



An Unorthodox Approach In Management Of Diabetic Ulcers With *Katupila*- Cream: A Case Series

1Pashmina Joshi, 2Prof.(Dr) T.S.Dudhamal

1PhD Scholar, 2Professor and HOD

1IPGT&RA, Gujarat Ayurved University,
2ITRA

Abstract

Ulcers are a major complication of diabetes, often resulting in chronic wounds that are difficult to heal and susceptible to infection, potentially leading to debilitation or even death. As much as Diabetic foot ulcers are a common complication, so are carbuncles. Carbuncles also known as *Bullosis diabeticorum* (BD) bursts open to lead to ulcer formation in any part of body. Due to the complex nature of the condition, a combined approach using both *Ayurveda* and conventional medical treatments can offer better outcomes. This report discusses three cases of diabetic ulcers located on the various parts of body. After performing thorough wound debridement, treatment was administered based on the *Ayurvedic* principles of *Vrana Chikitsa*, alongside infection control. Regular wound care and monitoring was carried out. The ulcers showed steady improvement, with reduced slough and smooth healing observed in all cases. Complete wound closure was achieved within six weeks, without recurrence reported during a one-month follow-up period. This integrative treatment approach appears to promote faster healing in chronic, non-healing diabetic ulcers.

Keywords:

Ayurveda, Carbuncle, Diabetic ulcer, *Dushtavrana*; *Katupila*, *Prameha pidika*,

Introduction

Ulcers caused by carbuncles or *Bullosis diabeticorum* (BD) in individuals with diabetes represent a serious medical concern. If not treated promptly, these ulcers can lead to multiple complications. Studies estimate that the lifetime risk of a person with diabetes developing an ulcer due to poorly managed BD ranges from 5% - 26% [1], [2]. Moreover, the recurrence rate of ulcers is significantly high, with 40% reoccurring within the first year after healing and 65% within five years [3]. High blood sugar levels in diabetics make the skin and subcutaneous tissues more susceptible to infections, a problem worsened by diabetes-induced immune suppression, which further increases the risk of serious infections. The primary goal of conventional treatment is to heal the tissue while maintaining function by managing blood sugar and modulating immune responses. Key strategies include antibiotic therapy for curbing infections, along with tissue debridement or excision, and the use of negative pressure wound therapy until now full healing is achieved. Despite the availability of various treatment options, diabetic ulcers continue to have substantial physical, psychological, and economic impacts on patients, their families, and society as a whole.

Ayurveda texts have emphasized on the incidence of *Parmaha pidika* which can be co-related to BD in the modern science. When inadequately treated it leads to ulcer formation [4]. The *Susruta Samhita* provides a comprehensive account of wound and ulcer management, delineating 60 specific approaches (*Vrana upakramas*) that align with *Ayurvedic* principles of wound healing. *Ayurveda* offers a rich array of herbal and

herbo-mineral preparations suitable for various stages of wound healing to disrupt pathogenic processes. The methodical application of wound treatment concepts such as *Nidana parivarjana* (avoidance of causative factors), *Amapachana* (detoxification), *Srotoshodhana* (clearing channels), *Vrana shodhana* (wound cleansing), and *Vrana ropana* (wound healing) holds promise for managing diabetic ulcers. *Katupila* (*Securinega Leucopyrus*), a traditional Sri Lankan remedy, exhibits notable in vitro antimicrobial activity [5]. This case series demonstrates the integration of *Katupila* into classical *Ayurvedic* strategies for managing diabetic foot ulcers across three distinct patient cases. Various forms of *katupila* like powder [6], kalka [7], oil [8], and gel [9] but cream has better accessibility due to its easy application.

Case 1:

A 55-year-old normotensive male with no history of diabetes mellitus (Type -1 DM) presented with boil on the left flank of gradual onset of 1 month. Swelling was mildly painful and associated with redness, itching and burning sensation. There was a rise in symptoms in the past 2 days. He was under self-medication for the swelling with local applications and oral painkillers [Tab Zerodol Sp 1 BD AF] but didn't get any satisfactory relief. Concerned about the prospect of increase in swelling and cellulitis, he sought *Ayurveda* management at this hospital. He was taking allopathic anti-inflammatory medicines irregularly, had the family history of diabetes. Vitals were stable (Blood pressure 130/90mmHg, Pulse rate 96 beats per minute, Spo2 100%). Local examination revealed an oval shaped swelling with marked induration in the surrounding skin with macerated overlying skin and sieve-like multiple opening from which the pus was being discharged at the level of 11th rib and between midclavicular and mid axillary line. The size of swelling with fluctuation was 4cm x 3cm. (Figure - 1). Local temperature was raised, and tenderness was present. Fasting and post prandial blood sugar before treatment was 187 mg/dl and 223 mg/dl respectively. The diagnosis was an ulcer due to carbuncle. (Wagner's classification 2: Deeper, full thickness extension)



Figure 1- Before treatment

Case 2:

A 60-year-old female patient with a 15-years history of type 1 diabetes mellitus (T2DM) presented with a large swelling of acute onset on left buttock. The swelling started as a point of itching and heaviness on left buttock and difficulty in sitting before 3 days. Within 2 days it progressed to severely painful and tender swelling with redness spreading around buttock. She had fever since 1 day. She had a history of stroke and left sided hemiplegia of lower limb before 5 years. She had been consistently taking allopathic anti diabetic medicines (tab. Metformin 500mg), anti-hypertensive medications (tab. Telmisartan 40mg), medication to prevent stroke (tab. Ecosprin AV 75mg+10mg) and Insulin (18-18-18) and no significant family history was observed. Personal history revealed no addiction to tobacco, cigarette and alcohol. Blood pressure was 168/98mmHg, Pulse rate 125 beats per minute and Spo2 100% Local examination revealed a large swelling of 5.4cm x 4.2cm in perianal region and extensive cellulitis over the left buttock (Figure - 2). Black patch of dead tissue of size 2.7cm x 4cm was adherent to the underlying deep fascia. Local temperature was raised and severe tenderness was present. Under the impression of fistula-in-ano and ultrasonography (USG) of local part revealing pus, the patient got admitted to seek management for the same. Fasting and post prandial blood sugar before treatment were 215 mg/dl and 195 mg/dl respectively. It was diagnosed as a diabetic carbuncle as no connection with anus or rectum could be elicited (Wagner's classification 2: Deeper, full thickness extension)



Figure2- Before Treatment

Case 3:

A 75-year-old hypertensive male with approximately 6-year history of type 2 diabetes mellitus (T2DM) presented with non-healing ulcer of gradual onset in the right hand since 3 weeks. It was associated with foul smell and pain that aggravated during movement and touching of soap or water. Past history revealed presence of a boil over the dorsum of palm before 1 week of onset of the ulcer associated with pain and itching and was treated as boil by home remedy. This boil burst opened and got converted into a non-healing ulcer. He had been consistently taking allopathic anti-diabetic medicines (tab. Glycomet GP2 1bd) and anti-hypertensive medicine (Telvas 40mg 1 od) and had the family history of diabetes. He did not have any addiction to tobacco, cigarette and alcohol. Vitals were stable (Blood pressure 134/84 mmHg, Pulse rate 86 beats per minute, SpO₂ 99%). Local examination revealed a 1.5 cm x 1.5 cm x 0.2 cm round shaped ulcer at dorsum of right hand proximal to knuckle of ring finger with raised edges, regular soft margins, slough at the floor with foul smell and pus discharge and mild induration and redness in surrounding skin (Figure - 3). Local temperature was slightly elevated, and tenderness was present. X-Ray of the affected part showed no osteomyelitic changes of the underlying bone. Fasting and post prandial blood sugar before treatment were 237 mg/dl and 266 mg/dl respectively. The diagnosis was a diabetic ulcer. (Wagner's classification 2: deep abscess formation)



Figure 3: Before treatment

Diagnostic assessment

Clinical examination concentrated on evaluating the ulcer's size, shape, margins, floor, and depth. Baseline blood sugar levels were measured to create an effective diabetes management plan. The diagnosis was made using Wagner's classification system for diabetic ulcer^[10]. Based on a comprehensive assessment of the signs and symptoms, and following *Ayurvedic* guidelines, the patients were diagnosed with *Madhumehajanaya Vrana* (a non-healing ulcer), and the treatment plan was tailored accordingly.

Therapeutic intervention:

An integrative treatment approach was formulated, considering the severity of the condition based on tissue involvement, signs, symptoms, as well as the balance of *Doshas* (*Vata*, *Pitta*, *Kapha*) and *Dushyas* (*Rasa*, *Rakta*, *Mamsa*, *Medas*). Anti-diabetic medications were continued on consultation with the physician concern.



Figure 4: case 1: during treatment



Figure 5: case 2: during treatment

In the case 1, removal of the dead tissue was done under short general anaesthesia combined with local anaesthesia and a clean oval shaped wound with regular margins was made of the size 4cm x 3cm x 0.6 cm (Figure - 4), while thorough surgical debridement was conducted in cases 2 under spinal anaesthesia (Figure – 5) and a clean wound was made of the size 5.4cm x 4.2cm x 4cm. In case 3 thorough cleaning of wound was done with sterile gauze and normal saline. Swab culture revealed the presence of *Pseudomonas aeruginosa* in case 1 and 2 whereas *E. coli* and *Pseudomonas aeruginosa* in case 3. Antibiotics (table 1) were prescribed during the post-debridement period (for 5 days in all three cases). Subsequently, *Ayurvedic* medications (table 1) were initiated.

Method of Wound Dressing-

After debridement wound cleaning was done with sterile gauze and normal saline and after than wound dressing was done with *katupila* cream daily once in the morning till complete healing for one month.

Results:

All cases showed significant progress in wound contraction, with the ulcers steadily becoming healthier, accompanied by a gradual reduction in the amount of slough. Complete wound healing was achieved within



Figure 6: case 1 after treatment



Figure7 - case 2 after treatment



Figure8 - case 3 after treatment

30 days (Figure - 6), 44 days (Figure - 7), and 30 days (Figure - 8), respectively.

3. Figure 6-

Timeline

Timeline of events are detailed in table 1.

Timeline of events		
Case 1	Case 2	Case 3
Day 1: Clinical evaluation Baseline blood investigations including HIV, HCV, HbsAg, VDRL		
Day 2: Swelling with induration, raised temperature and macerated skin covering the slough beneath. (Wagner's classification 2) 1. Debridement done under short GA + LA following strict aseptic precautions. 2. Wound cleaned with normal saline Dressing done with <i>katupila</i> cream. 3. Tab. Metformin 500mg 1-0-1 orally BF	Day 2: Swelling with dead tissue patch and cellulitis. (Wagner's classification 2). 1. Under spinal anaesthesia, surgical wound debridement done by following strict aseptic precautions. 2. Wound was cleaned with normal saline and dressing done with <i>katupila</i> cream. 3. Inj. Insulin 18-18-18 BF	Day 2: 2. Wound was cleaned with normal saline <i>kwatha</i> and dressing done with <i>katupila</i> cream. 3. Tab Glycomet GP2 1-0-1 orally BF
4. Inj. Cefotaxime and sulbactam 1.5g, intravenously, 12 hourly (for 5 days) 5. Inj. Ranitidine 50mg, intravenously, 12 hourly (for 5 days) 6. <i>Mamejvaghanvati</i> 2tab [500 mg] twice daily, before food 7. <i>Sanjivani vati</i> 125mg, 1-1-1 after food 8. Tab. <i>Kaishora guggulu</i> 2 tablets (1g) thrice daily, after food with warm water		
Day 14: healthy ulcer. No foul smell present and serous discharge. Continued 1,2,3,6,7,8,9 till the completion of treatment	Day 14: unhealthy wound, slough present. Continued 1,2,3,6,7,8,9 till the completion of treatment	Day 8: healthy ulcer. No foul smell present. Serous discharge. Continued 1,2,3,6,7,8,9 till the completion of treatment
Day 21: healthy ulcer. Wound size reduced. Mild serous discharge	Day 21: good wound contraction. Mild serous discharge from wound	Day 14: healthy wound. No slough present. Wound is healing from the base.
Day 28: healthy ulcer. Good wound contraction. Mild serous discharge	Day 30: good wound contraction. No discharge from wound	Day 28: completely healed wound Continued 3. Stopped dressing, medicines 6,7 and 8 continued for 3 weeks.
Day 30: wound completely healed Continued 3. Stopped dressing, medicines 7 and 8 continued for 3 weeks.	Day 44: completely healed wound. Continued 3. Stopped dressing, medicines 6,7 and 8 continued for 3 weeks.	
Follow up after one month: no recurrence noticed		

Table - 1: Timeline of events

Discussion:

Effective diabetes management is crucial in treating diabetic ulcer cases. Two of the three patients (case 2 and 3) had been on allopathic antidiabetic medications for a long time, but their blood sugar levels were still not within normal ranges. The other patient (case 1) was newly diagnosed case with diabetes mellitus, so the medication dosage was determined after consulting an allopathic physician. Antibiotics were recommended to prevent or address infections, particularly after surgical wound debridement. Debridement is considered a key practice in wound care, as it removes necrotic tissue, bacteria, and non-functional cells while stimulating the activity of growth factors ^[11].

Katupila possesses *Kashaya* (astringent) and *Tikta* (bitter) tastes. The astringent *Kashaya* taste aids in *Lekhana* (scraping away) of devitalized tissue, helping to clean the wound. It also reduces wound discharge through its *Stambhana* (holding) property. Additionally, its *Sandhankara* (uniting) and *Ropana* (healing) properties promote wound contraction and overall healing. The *Tikta* taste further contributes to wound healing by its *Soshana* (drying up abnormal discharges) and *Shodhana* (preparing the wound bed) actions. *Katupila*'s antimicrobial properties have been confirmed through in vitro studies ^[12]. The plant contains calcium oxalate crystals, tannins, and oils that support wound healing. *Katupila* cream, with its acidic pH, fosters wound healing by lowering the toxicity of bacterial byproducts ^[13], controlling infections, increasing antimicrobial activity, modifying protease activity, releasing oxygen, and enhancing both epithelialization and angiogenesis. The advantages of topical drug delivery systems are clear and impactful. From targeted treatment and reduced systemic side effects to convenience and suitability for various patient groups, this innovative approach to drug administration has revolutionized patient care. As technology continues to advance, the potential of topical drug delivery to transform the pharmaceutical landscape and enhance treatment outcomes remains promising.

Other supportive medications are also likely to contribute to the wound healing process. *Sanjeevani Vati* has *srotoshodhana* (channel-clearing) properties, which may have helped clear arterial blockages caused by diabetic complications ^[14]. *Kaishora Guggulu* is known for its detoxifying and rejuvenating effects especially in skin lesions. *Guggulu* gum contains the compound 5(1-methyl, 1-aminoethyl)-5-methyl-2-octanone, which has demonstrated significant antibacterial activity against gram-positive bacteria and moderate effectiveness against gram-negative bacteria ^[15], ^[16]. *Mamejvaghanvati*, a well-established *Ayurvedic* anti hyperglycemic drug, is effective due to its *Atitikta* (extremely bitter) taste and *Ruksha* (dry) quality ^[17]. It also helps reduce *kapha* in the wound, thereby decreasing pus formation.

Conclusion

This study utilized a multidisciplinary approach, blending *Ayurvedic* and conventional wound healing principles to treat three cases of diabetic ulcers. All wounds healed progressively without complications, and no recurrences were noted after one month. These findings underscore the potential effectiveness of integrating various therapies in the management of diabetic foot ulcers. Further research, particularly randomized controlled trials, is required to enhance wound healing techniques and improve patient outcomes.

Conflicts of interest

The authors declare no potential conflicts of interest with respect to research, authorship and/or publication of this article

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