

MANAGEMENT OF CHRONIC LIMB-THREATENING ISCHEMIA (CLTI) WITH SEVERE INFRAPOPLITEAL ATTENUATION THROUGH MARGAVARANA CHIKITSA: A CLINICAL CASE STUDY

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ABSTRACT

Background: Chronic Limb-Threatening Ischemia (CLTI) complicated by distal arterial hypoplasia and inadequate distal runoff presents a substantial barrier to conventional endovascular or surgical revascularization. When mechanical options fail, conservative management focused on microvascular pathways becomes crucial. **Methods:** A 36-year-old male presenting with severe bilateral intermittent claudication (Rutherford Category 3; pain-free walking distance of 50–100 m) and severely attenuated infra-popliteal vessels was admitted to Panchakarma at the National Institute of Ayurveda Hospital, Jaipur. He was managed with a structured 23-day protocol consisting of 5 days of *Udwartana* (Days 1–5) followed by 18 days of *Patra Pinda Sweda* (Days 6–23). Concurrently, a 16-day scheduled internal *Kala Basti* regimen (Days 1–16) using *Anuvasana* of *Vrihat Saindhwadi Taila* and a *Niruha* of *Lekhaniya Mahakashaya Kwatha* with

Eranda-mooladi Kwatha was administered. This was accompanied by a localized 14-day *Indrabasti Bahya Basti* (Days 6–19) using *Dashmoola Taila* and succeeded by a 7-day *Panchatikta Kshira Basti* (Days 17–23) along with oral formulations. **Results:** The integrative protocol successfully bypassed the structural limitations of the narrowed vessels where mechanical Fogarty catheterization had previously failed. Objective staging showed an improvement from Rutherford Category 3 (severe claudication) to Category 1 (mild

claudication), with pain-free walking distance increasing to over 400 meters, resulting in functional limb salvage. Conclusion: Sequential Ayurvedic interventions addressing *Marga avarana* provide an effective, non-invasive therapeutic pathway for functional collateral development and limb salvage in surgical "no-option" peripheral vascular diseases.

KEYWORDS: Chronic Limb-Threatening Ischemia, *Margavarana*, Rutherford-Becker Staging, Claudication Score, *Patra Pinda Sweda*, *Indrabasti Bahya Basti*, *Basti*, *Sira-Sankocha*.

1. INTRODUCTION

Chronic Limb-Threatening Ischemia (CLTI) represents the advanced clinical spectrum of peripheral arterial disease (PAD). The femoropopliteal arteries are very common sites of involvement in patients with atherosclerotic peripheral arterial disease (PAD).^[1] A minority of those will require treatment for intermittent claudication (IC) or critical limb ischemia (CLI). PAD often is multilevel and femoropopliteal lesions may be combined either with more proximal aortoiliac disease or with distal infrapopliteal lesions, particularly in patients presenting with limb-threatening CLI. Patients may be elderly with multiple comorbidities, such as diabetes, coronary artery disease, carotid stenosis, renal dialysis, and chronic obstructive pulmonary disease, which put them at increased perioperative risk.^{[2], [3], [4]} characterized by chronic ischemic rest pain, non-healing lower-extremity ulcers, or gangrene. The long-term durability of standard interventions such as surgical bypass grafting or endovascular balloon angioplasty is strictly dependent on the adequacy of the "distal runoff." The patency and internal diameter of the infra-popliteal arterial bed, i.e., the anterior tibial, posterior tibial and peroneal arteries, are the distal runoff. Diffuse arterial attenuation or vessel narrowing creates a technical ceiling; mechanical embolectomy catheters (such as Fogarty catheters) cannot be safely advanced through an ultra-thin caliber lumen without risking vascular dissection or rupture. When the runoff is graded as extremely poor, patients are often classified as "no-option" cases, leaving them vulnerable to major limb amputation. From the classical Ayurvedic viewpoint, the complex vascular failure is comprehended through the concept of *Vata-Vyadhi*, presenting as *Siragata Vata* (*Vata* localized in the vascular tree) with *Margavarana* (pathological occlusion of channels). The first stage of this disease is common to *Medoroga* and *Sthaulya*, where excessive consumption of *Abhishyandi* (channel blocking) and Guru (heavy) factors cause *Dhatvagni Mandya* (depressing the tissue-specific metabolic fires), leading to abnormal *Meda* (lipids) and *Kapha* accumulation in the

Raktavaha Srotas (blood vessels), resulting in *Sira-Sankocha* (structural narrowing) and *Sira-Kathinya* (vascular wall stiffness). Therefore, the management of this condition needs a specific multi-stage approach of biochemical scraping (*Lekhana*) to remove the obstruction followed by tissue rejuvenation (*Rasayana*) for restoration of endothelial elasticity.

2. CASE HISTORY

2.1 Patient Information and Clinical Presentation

A 36 year-old male patient was admitted to inpatient department (IPD) of Panchakarma at the National Institute of Ayurveda Hospital, Jaipur. The patient complained of severe, progressive pain, burning sensations, and an intense feeling of heaviness (*Gaurava*) in both lower limbs persisting for the past twelve months.

To map the functional severity of the lower limb ischemia, the standard Rutherford Becker Clinical Staging for Peripheral Arterial Disease was employed.^[4] At baseline, the patient exhibited severe, debilitating cramping in the calf muscles upon ambulating a distance of merely 50–100 meters, which required absolute rest for resolution. He experienced extreme difficulty when climbing stairs or attempting to squat. There were no ischemic ulcerations or gangrenous changes on presentation. Using these clinical metrics, the patient was graded as Rutherford Grade I, Category 3 (Severe Claudication) with a severely limited Pain-Free Walking Distance (PFWD).

2.2 Diagnostic and Surgical Assessment

The patient underwent lower limb Computed Tomography (CT) Angiography, which showed a sudden, diffuse transition to “very thin caliber” vessels in the popliteal and infra-popliteal segments bilaterally involving the anterior tibial artery (ATA), posterior tibial artery (PTA), and peroneal artery (Figure 1 and Figure 2). Prior to admission, surgical exploration of the left popliteal artery was attempted at a tertiary center. The operative notes confirmed extreme structural attenuation of the PTA, with a note that standard Fogarty embolectomy catheters from 2Fr to 4Fr could not be safely advanced through the narrowed lumen secondary to the ultra-thin vessel diameter, resulting in an inadequate distal runoff. Consequently, the surgical revascularization was aborted, and the patient was referred for conservative management. [Insert Figure 1 here] [Insert Figure 2 here].

3. Ayurvedic Pathogenesis (*Samprapti* Analysis)

To establish a targeted treatment protocol, the underlying disease mechanism was analyzed based on classical diagnostic parameters (*Samprapti Ghataka*)

Dosha : *Vayu* and *Kapha*.

Dushya: *Rakta*, *Meda*, and *Mamsa-Asthi*.

Srotas: *Raktavaha Srotas* and *Medovaha Srotas*.

Sroto-Dushti Lakshana: *Sanga* and *Vimarga-gamana*.

Agni: *Jatharagni Mandya* leading to *Medodhatvagni Mandya*.

Adhithana: *Adho-Shakha Sira* and *Dhamani*.

Rupa: Claudication pain (*Shula*), heaviness (*Gaurava*), and *Sira-Riktata* (distal poor runoff/emptiness of vessels).

4. MATERIAL AND METHODS (Therapeutic Interventions)

The treatment protocol was divided into oral internal pharmacotherapy and a sequenced Panchakarma regimen over a total period of 23 days.

4.1 Internal Oral Medications

Table 1: Details of Internal Oral Medications.

S.No	Medicine Name	Dosage & Anupana	Timing of Administration	Pharmacological Rationale
1.	<i>Kaishore Guggulu</i> ^[5]	2 Tablets (500 mg each) with lukewarm water	Twice daily on an empty stomach (<i>Pragbhakta</i>)	Acts as a potent <i>Lekhana</i> (scraping) and <i>Shothahara</i> agent; reduces inflammatory exudates in blood vessels.
2.	<i>Punarnavashtak Kwatha</i> ^[6]	40 ml liquid decoction	Twice daily on an empty stomach (<i>Pragbhakta</i>)	Formulated with <i>Punarnava</i> , <i>Nimba</i> , <i>Patola</i> , <i>Shunthi</i> , <i>Tikta</i> , <i>Daruharidra</i> , <i>Haritaki</i> , <i>Guduchi</i> Clears <i>Srotorodha</i> .
3.	<i>Arogyavardhini Vati</i> ^[7]	2 Tablets (250 mg each) with water	Twice daily after meals (<i>Apana Kale</i>)	Contains <i>Katuki</i> , <i>Guggulu</i> , <i>Shilajatu</i> , <i>Triphala</i> . Corrects <i>Meda-dhatu Dushti</i> (lipid metabolic errors).
4.	<i>Arjuna Arishta</i> ^[8]	15 ml mixed with an equal quantity of lukewarm water	Twice daily after meals (<i>Apana Kale</i>)	Provides <i>Hridya</i> and <i>Sira-Balya</i> (vascular strengthening) actions; enhances blood flow velocity to the extremities

5.	Herbal Churna Mixture	6 grams total (<i>Panchkola</i> : 2g, <i>Gokshur</i> : 2g, <i>Vidanga</i> : 1g, <i>Kutki</i> : 1g) with warm water	Twice daily after meals (<i>Apana Kale</i>)	<i>Panchkola</i> helps in tissue metabolism (<i>Dhatvagni</i>). <i>Vidanga</i> and <i>Kutki</i> help as <i>Srotoshodhaka</i> to remove <i>Ama</i> .
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4.2 Panchakarma Regimen

Table 2: Chronological Schedule of Panchakarma Procedures (Total 23 Days).

Days	Procedure	Medicines Used	Mode of Action & Rationale
Days 1–5	<i>Ruksha Udwartana</i> ^[9] (Dry Powder Massage)	<i>Kolkulathadi Churna</i>	Administered initially for 5 days to reduce localized <i>Kapha-Meda</i> accumulation, address limb heaviness (<i>Gaurava</i>), and prepare the channels by scraping systemic <i>Ama</i> . ^[10] (<i>Charaka Samhita Sutra Sthana 22</i>)
Days 6–23	<i>Patra Pinda Sweda</i> (PPS)	Fresh medicinal leaves (<i>Vatahara Patra</i>) with <i>Dashmoola Taila</i>	Administered continuously for 18 days. Induces intensive localized <i>Svedana</i> (sudation) to promote peripheral vasodilation, relieve arterial spasms, and improve arterial perfusion in ischemic areas.
Days 1–16	Internal Basti Regimen (16 Day continuous sequence)	<i>Anuvasana: Vrihat Saindhwadi Taila Niruha Kwatha Mixture: Lekhaniya Mahakashaya Kwatha</i> ^[10] (250 ml) + <i>Eranda-mooladi Kwatha</i> ^[11] (250 ml)	Formulated in an alternate cycle over 16 day. The composite <i>Niruha dravya</i> was emulsified with <i>Kalka, Madhu, Saindhava, and Sneha</i> to non-invasively break advanced mechanical lipid barriers.
Days 6–19	<i>Indrabasti Bahya Basti</i> (Localized Dough Ring Retention)	<i>Dashmoola Taila</i>	Administered continuously for 14 days to match the mid-to-late phase of the primary internal <i>Basti</i> course. Implemented at the bilateral calf region (<i>Indrabasti Marma locus</i>) by forming a <i>masha-pishti</i> (black gram dough) boundary to hold lukewarm <i>Dashmoola Taila</i> , enhancing localized perfusion.
Days 17–23	<i>Panchatikta Kshira Basti</i> (7 Day continuous)	<i>Panchatikta Dravya</i> processed in milk with <i>Guggulutiktaka Ghrita</i>	Transitioned immediately following the primary <i>Basti</i> course to serve as an endothelial-repair phase to nourish the vascular walls and prevent post-cleansing vessel brittleness. ^[14]

4.3 Composition and Rationale of Specialized Basti Formulations.

1. Niruha Basti Kwatha Combination (*Lekhaniya* + *Erandamooladi*)

Lekhaniya Mahakashaya Ingredients: *Musta*, *Kushtha*, *Haridra*, *Daruharidra*, *Vacha*, *Ativisha*, *Katurohini*, *Chitraka*, *Chirabilva*, and *Haimavati* (250 ml). Ingredients of *Eranda-mooladi Kwatha*: *Eranda moola*, *Rasna*, *Chitraka*, *Sunthi*, *Devdaru*, *Pushkarmoola*, *Guduchi*, *Haritaki*, etc. (250 ml) Classical Rationale: *Lekhaniya Mahakashaya* possesses *Teekshna* (sharp) and *Ruksha* (dry) attributes, enabling the bio-chemical scraping (*Lekhana*) of adherent plaque (*Kapha-Meda* accumulation) within the vessel lumen. Its combination with *Eranda-mooladi Kwatha* greatly increases its *Vata-shamak* and *Srotoshodhaka* properties. *Eranda-moola* is traditionally classified as *Vrishya-Vataharanam* (the best among Vata-pacifying herbs), which immediately corrects the severe ischemia-induced vascular spasms (*Ayam Akunchana*) and restores the physiological movement (*Anulomana*) of *Vyana Vayu*. (*Charaka Samhita Sutra Sthana 4/6(8)* & *Siddhi Sthana 3/38-42*).

2. *Vrihat Saindhwadi Taila*^[12] (*Anuvasana Basti*)

Classical Rationale: About 82% of its ingredients have *Ushna Veerya* (hot potency), which alleviates *Sroto-avarodh* (luminal blockages) and vascular inflammation (*Shotha*). *Saindhava Lavana* shows *Kaphavilayana* (liquefying) and *Kapha Chedana* (excision) properties which effectively remove the narrowed arterial lumen. (*Bhaishajya Ratnavali Amavatarogadhikara 26/218-223*).

3. *Panchatikta Kshira Basti*^[13] (**Rejuvenative Formulation**)

Classical Rationale: *Tikta Rasa* (bitter taste) is dominated by *Vayu* and *Akasha Mahabhuta*, conferring a high structural affinity toward the vascular network (*Sira*) and bone tissue (*Asthi*). The milk medium combined with *Guggulutiktaka Ghrita* (owing to its *Samskarasya Anuvartana* property) effectively pacifies hyper-reactive *Vyana Vayu* and induces micro-endothelial cell rejuvenation. (*Charaka Samhita Kalpa Sthana 12/66-70* & *Astanga Hridaya Sutra Sthana 19*)

5. RESULTS

The patient was subjected to 23 days of *Panchakarma* protocol and was completely relieved of her clinical and functional symptoms. Objective parameters measured by the Rutherford Becker Classification and localized clinical assessment showed significant improvement towards vascular normalcy.

Table 3: Objective Changes in Claudication and Vascular Scores.

Assessment Parameter	Baseline (Pre-Treatment)	Post-Treatment (Day 23)	Clinical Significance
Rutherford Classification	Grade I, Category 3 (Severe Claudication)	Grade I, Category 1 (Mild Claudication)	Profound reduction in arterial insufficiency and down staging of disease severity.
Pain-Free Walking Distance (PFWD)	50–100 meters	> 400 meters	Indicates improved collateral tissue perfusion, and functional capillary bed recruitment
Lower Limb Heaviness (<i>Gaurava</i>)	Severe (Grade III)	Completely Resolved (Grade 0)	Indicates complete removal of blockages of <i>Kapha-Meda</i> channels.
Intermittent Claudication Pain Scale	Pain on minimal exertion that is severe and excruciating	Absent during normal daily ambulation	Reversal of local tissue hypoxia and nerve endings ischemia.
Functional Mobility (Squatting/Stairs)	Extremely restricted; impossible without support	Performed comfortably without distress	Restored skeletal muscle metabolism and perfusion.

6. DISCUSSION

6.1 Significance of Down-Staging the Rutherford Becker Claudication Score

The notable clinical outcome in this study is the reduction of the patient's vascular impairment from Rutherford Category 3 to Category 1. In peripheral angiology, achieving a multi-category down-staging through non-operative means is rarely observed when infrapopliteal distal runoff is severely compromised. This extension of the ischemic threshold of the lower limb musculature may allow the gastrocnemius-soleus complex to maintain ambulation without premature anaerobic glycolysis or lactic acid accumulation.

6.2 Critical Synchronization of Systemic and Local *Basti* Timelines

The therapeutic protocol highlighted systematic clearance of lumen prior to stabilization of the endothelium in a sequential manner. The internal composite *Niruha Basti* (*Lekhaniya Mahakashaya* and *Eranda-mooladi Kwatha*) was administered from Days 1 to 16, to reduce vascular resistance and resolve channel occlusion (*Srotorodha*), the localized *Indrabasti Bahya Basti* is integrated as an adjunctive therapy within this primary clearing window (Days 6–19). Introducing the localized oil pool at this stage allowed the lipophilic bio-constituents of *Dashmoola Taila* to act concurrently with systemic vascular offloading. This clearance phase was immediately succeeded by *Panchatikta Kshira Basti* (Days 17–23) to provide bio-nutrition to the vascular architecture and protect against post-cleansing endothelial brittleness.

6.3 Role of Preparatory Phase

Udwartana and Prolonged *Patra Pinda Sweda* The initial 5 days of *Ruksha Udwartana* with *Kolkulathadi Churna* served as a critical preparatory phase. In *Margavarana* dominated by *Kapha-Meda* accumulation, immediate unctuous therapy (*Snehana*) can paradoxically aggravate luminal obstruction (*Srotorodha*). The dry (*Ruksha*) and light (*Laghu*) attributes of *Udwartana* mobilized subcutaneous fluid retention and addressed limb heaviness (*Gaurava*), thereby reducing external pressure on the superficial vascular bed. Subsequently, the 18-day course of *Patra Pinda Sweda* (Days 6–23) provided sustained thermal energy and mechanical friction over the lower extremities. In chronic ischemia, prolonged thermal conditioning downregulates sympathetic vascular tone, counteracting ischemia-induced vasospasm (*Sira-Sankocha*) and significantly improving deep tissue micro-perfusion.

6.4 Synergistic Mode of Composite *Niruha Basti (Lekhaniya & Eranda-mooladi)*

The 1:1 composite of *Lekhaniya Mahakashaya* and *Eranda-mooladi Kwatha* in *Niruha Basti* acts as a non-invasive biological intervention in the presence of constraints of conventional endovascular revascularization. The exclusive use of *Lekhana* agents can lead to tissue dryness (*Rukshata*), which paradoxically worsens *Vata* and causes rebound arterial constriction (*Sira-Sankocha*).

The addition of *Eranda-mooladi Kwatha* neutralizes this effect due to its *Ushna*, *Tikshna*, and *Vata-Anulomaka* properties. While the *Lekhaniya* agents address and soften atheromatous lipids along the endothelial walls, the *Eranda-mooladi* components simultaneously pacify *Vyana Vayu*. This dual action reduces ischemia-induced vascular spasms, decreases vessel stiffness (*Sira-Kathinya*) and promotes collateral microvascular expansion.

6.5 Therapeutic Impact of 14-Day Localized *Indrabasti Bahya Basti*

The 14-day localized administration of *Indrabasti Bahya Basti* with *Dashmoola Taila* directly targets the anatomical position of the attenuated infrapopliteal vessels. The posterior tibial and peroneal branches travel deep in the gastrocnemius-soleus complex. A continuous pool of lukewarm oil establishes a constant transcutaneous thermal gradient.

This constant heat transfer results in the secretion of endogenous vasodilators from the vascular endothelium including Nitric Oxide (NO) allowing local vasodilation. Simultaneously, the transdermal absorption of the anti-inflammatory (*Shothahara*) fractions

of Dashmoola helps alleviate localized tissue hypoxia, resulting in the resolution of claudication pain and supporting collateral capillary recruitment.

6.6 Endothelial Stabilization via *Panchatikta Kshira Basti*

In the last phase (Days 17 to 23), structural stabilization was achieved by *Panchatikta Kshira Basti*. Drugs with *Tikta Rasa* (bitter taste) and predominance of *Vayu* and *Akasha Mahabhuta* have a known affinity towards vascular networks (*Sira*). The milk medium and *Guggulutiktaka Ghrita* provided necessary bio-nutrition (*Brimhana*) and lipid-mediated lubrication to the cleared endothelial lining. The last phase thus minimized vessel wall brittleness, promoted long-term structural patency and secured the functional limb salvage achieved.

7. CONCLUSION

In advanced cases of Chronic Limb-Threatening Ischemia (CLTI) where severe infra-popliteal attenuation and inadequate distal runoff render conventional endovascular or surgical revascularization impossible, this structured Ayurvedic therapeutic framework offers a highly effective, non-invasive alternative. The strategic, sequential alignment of a 5-day *Ruksha Udwartana* and an 18-day *Patra Pinda Sweda* conditioning phase—interspersed with a precise Day 1–16 internal *Basti* regimen, a concurrent 14-day localized *Indrabasti Bahya Basti* protocol, and capped by a Day 17–23 rejuvenative *Panchatikta Kshira Basti*—successfully achieves *Samprapti Vighatana* (pathogenetic deconstruction) of *Margavarana*. Ultimately, this comprehensive protocol eliminates the immediate threat of major limb amputation, down-stages the Rutherford-Becker clinical classification system from severe claudication to mild symptoms, and successfully restores long-term functional mobility and tissue perfusion to the patient.

8. REFERENCES

1. Kasapis C, Gurm HS. Current approach to the diagnosis and treatment of femoral popliteal arterial disease: A systematic review. *Curr Cardiol Rev.*, 2009; 5(4): 296–311.
2. Dormandy JA, Rutherford RB; TASC Working Group. Management of peripheral arterial disease (PAD). TransAtlantic Inter-Society Consensus (TASC). *J Vasc Surg.*, 2000; 31(1 Pt 2): S1–S296.
3. Norgren L, Hiatt WR, Dormandy JA, et al; TASC II Working Group. Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II). *Eur J Vasc Endovasc Surg.*, 2007; 33(Suppl 1): S1–S75.

4. Rooke TW, Hirsch AT, Misra S, et al. 2011 ACCF/AHA focused update of the guideline for the management of patients with peripheral artery disease (updating the 2005 guideline): a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *J Vasc Surg.*, 2011; 54(5): e32–e58.
5. Rutherford RB, Baker JD, Ernst C, Johnston KW, Porter JM, Ahn S, Jones DN. Suggested standards for reports dealing with cerebrovascular disease. *Journal of Vascular Surgery*, 1997; 26(3): 517–538.
6. Upadhyaya Y, editor. *Sharangdhara Samhita of Sharangdhara Acharya*, Madhyama Khanda, Chapter 7: Verses 70-81. 4th ed. Varanasi: Chaukhamba Sanskrit Sansthan, 200; 192-195.
7. Tripathi I, Dwivedi R, editors. *Chakradatta of Sri Chakrapanidatta*, Shotha Chikitsa Prakaran, Verse 10. 8th ed. Varanasi: Chaukhamba Sanskrit Bhavan, 2023; 236.
8. Shastri A, editor. *Rasaratna Samuchchya*, Chapter 20, Verse 87. 9th ed. Varanasi: Chaukhamba Sanskrit Publisher, 1994; 400.
9. Mishra SN, editor. *Bhaishajya Ratnavali of Govinda Das Sen*, Hrudroga Adhikara, Verses 33/75-77. 1st ed. Varanasi: Chaukhamba Surbharati Prakashan, 2016; 642.
10. Sitaram B, translator. *Laghutrayi - Astanga Hridaya of Vagbhata*, Sutra Sthana, Chapter 1. Varanasi: Chaukhamba Orientalia, 2008; 3-12.
11. Sastri SN, editor. *Charaka Samhita of Agnivesha*, Sutra Sthana, Chapter 4, Verse 8. 1st ed. Varanasi: Chaukhamba Sanskrit Series Office, 2009; 94.
12. Sharma RK, Dash B, editors. *Charaka Samhita*, Siddhi Sthana, Chapter 3, Verses 38-42. Vol.6. Varanasi: Chaukhamba Sanskrit Series Office, 2013; 223-224.
13. Nadkarni KM. *Indian Materia Medica*. Vol. 2. Reprint ed. Mumbai: Popular Prakashan, 2013; 1308-1309.
14. Chaturvedi GN, editor. *Charaka Samhita*, Sutra Sthana, Chapter 28, Verse 27. Varanasi: Chaukhamba Bharati Academy, 2009; 573.