

**Effect of *Kshar Taila* in the Management of Gangrene (*Kotha roga*)
Following Debridement: A Case Report**

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Abstract:

Gangrene is a serious complication of diabetes mellitus and often requires prompt surgical intervention to prevent limb loss. Adjunctive therapies that enhance wound healing following debridement may improve clinical outcomes. A 65-year-old male with a 10-year history of Type 2 diabetes mellitus presented with a non-healing, blackish ulcer over the right great toe following neglected minor trauma. Clinical and radiological evaluation confirmed localized diabetic foot gangrene without bony involvement. Surgical debridement was performed to remove necrotic tissue. Post-debridement, *Kshara Taila Pichu*, an Ayurvedic medicated oil dressing, was applied locally on alternate days for four weeks. Reduction in slough was observed within five days, purulent discharge subsided within ten days, and complete wound healing was achieved within two months without any adverse effects. This case highlights the potential role of *Kshara Taila Pichu* as a safe and effective adjunct to surgical debridement in the management of diabetic foot gangrene.

Keywords: *Kotha*, Gangrene, Debridement, Ergotism, *Kshara Taila Pichu*, Necrosis, Diabetes

Introduction: The frequency of gangrene among peripheral vascular disease patients is a crucial marker of the severity and burden of the illness [1]. There is a need for more research to establish precise figures and inform evidence-based therapies, as previous studies have shown variable prevalence rates ranging from 20% to 60%. Gangrene is the localized death of soft tissue in animals brought on by a sustained interruption of the blood flow, which can happen due to an infection or an accident. Gangrene is more likely to appear in conditions like typhus, arteriosclerosis, diabetes, Raynaud's disease, and thromboangitisobliterans (Buerger's disease). Additionally, severe burns, the cold, or prolonged bed rest (bed sores) could cause it. Moist gangrene arises when the blood supply is abruptly cut off, either by a severe burn or an arterial blood clot. Germs multiply due to fluids leaking from tissue that the trauma has not totally destroyed. The infected area swells, turns discolored, and eventually starts to bad smell. If the infection is not treated, it may spread outside of the wound and result in death. The primary form of treatment is the administration of antibiotics, which may be augmented by the surgical removal of infected tissue to prevent the infection from spreading. [2]

Wet or dry tissue necrosis is referred to as gangrene in clinical settings. Gangrene may be brought on by external pressure, severe edema, burns, frostbite, snakebites, vasculitis, ergotism, bacterial sepsis, or viral infections. The obstruction of the venous or arterial blood flow causes the distinctive lesion. [3] Wet or moist gangrene is brought on by bacterial infection-induced putrefaction and obstruction or lymphatic and venous drainage impairment. Dry gangrene lesions are cold to the touch, leathery, discolored, sunken, and dry. It could take a while for the skin to shed. Gangrene lesions are large, reddish, and pungent. A rare condition is venous gangrene of the limb. It has been demonstrated that ischemia is caused by peripheral artery collapse. The pathogenesis of venous gangrene may be small artery occlusive thrombosis. This condition is the deadly variety of the problem and does not respond well to conventional treatment. [4]

Debridement removes damaged, nonhealing tissue, foreign objects, and nonhealing tissue from a wound. Even though surgeons know the benefits of debridement, only some randomized trials have produced data to support its use. Debridement makes it possible to eliminate the tissue with the most bacteria, reliable cultures, and an osteomyelitis diagnosis. The most direct way of debridement is surgery. Patients who aren't ideal candidates for surgical debridement or lack access to a surgeon can use other debridement methods, such as mechanical, autolytic, enzymatic, and biologic debridement. Although those with surgical training are better suited to

do operative debridement, various allied healthcare workers can complete the other forms of debridement. Debridement is still a crucial component of providing quality wound care, but it still needs to be determined what kind, how much, and how frequently it needs to be done. [5] 15% of diabetes is thought to experience foot ulcers at some point in their lives. Debridement is commonly recommended as a successful treatment to hasten ulcer healing. [6-7]

Case Report

Patient Information:

A 65-year-old male presented to the Shalyatantra Outpatient Department of a tertiary Ayurvedic hospital with a blackish, non-healing ulcer over the right great toe associated with mild pus discharge and intermittent pain for one month. The lesion developed following a screw-related injury two months earlier, which was neglected initially. The patient was a known case of **Type 2 Diabetes Mellitus** for 10 years.

A detailed history of the patient is provided in [Table 1](#). Upon primary examination at his baseline visit to the outpatient department, patient exhibited good orientation, bilaterally symmetrical air entry, normal heart sounds, a soft, non-tender abdomen, and no signs of organomegaly. The general condition was fair, No pallor icterus/swelling was found, and blood pressure was 130/80 mm of Hg. *Prakriti* (Basic constitution) of patient was *Kaphapradhana Vataja Prakriti*. The *Kostha* (nature of the digestive system) of the patient was *Krura* (irregular). *Ashatavidha Parikshana* (Eight-fold examination) results are mentioned in [Table 2](#). In the local examination, there was swelling over the right toe, mild pus discharge, and blackish discoloration of the wound with slough and debris there was no infection in the nail bed.

Table no. 1: Patient past-personal-drug and family history

Past Medical History	K/C/O Diabetes Mellitus type 2
Personal History	Diet: Mixed types of diet, spicy and junk food Sleep: Disturbed and irregular

	Bowel habits: Normal Addiction: Tobacco chewing occasionally cigarette smoking Occupation: Agriculture
Family History:	Father: K/C/O Hypertension(On regular Rx) Mother: NAD Siblings: Normal, No genetic history
Drug History	No any drug history

Table no.2: Eightfold examination

S.N.	Head	Observation	S.N.	Head	Observation
1	<i>Nadi</i> (pulse)	78/min (<i>Vata-kaphaj</i>)	5	<i>Shabda</i> (speech)	<i>Spashta</i> (clear)
2	<i>Mala</i> (stool)	Normal	6	<i>Sparsha</i> (touch)	<i>Ushna</i>
3	<i>Mutra</i> (urine)	Normal	7	<i>Druk</i> (vision)	Good
4	<i>Jivha</i> (tongue)	<i>Nirama</i> (Uncoated)	8	<i>Akruti</i> (posture)	<i>Madhyam</i>

Investigations: Peripheral blood parameters were white blood cells of 4.67 10⁹/L, total red blood cell count of 4.22 10¹²/L, hemoglobin of 125 g/L, granulocytes of 56.7%, fasting glucose of 6.65 mmol/L, postprandial glucose of 14.33 mmol/L, and HbA1c of 6.8%. Procalcitonin levels are normal (0.25 ng/mL), high-sensitivity C-reactive protein is 8.15 mg/L, and the erythrocyte sedimentation rate is 35 mm/h. The right foot's first toe and fifth phalanges had soft tissue edema and low-density shadows on radiographs but no bony damage. The peripheral arterial pulses were feeble. Right: 0.80; left: 0.85 for the ankle/brachial index. The lower limb's vascular magnetic resonance revealed that the arteries were open in both lower extremities.

Timeline and diagnostic assessment:

When the patient initially arrived at the outpatient Department of Panchakarma, Mahatma Gandhi Ayurveda Hospital and Research Centre, Salod (Hirapur), Wardha, Maharashtra, he had diabetes, so it became difficult to heal the wound itself, although it is observed that the condition worsened as compared to the initial stage when his foot got injured, and there is a necrotic changes at the injury place and gangrene formation due to tissue death at the site of injury. So debridement was planned under proper aseptic precaution. Due to debridement, all dead tissue is removed. However, after debridement, slough formation is observed; therefore, *Kshara Taila Pichu* is planned to be done. After that procedure, the slough was present after debridement was reduced. Then, in a few sittings, *Kshara Taila Pichu* is repeated and observed that gangrenous tissues are removed and the wound is adequately healed. During this therapeutic and parasurgical intervention, no adverse reactions were seen.

Table no. 3: Timeline of Clinical Events and Interventions

Time Point	Clinical Events / Interventions
Day 0	Sustained injury to right toe by a screw
Day 30	Patient reported to OPD with blackish, non-healing ulcer and pus discharge
Day 31	Clinical evaluation and diagnostic tests performed
Day 32	Surgical debridement of necrotic tissue under aseptic conditions
Day 34 – Day 64	<i>Kshar Taila Pichu</i> applied on alternate days (external dressing therapy)
Day 35	Noticeable reduction in slough formation
Day 40	Cessation of pus discharge and gradual pain relief
Day 60 – Day 64	Wound completely healed; healthy granulation tissue observed
Day 65	Final assessment showed full wound recovery without complications

Therapeutic intervention: Treatment was totally focused over the external application of *Kshara Taila Pichu*

Cleaning of the wound:

A sterile saline solution was used to rinse the wound gently. As there is a delay in wound healing and damage to healthy tissues. Remove visible dirt, debris, and foreign objects from the wound using sterile tweezers or gloved fingers. A sterile saline solution bottle is used to irrigate the wound thoroughly. Direct the flow of saline solution to flush out any remaining debris or bacteria. This helps remove bacteria and promotes wound healing. [8]

Debridement of the wound:

1. Anesthesia: Local anesthesia is administered to numb the area and minimize pain during the procedure.
2. Cleaning and Sterilization: Before starting the debridement, the surrounding skin and the surgical instruments are thoroughly cleaned and sterilized to minimize the risk of infection.
3. Debridement Technique: Sterile instruments are used, such as a scalpel, scissors, or forceps, to remove the necrotic tissue from the wound carefully. Debridement of the wound is done by gently lifting the edge of the necrotic tissue and then carefully cutting it away, not damaging healthy tissue.[9]
4. Wound Care: The incision is closely checked to eliminate all necrotic tissue following the precise debridement. Afterward, any leftover debris or germs are cleaned out of the incision using an antiseptic or sterile saline solution.
5. *Kshar Taila Pichu* Application: The lesion was meticulously cleaned with regular saline continuously flowing. The lesion was then gently covered with the *Kshara Pichu* and *Kshara Taila*. The wound was wrapped using sterile dressing material. After that, the dressing was done on alternate days for a month. This process was done for five days. *Kshar Pichu* application and dressing is a one-month technique limited to covering wounds or using as a dressing pad.

Follow up and therapeutic outcome:

Table no. 4: The assessment of the patient was done based on the improvement in the wound healing

Sr No.	Before treatment	After treatment	Duration
1.	Whitish yellow slough present	Slough progressively vanished	In 5 days
2.	Mild pus discharge	Pus discharge stop	In 10 days
3.	On and off pain	Pain subsided gradually	In 10 days



Image no.1: The status of the wound before initiating the treatment



Image no.2: Wound after debridement



Image no.3: Wound during application of *Kshar Tail Pichu*



Image no.4: Completely healed wound after treatment

Discussion:

As the incidence rate of *Kotha* is increasing day by day, it becomes necessary to treat it as soon as possible. *Kotha* is the localized death of soft tissue in animals brought on by a sustained interruption of the blood flow, which can happen due to an infection or an accident. If left untreated, it will begin to spread to the neighbourhood and could even harm internal organs. Tissue death is due to insufficient blood flow to that part or organs. To rule out the treatment and to avoid amputation, many studies had been done by researchers to treat *Kotha* in its early stages, such as diabetic foot ulceration, by doing *Jalukaavacharan* and trigone honey, which came to be known to help treat this kind of condition. As in *Jalukaavcharan*, there is letting of impure blood, so it is beneficial to heal the ulceration. As per other conditions means in trigone of honey, which is also helpful to treat this kind of ulceration and as per this, *Kshara Taila Pichu* is also very useful in the treatment of *Kotha*. According to Acharya Sushruta, *Kshara* is a material possessing the qualities of *Kshanan* (destroying the lesion) and *Ksharana* (melting away). *Ksharana* suggests "one who mobilizes and removes the deformed skin, flesh, etc." or "one who eliminates the deformed skin, flesh, etc." In contrast to other non-surgical methods, *Kshara karma* is a simple, safe method. Additionally, no specialized knowledge is required. It is easily accessible, causes less discomfort, and is less likely to recur. It is highly efficient and economical, resulting in a reduced length of hospital stay.

The effect of *Kshara Taila Pichu* over the *Vrana* is mentioned below:

Effect on *Vrana Vedana*: By the conclusion of the second week, the severe discomfort that was present initially has subsided. *Kshara Taila Pichus* entire contents were *Ushnavirya*, making them *Vedanasthapana*.

Effect on *Vrana Varna*: By the end of the second week, the slough had vanished entirely, and the floor was covered with red, healthy granulation tissue. The *Lekhana* land belongs to *Laghu* and *Ruksha Guna*, therefore slough was cleared out and the wound floor was cleaned.

Effect on *Vrana Srava*: By the conclusion of the second week, the purulent discharge that was present initially is subsided. This might be because of *Kshara Taila Pichu Shodhana* characteristic.

Effect on *Vrana Gandha*: By the conclusion of the first week, the unpleasant odor that existed before treatment had disappeared entirely. The infection and unpleasant odor were eliminated thanks to the *Krimighna*, *Vishaghna*, and *Kushthghna* characteristics of the constituents of *Kshara Taila Pichu*.

Effect on *Vrana Aakriti*: *Vrana* had a minor scar when the treatment was finished, and it fully recovered. By speeding up healing and contraction, *Laghu Guna* assisted in reducing the size of the wound. [10]

Conclusion:

Kshara Taila Pichu is a good substitute for *Kotha*. It relieves the signs and symptoms of *Kotha* and performs the activity of *Shodhana*, *Lekhana*, and *Ropana* with fine scarring without causing any adverse effects. Therefore, based on this case study, *Kshara Taila Pichu* was shown to be very beneficial when applied locally in the management of *Kotha*.

Patient perspective:

The patient is happy with the course of treatment and the expected results.

Ethical statement:

The patient gave written informed consent for this case study to be published and agreed to have his clinical information disclosed. The protocols and interventions recommended and carried out in this investigation adhered to the ethical guidelines outlined in the 1964 Declaration of Helsinki, as updated in 2013.

Conflict of interest:

The author declares that there is no conflict of interest.

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