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Ayurvedic Management of Leg Gangrene in Type 2 Diabetes Mellitus Patient-A Case Report

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Abstract: Gangrene of the lower limb is a serious complication commonly associated with Diabetes Mellitus, arising due to ischemia, infection, and neuropathy, often leading to limb loss if not managed effectively. In Ayurveda, a condition comparable to gangrene is described as *Vrana Kotha*, considered an advanced stage of *Duṣṭa Vraṇa* predominantly involving vitiation of *Pitta doṣa* and characterized by progressive tissue necrosis. This case report presents a 65-year-old male with a five-year history of Diabetes Mellitus who developed multiple non-healing ulcers over the right foot for a duration of two months. The condition began after exposure to rainwater, initially presenting with edema and abscess formation, which later progressed to ulceration and dry gangrene with necrotic tissue and clear demarcation. The patient had poor glycemic control and showed minimal response to conventional antibiotic therapy. Management was carried out based on Ayurvedic principles of *Prameha Chikitsa* and *Duṣṭa Vraṇa Chikitsa*. Initial Gangrene care involved cleansing with *Triphalā Kaṣāya*, followed by *Chedana* (surgical debridement) to remove necrotic tissue. In the post-debridement phase, wound management was continued with *Jātyādi Ghṛta* dressing along with regular irrigation to facilitate *Sodhana* (cleansing) and *Ropana* (healing). Internal medications were administered to control the underlying metabolic condition and improve tissue regeneration. The patient showed gradual improvement with reduction in necrotic tissue, development of healthy granulation tissue, and progressive wound healing without complications. This case demonstrates that an integrated Ayurvedic approach combining surgical intervention, local wound care, and systemic therapy can be effective in managing diabetic foot gangrene and may play a significant role in limb salvage.

Keywords: *Diabetic Foot Gangrene, Diabetes Mellitus, Vrana Kotha, Duṣṭa Vraṇa, Chedana, Wound Healing, Prameha Chikitsa.*

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I. INTRODUCTION

Gangrene of the lower limb is the death of tissue in the extremity due to prolonged ischemia, commonly resulting from arterial occlusion, and often complicated by secondary infection and putrefaction[1]. Approximately 19–34% of patients with diabetes develop foot ulcers during their lifetime, and a substantial proportion of these, particularly when infected or ischemic, progress to gangrene[2]. Diabetic foot gangrene is a multifactorial condition that develops due to the combined effects of vascular, neural, infectious, and metabolic abnormalities associated with diabetes mellitus

Foot ulcers in individuals with diabetes have a high tendency to progress to gangrene, primarily due to the presence of peripheral arterial disease (PAD) and associated infections. Gangrene of the foot is broadly categorized into two forms: dry gangrene, which results from ischemia without infection, and wet gangrene, where necrotic tissue is accompanied by infection. Wet gangrene, in particular, is a serious condition that poses significant risks to both limb viability and patient survival.

In the *Suśruta Saṃhitā, Kotha* is mentioned as a pathological condition involving progressive decomposition of bodily tissues such as *Snāyu* (ligaments and nerves), *Māṃsa* (muscle tissue), and *Sirā* (vascular structures). Although an extensive independent description of *Kotha* is not provided, it is discussed in relation to *Duṣṭa Vraṇa*. Based on the clinical manifestations, this condition can be best matched with *Vrana Kotha*, which is associated with a poor prognosis for *Vrana*. *Vrana Kotha* exhibits similar features to gangrene. *Vrana Kotha* can be understood as a *Pittaja Nanatmaja Vikara*, as described in *Charaka Samhita (Sutra Sthana 20),* where diseases arise due to the vitiation of *Pitta dosha* alone. The classical features of *Pitta* such as *Daha* (burning), *Paka* (suppuration), and *Raga* (discoloration) contribute to *Mamsa paka* (tissue necrosis), which is the

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hallmark of *Kotha*. Further, Sushruta describes *Dushta Vrana* with features like *Durgandha* and *Puti mamsa*, which closely resemble the clinical presentation of gangrene. Thus, *Vrana Kotha* represents an advanced stage of *Dushta Vrana* dominated by *Pitta*, and in severe cases progresses to *Asadhya Vrana*. According to *Suśruta*, *Chedana* (surgical excision/debridement) is indicated in the management of *Kotha* for removal of necrotic and non-viable tissues.

In the present case study, wound management was carried out in a stepwise and systematic manner, along with appropriate internal medications. The treatment approach was based on the principles of *Prameha Chikitsa* and *Kotha Chikitsa*, including surgical intervention (*Chedana Śastrakarma*), as well as *Dusṭa Vraṇa Chikitsa*, focusing on both *Vraṇa Śodhana* (cleansing of the wound) and *Vraṇa Ropaṇa* (healing of the wound).

Internal medications were administered in accordance with *Prameha Chikitsa* to address the underlying metabolic disorder (diabetes), improve tissue metabolism, and prevent further progression of the disease.

II. CASE REPORT

➢ *Presenting Complaints:*

Multiple non-healing blackish lesions over the right foot (dorsal aspect, medial malleolus, and heel) for 2 months.

➢ *History of Presenting Illness:*

A 65-year-old male presented with complaints of multiple non-healing blackish lesions over the right foot for the past two months. The condition began following exposure to rainwater, after which the patient developed edema and abscess formation in the right lower limb. This gradually progressed to ulceration. Over time, the affected areas turned black, became dry and shrunken, and showed a clear line of demarcation from the surrounding normal skin. There was no discharge from the lesions. Despite receiving conventional antibiotic therapy, there was no significant clinical improvement, and the condition persisted, suggesting an underlying ischemic pathology. The patient therefore sought Ayurvedic management for further care was admitted to Government Ayurveda College Hospital, Tripunithura on 29/08/2025 for further care.

➢ *Past History of Illness:*

Known case of Type 2 Diabetes Mellitus for the past 5 years.

➢ *Personal History:*

Not significant / No relevant personal history reported.

➢ *Local Examination of Right Foot (30/08/2025)*

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Table 1 Local Examination of Right Foot

FEATURES	1	2
INSPECTION		
Site	One over the dorsal aspect of the right foot extending towards the medial malleolus	over the medial aspect of the right foot extending from the mid-foot towards the ankle region.
Size	6 × 3 cm	10 × 4 cm
Shape	Irregular	Irregular
edge	Well-defined with clear line of demarcation; edges appear slightly raised and irregular	Well-defined with a distinct line of demarcation; edges are irregular and slightly elevated
margin	Well defined	Clearly demarcated
Floor	Covered with blackish necrotic tissue with areas of slough	Covered with blackish necrotic tissue (eschar), dry in appearance
Discharge	Minimal to absent	Absent
Surrounding Skin:	Hyperpigmented, dry	Hyperpigmented,dry
PALPATION		
Tenderness	G0	G0
Local temperature	Not raised	Not raised
Bleed on touch	Absent	Absent
base	Firm	Firm
depth	.5cm	.5cm
induration	Surrounding skin is indurated	Surrounding skin is indurated
Regional lymph node	Not enlarged	Not enlarged
PERIPHERAL PULSES		
Anterior tibialis	Feeble	
Posterior tibialis	Feeble	
Dorsalis pedis	Feeble	

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➢ *Investigations*

Blood report on 30/08/2025

FBS : 178 mg%

PPBS : 489mg%

RFT : Blood urea-15mg%, Serum creatinine - 0.7mg%, Uric acid-2.2mg%

LIPID PROFILE : Total cholesterol-125mg%, HDL-37mg%, LDL-71mg%, VLDL-17mg%, Triglycerides-110mg%

➢ *Before Treatment (30/08/2025)*



Fig 1 Gangreneous Lesion 1



Fig 2 Gangreneous Lesion 2

➢ *Treatment*

Internal medications (30/08/2025 to 03/12/2025)

Table 2 Internal Medications

Guluchyadi kashaya+ punarnavadi kashaya	90ml bd bf
Nishakathakadi kashaya	180ml
Kaisora guggulu	2bd after food
Chandraprabha	2bd after food
.Guggulu tiktaka ghritam	2tsp before food
Gandharva erandam	10ml HS

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➢ *External Treatment*

Table 3 External Treatment

DURATION	PROCEDURES	DETAILS
30/08/2025 to 05/09/2025	Cleansing of gangreneous area *(Śodhana)*	Gangreneous area was cleaned daily with *Triphala Kaṣāya*. The Gangreneous area was kept open, clean, and dry without bandaging.
06/09/2025 to 03/12/2025	*Chedana* (Debridement) and Wound management	Surgical debridement was performed to remove slough and necrotic tissue. Daily *Triphala Kaṣāya kṣālana* was carried out, followed by dressing with *Jātyādi Ghṛta*. Sterile bandaging was done after dressing.

III. RESULTS

➢ *After Treatment (03/12/2025)*



Fig 3 Gangreneous Lesion 1



Fig 4 Gangreneous Lesion 2

Table 4 Local Examination of Right Foot After Treatment

Parameter	30/08/2025	08/09/2025	After Completion(03/12/2025)
Size	~10 × 4 cm	Progressive reduction	~4 × 2 cm
	~06 × 3 cm		complete healed
Necrotic Slough (%)	>70%	Reduced after debridement	<10%
Granulation Tissue (%)	<20%	Gradual increase	>80% healthy granulation
Discharge	Minimal	Reduced	Absent
Induration	Present	Gradual reduction	Minimal/Absent
Wound Contraction	Absent	Progressive	~50–60% contraction

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Foul Odor/Infection	Absent initially	No infection developed	Absent
Systemic Signs (Fever/Sepsis)	Absent	Absent	Absent
Glycemic Control	Poor/Moderate	Improved	Better controlled

➢ *Blood Report on 01/12/2025*

FBS : 128 mg%

PPBS : 310mg%

RFT : Blood urea-15mg%, Serum creatinine - 0.8mg%, Uric acid-2.2mg%

LIPID PROFILE : Total cholesterol-125mg%, HDL-37mg%, LDL-71mg%, VLDL-17mg%, Triglycerides-110mg%

The patient showed progressive and clinically significant improvement following Ayurvedic management.

In the initial phase, Gangrene cleansing with *Triphalā Kaṣāya* resulted in reduction of local edema, tenderness, and moisture, with partial loosening of necrotic slough. Post-debridement, there was clear exposure of viable tissue, facilitating further healing.

Subsequent wound dressing with *Jātyādi Ghṛta* along with *Triphalā Kaṣāya kṣālana* promoted the formation of healthy granulation tissue. Over the treatment period, the following changes were observed gradual reduction in necrotic slough, replacement of unhealthy tissue with healthy granulation, decrease in surrounding inflammation and induration, significant reduction in discharge, absence of foul odor or secondary infection, progressive wound contraction, reduction in pain intensity

No systemic complications such as fever or sepsis were noted during the treatment period. Additionally, better glycemic control was achieved with internal medications.

By the end of the treatment, the ulcer showed marked healing with healthy granulation and evidence of epithelialization, significantly reducing the risk of amputation.

IV. DISCUSSIONS

Diabetic gangrene is a complex clinical condition resulting from peripheral vascular insufficiency, neuropathy, and impaired immunity. Chronic hyperglycemia leads to endothelial dysfunction, reduced tissue perfusion, and delayed wound healing, thereby predisposing to ulceration and necrosis.

In Ayurveda, such a presentation can be correlated with *Kotha*, described in the *Sushruta Samhita* as a severe stage of *Duṣṭa Vraṇa* involving progressive tissue destruction of *Māṃsa, Sirā,* and *Snāyu*. The chronicity and features of this case indicate a *Tridoṣhic* involvement with predominance of *Pitta* and *Kapha* along with *Rakta duṣṭi.*

➢ *Effect of External Therapies*

Triphalā Kaṣāya kṣālana played a crucial role in wound bed preparation in the present case. Owing to its *Sodhana* (cleansing), *Ropana* (healing), and *Krimighna* (antimicrobial) properties, it facilitated effective removal of slough, debris, and microbial contaminants, thereby maintaining a clean wound environment. The *Kaṣāya rasa* (astringent property) of *Triphalā* contributed to reduction of wound exudate and local edema, promoting wound contraction.

Experimental studies have demonstrated significant wound healing activity of *Triphalā*. In an incision and excision wound model, *Triphalā* showed enhanced tensile strength and accelerated wound contraction, indicating improved collagen maturation and tissue regeneration[3].Furthermore, studies on diabetic wound models have reported increased hydroxyproline content and faster epithelialization in *Triphalā*-treated groups[4] Its antioxidant and anti-inflammatory properties further aid in reducing oxidative stress and modulating the inflammatory response, which are critical in chronic wound healing.[5]

Thus, regular *Kṣālana* with *Triphalā Kaṣāya* not only aids in wound cleansing but also enhances the healing cascade by promoting granulation tissue formation and epithelialization, making it an effective intervention in the management of chronic non-healing wounds.

Surgical debridement *(Chedana)* played a crucial role in the management of gangrene by removing necrotic tissue and preventing the spread of tissue damage. This helped in improving local circulation and promoting the formation of healthy granulation tissue. In *Ayurveda, Chedana* is indicated in conditions like *Kotha* for excision of dead tissue to arrest disease progression and facilitate healing. Modern studies also support that debridement reduces infection and accelerates recovery in gangrenous conditions[6 7]

Following surgical debridement (*Chedana*), application of *Jātyādi Ghṛta* facilitated rapid healing by promoting healthy granulation tissue and epithelialization. The prior removal of necrotic tissue enhanced drug penetration and efficacy, while the *Ropana* (healing), *Snigdha*, and antimicrobial properties of *Jātyādi Ghṛta* supported tissue regeneration and reduced local inflammation. This combined approach aligns with both Ayurvedic principles of *Duṣṭa Vraṇa cikitsā* and modern concepts of wound bed preparation[8]

➢ *Effect of Internal Medications*

The internal medications contributed through multiple mechanisms:

Doṣa śamana and *Rakta prasādana*

Reduction of inflammation and edema

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Enhancement of tissue metabolism

Glycemic control (critical in diabetic wound healing)

Formulations like *Nishakathakadi Kaṣāya* played a key role in controlling blood glucose levels, which is essential for preventing further tissue damage and promoting healing.

The integrative effect of internal and external therapies resulted in effective wound bed preparation and tissue regeneration.

V. CONCLUSION

This case study demonstrates that Ayurvedic management including *Chedana sastra karma*, *Vrana ropana* and *Sodhana* can be an effective approach in the treatment of diabetic lower limb gangrene, particularly in cases where surgical amputation is being considered or delayed. The combined use of internal medications and external wound care procedures resulted in significant clinical improvement, including reduction of necrotic tissue, promotion of healthy granulation, and progressive wound healing.

The phased management involving *Triphalā Kaṣāya* for wound cleansing, timely debridement, and application of *Jātyādi Ghṛta* played a crucial role in achieving *Sodhana* and *Ropana*. Additionally, internal medications contributed to systemic correction by improving glycemic control, reducing inflammation, and enhancing tissue metabolism.

Correlation of this condition with *Kotha* described in the *Suśruta Saṃhitā* highlights the relevance of classical Ayurvedic principles in managing complex chronic wounds.

Overall, this case emphasizes that early intervention, proper wound care, and a holistic Ayurvedic approach can help prevent complications such as infection and amputation, thereby improving patient outcomes. Further clinical studies with larger sample sizes are recommended to validate these findings and establish standardized treatment protocols.

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