

## Efficacy of *Thumari* oil in the management of Diabetic Ulcer – A case study

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### ABSTRACT:

Diabetic ulcer is a burning issue in contemporary surgical practice as it is difficult to heal and often prone to infection. The impaired healing might be due to glucose laden tissue, atherosclerotic changes and peripheral neuritis. In Indian system of medicine many medicinal plants were described for wound healing just like *Jatayadi Taila*, *Apamarga Kshar Taila* etc. In this case report, a case of *Madhumehajanya Dushta Vrana* (diabetic wound) has been treated with help of traditional medicine. A female diabetic patient aged 70 years was presented with a non-healing wound on her right ankle since 15 days with maggots, pus discharge and discoloration. Patient was known case of type -2 diabetes mellitus (T2DM), hypertension and IHD. In this case the wound was treated with local application of *Thumari* oil (*Securinega leucopyrus* (willd.) daily once up to complete wound healing i.e., 8 weeks. The conventional medicines for T2DM, HTN, and IHD were continued as prescribed by the physician and *Amapachan vati* 1 Tablet three time before meal with luke warm water simultaneously given with local management of wound. Significant reduction in the wound, slough, swelling and discoloration with granulation at base of the wound was observed. The wound healed completely by topical application of *S. leucopyrus* oil within 8 weeks. This case demonstrated that *S. leucopyrus* oil has potential to heal the diabetic wound.

**KEYWORDS:** *Thumari* oil, Diabetic ulcer, *Madhumehajanya Dushta Vrana*, Wound healing.

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### INTRODUCTION:

Diabetes mellitus (DM) is a complex disease that affects almost all the body's vital organs. Around 422 million people have been diagnosed with DM worldwide and most of them are due to type 2 DM.<sup>[1]</sup> The incidence of DM is estimated to increase by 642 million

individuals by 2040.<sup>[2]</sup> DM is considered to have many complications among which diabetic wound (DW) is one of the most distressing complication. Neuropathy of the foot and impaired wound healing are frequently associated with peripheral arterial occlusive disease. These factors

combine to contribute to the development of foot ulcers. Successful wound healing and limb salvaged are the ultimate goal required for DFU care. Wound care protocol comprised of comprehensive wound care, appropriate offloading, sepsis management and vascular neuropathy assessment.

The concepts of *Vrana* such as causes, classification, examination, treatment, bandaging and its complications etc. were rooted in the text of *Sushruta*. Its acceptance in recent era is depicted by remaining unchanged even in this 21<sup>st</sup> century.<sup>[3]</sup> All types of non-healing wounds and chronic ulcers i.e. leprotic wound, diabetic wound, tubercular wound are covered by single term called *Vrana* in *Ayurveda*.<sup>[4]</sup> There are sixty types of procedures (60 *Vrana Upkramas*) for the management of wounds to achieve early healing without complication and cosmetic scar. Numerous herbal drugs for local application as well as systemic use were also advocated. Treatment of *Vrana* care can be broadly classified as *Vrana Shodhana* (wound cleaning), *Vrana Ropana* (wound healing) and cosmetology.

According to Acharya Susrutha, the wounds of those suffering from *kushtha*, poison (*visa*) consumption and *Madhumeha* are *Krichhasadhya Vrana*.<sup>[5]</sup>

Wounds can be defined as a break or incontinuity in the epithelial lining. Wound healing is complex phenomenon and is differing from patient to patient. The wounds are said to be non-healing when does not improve after four weeks or does not heal within eight weeks. Restoration of anatomical continuity and functional status of skin can be achieved by proper wound healing. Diabetic ulcers are more prevalent among non-healing ulcers and are reluctant to heal that results in amputation. The diabetic ulcers treated with conventional medicament have their own limitations and

patients demand increased towards *Ayurveda* for herbal medicament.

#### **CASE REPORT:**

A 70 year old female patient presented in Shalya tantra OPD with the complaint of non-healing wound at right ankle joint with throbbing pain and swelling at the wound site since 15 days. Associated symptoms i.e. pus discharge, foul smell, slough were also present at time of visit. Patient is known case of type -2 diabetes mellitus (T2DM), hypertension, IHD for last 10 year. The conventional medicines for T2DM, HTN, and IHD are continued as prescribed by the physician.

**General Examination:** Patient was conscious and well oriented to time, date, place and person.

**Family /Surgical/Allergic History :** No any significant history was found.

**Medicine History:** Patient was taking oral antihypertensive, hypoglycaemic, heart disease medication.

#### **LOCAL EXAMINATION:**

**Inspection** - Size - Approx. (6×3×2) cm; Shape - Irregular; Number -Single wound; Position- wound at lateral side of Rt. Ankle joint; Margin- Irregular; Edge-Punched out; Floor - 60% slough/40% granulation and approx. 8-10 maggots present; Discharge- Purulent; Surrounding area - non pitting swelling and blackish marginal discolouration present on ankle and wound periphery area. [Figure. 1]

**Palpation** - Size (5.5×4 ×2) cm; Tenderness-present; Edge and margin-Induration present; Base-muscular; Bleeding-touch on bleeding absent. Pulsation -dorsalis pedis artery, posterior tibial and anterior tibial artery regular palpated in both foot and found regular and normal flow.

Previously Patient haven't taken any treatment for the wound. Laboratory investigations for total leukocyte count, differential leukocyte count, haemoglobin, blood urea and serum creatinine were within the normal range while blood sugar level was found elevated. [Fasting blood sugar (FBS-160mg/dl) and postprandial blood sugar (PPBS - 133mg/dl)] . Patient's vital is Pulse - 84/minute, BP - 130/90 mmHg, RR - 22/min , SpO2 - 99%

#### TREATMENT PLAN:

**Local Application:** Patient was treated with local application of *Thumari* oil.

**Preparation of *Thumari* oil:** *Tila Taila* (4ltr) will be taken in a steel vessel and heated over *Mandagni* (90° C to 100° C) to remove water contain in it. One part (1kg) of *Thumari Kalka* will be added into sesame oil (*Tila taila*) and subjected to heat maintaining temperature with constant stirring to avoid *Kalka* to adhere to vessel. Earlier prepared *Kwatha* (decoction) will be added in *sesame* oil. Heating will be continued up to the characteristic feature of *khara paka* (*Thumari taila* formed). [6] *Taila* will be

filtered while hot through a clean cotton cloth into a sterile stainless-steel container.

#### GENREAL MEASURES:

**Oral medication** 1. *Amapachan vati* 1 Tablet three time before meal with luke warm water.

**Specific advise** Anti-Diabetic diet with specific exercise, advised to avoid long time standing, proper bandage care.

**Procedure of wound dressing:** On first day of visit, there were numerous maggots in the floor of wound. So, for its removal turpentine was used for initial 3 -5days. After that, daily wound dressing was done with local application of *Thumari* oil followed by cleaning with normal saline. Then wound was covered with sterile gauze and packed with bandage.

#### OBSERVATIONS:

Daily observation was done over event of healing by assessing parameters like pain, discharge, slough, foul smell, wound size, peripheral skin, edges etc. Parameters were assessed 7<sup>th</sup> day, 2<sup>nd</sup> week and 2-2-week interval for data collection. (Table no.1, 2 &3).

**Table-1: Timeline:**

Weekly observation	Wound status
0 Day (First visit to hospital)	Wound was 70% covered with slough, severe foul smell, severe throbbing pain, maggots, severe pus discharge, marginal blackish discolouration, punched out edge, peripheral pulsations were present with full volume
7 <sup>th</sup> day (Figure 2)	Wound was 50% covered with slough, moderate foul smell, moderate throbbing pain, pus discharge, marginal blackish discolouration, punched out edge, pulsation was present.
2 <sup>nd</sup> week (Figure 3)	Mild slough present, mild foul smell, seropurulent discharge, blackish discolouration, slopping edge.
4 <sup>th</sup> week (Figure 4)	No slough, mild throbbing pain, serous discharge, mild blackish discolouration, slopping edge.
6 <sup>th</sup> week (Figure 5)	Wound healthy, wound contraction start
8 <sup>th</sup> week (Figure 6)	90% wound healed
9 <sup>th</sup> week (Figure 7)	Complete wound healed

Table – 2: Assessment criteria

Criteria	Grade 1	Grade 2	Grade 3	Grade 4
<b>Pain</b>	No pain	Mild	Moderate	Severe
<b>Floor</b>	No slough, healthy granulation starts, no pus discharge	Mild slough, mild unhealthy granulation, mild pus discharge	Moderate Slough present, moderate unhealthy granulation, moderate pus discharge	Maggots present, slough present, unhealthy granulation, pus discharge
<b>Odour</b>	No smell	Mild	Moderate	Severe

Table-3: Weekly assessment of wound

Assessment	0 day	1 <sup>st</sup> week	2 <sup>nd</sup> week	4 <sup>th</sup> week	6 <sup>th</sup> week	8 <sup>th</sup> week	9 <sup>th</sup> week
<b>pain</b>	Grade 3	Grade 2	Grade 2	Grade 2	Grade 1	Grade 1	Grade 1
<b>Floor</b>	Grade 4	Grade 3	Grade 2	Grade 1	Grade 1	Grade 1	Grade 1
<b>Odour</b>	Grade 4	Grade 3	Grade 2	Grade 1	Grade 1	Grade 1	Grade 1
<b>Wound size (Cm.)</b>	(5.5x4x2) 44cm <sup>3</sup>	(5x4x1) 20cm <sup>3</sup>	(3.7x3x0) 11.1cm <sup>3</sup>	(3x2x0) 6cm <sup>3</sup>	(2x2x0) 4cm <sup>3</sup>	(1x1x0) 1cm <sup>3</sup>	Wound healed

### RESULT:

After 7 days application of *Thumari* oil, punched out edge convert into slopping edge and swelling and discolouration also remarkably reduced (Figure-2); Pain was reduced from Grade 3 to Grade 2 and simultaneously wound floor and odour converted from Grade 4 to Grade 3 (Figure 8), wound size was significantly reduced from 44cm<sup>3</sup> to 20 cm<sup>3</sup> (Figure 9). After 2<sup>nd</sup> week, wound was started healing from base and fresh contraction of margin appeared (Figure 3); Pain, wound floor and odour converted in Grade 2; wound size was significantly reduced from 20cm<sup>3</sup> to 11.1 cm<sup>3</sup> (Figure 9). After 6<sup>th</sup> week, the filling of the wound from base with fresh and well vascularized tissues and healthy granulation was seen on the wound surface (Figure 5); Pain, wound floor and odour converted in Grade 1; wound size was significantly reduced from 11.1 cm<sup>3</sup> to 4cm<sup>3</sup> (Figure 9). After 9<sup>th</sup> weeks wound was completely healed with minimum scar (Figure 7).

The wound was treated with application of *Thumari* oil and observed that after 7 days, wound was started contraction and swelling, blackish discolouration, bad odour relieved within 15 days which indicates that the drug has the property to debride the dead tissue. The wound became fresh having healthy granulation tissue within 1 month which showed that applied drug prevents infection. Wound healed completely within 8 weeks with minimum scar, which proves the “*Savarnikarana*” (bringing back the normal skin colour) effect of *Thumari*.



**[Figure 1. Wound at time of first visit to hospital after removal maggots (25/10/2021)]**



**[Figure 2. 7<sup>th</sup> day ]**



**[Figure 3. 2<sup>nd</sup> week]**



**[Figure 4. 4<sup>th</sup> week]**


[Figure 5. 6<sup>th</sup> week]

[Figure 6. 8<sup>th</sup> week]

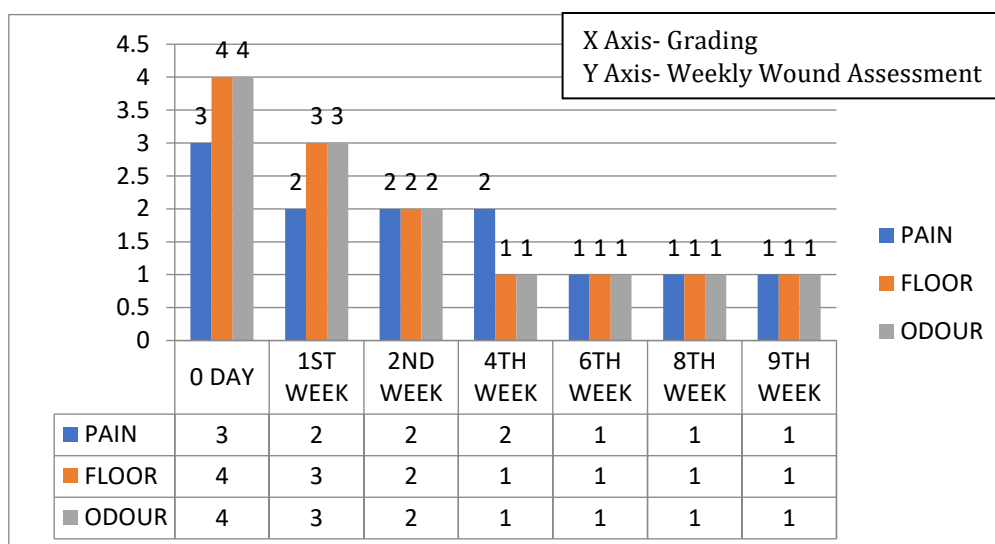
[Figure 7. 9<sup>th</sup> week]


Figure 8: Wound healing assessment

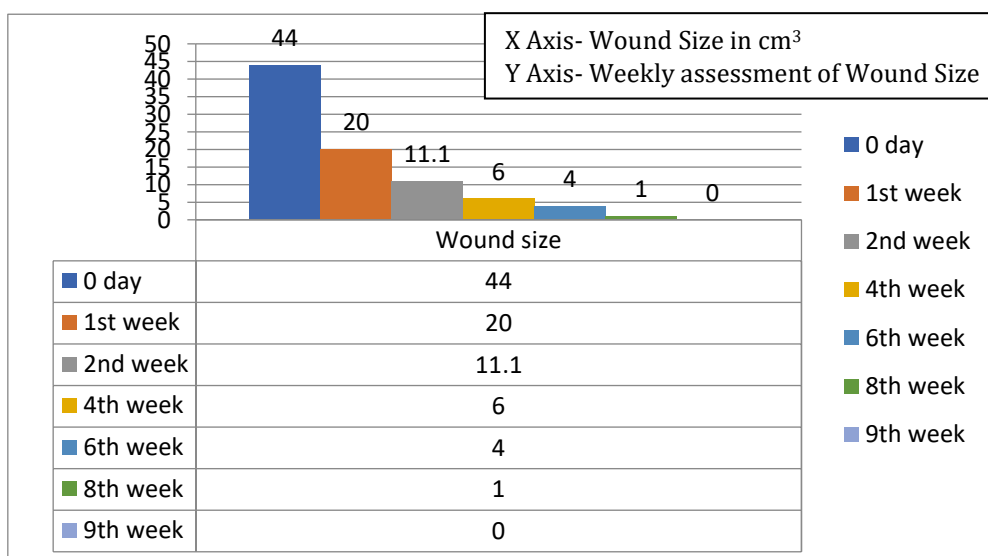


Figure 9: Weekly wound size reduction

**DISCUSSION:**

The identical signs of *Dushta Vrana* mentioned in the classics are *Ativivrita* (broad base), *Bhairava* (ugly look), *Putipuyamansa* (pus discharge), *Gandha* (foul smell), *Vedana* (pain), *Dirghakalanubandhi* (chronicity),<sup>[7]</sup> which was clearly noted in this case. so, this present *Vrana* can be demonstrated as "*Dushta Vrana*." One additional finding in this case was uncontrolled diabetes which was the main cause for delayed or unhealthy healing. So, case can be correlated to *Madhumehajanya Dushta Vrana*. By this citation, *Krishasadyata* will be there as mentioned in classics. *Ayurveda* management for *Madhumehajanya Dushta Vrana* includes two stage therapy i.e., *Shodhana* and *Ropana*.<sup>[8]</sup> Along with *Vrana* care, care of patient (*Vranit*) is also described by mentioning of *Pathya- Apathya Ahara* and *Vihara* which are prime important in ulcer management.<sup>[9]</sup> There are number of drugs mentioned according to status of wound, but choice should be made depending on wound condition. *Ama pachan vatti* -digest the *Ama* in body and result in proper formation of *Ahara Rasa* which is responsible for *Dhatu* formation.

*Thumari* has *Kashaya Rasa* which provides *Lekhana* (scraping) properties that helps in sloughing out necrosed tissue and preparing the wound for healing. It has *Sandhankara* properties which means it helps in wound contraction, *Ropana* properties that helps in healing and *Stambhana* properties which helps to stop discharge from the wound. *Tikta Rasa* also having *Lekhana*, *Shoshana* (dryness of discharge) properties that dries up the pus, *Shodhana* which helps in purification of ulcers. *Thumari* leaf powder having large amount of tannin and oil that is helpful in the wound healing. Antioxidant activity of *Thumari* seems due to the presence of flavonoids, tannins in abundant quantity.<sup>[10]</sup>

Application of *Thumari Taila* has provided autolytic wound debridement and helped in improving healthy granulation, tissue contracture and wound healing ultimately. Bakshu LM et. al. and Sambhaji DT et. al. concluded antimicrobial activity of *Securinega leucopyrus* Willd. Meull against *Aspergillus* species of Fungus.<sup>[11- 12]</sup>

During the treatment antidiabetic drug (metformin 500 mg) was continued, which to maintain blood sugar level. As diabetic wounds are difficult to heal only with local treatment, additional anti-diabetic drug might have helped in early healing. Metformin is also known to increase angiogenesis, which is essential for wound healing.<sup>[13]</sup> In this case three factors, i.e., DM, vasculopathy and as per site low blood circulation were factors that delay the healing in this case. But previous studies on this drug i.e., *Thumari - Securinega leucopyrus* (Willd.) Muell. is already proven in the management of diabetic wound in powder form & gel form. This case demonstrated that *Thumari* oil has potential to heal the infected diabetic wound without any complication.

**CONCLUSION:**

This case demonstrated that *Thummari* oil has potential to heal the infected diabetic wound without any complications.

**INFORMED WRITTEN CONSENT:**

It was taken from the patient before starting of the treatment protocol as well as prior to publication of the case details and pictures.

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