily digestible, protein-rich meals (e.g., lentil soups, soft cooked rice, lean proteins) to support wound healing and maintain nutritional status.
- Foods that improve digestion and immunity: ginger (in small amounts if appropriate), cooked vegetables, small amounts of ghee if tolerated.
- Adequate hydration and micronutrient support (vitamin C, zinc) as per physician guidance.

Apathya (to be avoided):
- Heavy, oily, and fried foods that may impair digestion and contribute to sluggish recovery.
- Excessive immunosuppressive substances (alcohol), and exposure to unhygienic environments or unclean dressings.
- Foods known to increase Pitta in sensitive individuals (excess spicy, sour items) if classical assessment suggests Pitta predominance.

Note: All dietary advice must be individualized, especially for patients with diabetes, renal impairment, or other systemic illnesses.

Results — Modern Clinical Overview (Concise)

- Presentation & diagnosis: severe pain, rapid progression, systemic toxicity; LRINEC score is adjunctive but not definitive. Early surgical exploration is diagnostic.
- Primary treatments: immediate broad-spectrum IV antibiotics, urgent aggressive debridement, repeated re-explorations, and critical care.
- Outcomes: mortality variable (10–30%+); diabetes, immunosuppression and surgical delay increase risk.

DISCUSSION:

The Ayurvedic descriptions of Dushta Vrana and classical Shalyatantra procedures echo core surgical principles: early removal of morbid tissue, local cleansing, and interventions to promote healing. Integration is feasible only after modern life-saving measures are applied. Any Ayurvedic para-surgical or topical therapy must not delay debridement and must be used within a multidisciplinary framework with careful monitoring for re-infection or delayed healing.

CONCLUSION:

Necrotizing fasciitis demands prompt surgical and critical care. Classical Shalyatantra contributes logically consistent wound-management strategies that can be considered as adjunctive measures during the stabilization and healing phases. High-quality clinical studies are needed to standardize adjunctive Ayurvedic regimens and confirm safety and efficacy.

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