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ROLE OF NIMBA KALKA IN DIABETIC WOUND HEALING

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ABSTRACT

One of the most dangerous complications of diabetes mellitus is the loss of lower limb by amputation as a consequence to diabetic foot ulcer (DFU). The estimated global prevalence of DFU is around 6.3%. The DFU is a type of nonhealing ulcer. *Ayurveda* explains it as *Dusta Vrana* (chronic non- healing ulcer). In *Ayurveda*, *Vrana* (wound) has stated as tissue destruction and discoloration of viable tissue due to various etiology. Depending on its etiological factor, it can also be termed as *Pramehajanya Dusta Vrana* (non-healing ulcer due to diabetes). The general line of management of *Pramehajanya Vrana* (diabetic wound/ulcer) mentioned by *Acharya Sushuta* says that one should adopt the principle and protocol of *Dusta Vrana* management. While describing the *Sasti Upakrama* (60 modalities of ulcer management), ***Nimbadi Kalka*** (a paste where neem leaves are the main ingredient) is mentioned, having both *Vrana Sodhana* (cleansing) and *Vrana Ropana* (healing) properties and beneficial for non-healing ulcer.

KEYWORDS: Anti-inflammatory, anti-microbial, anti-oxidant, *Nimbadi Kalka, Pramehajanya Vraṇa.*

INTRODUCTION

According to the World Health Organization (WHO) India ranks fourth in the world for diabetes.[1] The prevalence rate of diabetes mellitus (DM) in India has increased from 61.9 million in 2012 to 69.2 million in 2015. Such an increase is the result of rapid industrialization and urbanization, due to which the lifestyle has become more sedentary with no compensatory recreational physical activities. Consumption pattern has also changed from coarse grains to refined wheat flour and white rice, junk foods, and sweet beverages. It is also the highest regional contributor in terms of diabetes mortality. Morbidity and mortality occur due to its micro vascular and macro vascular complications such as Retinopathy, Nephropathy, Neuropathy, Coronary artery disease (CAD), Peripheral vascular disease (PVD), and diabetic foot ulcer (DFU). Epidemiological data show that approximately 90% of the Indians with diabetes have diabetic foot infections.[2] Foot ulcers are defined as lesions involving a skin break with loss of epithelium that can extend into the dermis and deeper layers sometimes involving bone and muscle.[3] According to WHO, diabetic foot is ***"ulceration or infection or destruction of deeper tissues which are associated with neurological abnormalities, peripheral vascular disease and metabolic complications."***[4-5]**.**

Diabetic foot ulcers (DFU) have a lifetime prevalence of 15–25%. Infection is the most common, severe and DFU complication with high risk of mortality and morbidity associated with lower limb amputation. The diagnosis of diabetic foot infection (DFI) is often difficult, leading to the inappropriate use of antibiotics. The bacterial organization in DFU and the involvement of multidrug-resistant (MDR) bacteria require new antimicrobial solutions. This review discusses the role of the *nimba* in DFU and its approach to classical treatment that could improve DFU management. For the treatment of diabetic ulcer, *Acharya Sushruta* has advised to follow the treatment protocol of chronic wounds (*Dustavrana Cikitsa Vidhi*).[6] In the chapter *Dvivraṇayacikitsa* (treatment of two different types of ulcer—name of the chapter), *Sushruta* has mentioned 60 treatment measures (*Sasthi Upakrama*) for the management of wounds (*Vraṇa*), in which Kalka (paste) is mentioned for *Sodhana* (cleaning) and *Ropana* (healing). The blend of *Tila Kalka* (seasame seed paste) mixed with honey and *Nimba Patra* (neem leaves) helps for *Vrana Sodhana* (cleansing) and when, mixed with ghee promotes healing.[7] So, the combination of *Tila*, *Nimba*, *Madhu* and *Sarpi* was proposed here

to assess its healing property on DFU.

Inclusion criteria

1.	The patients aged between 40 and 70 years, irrespective of sex
2.	Hba1c between 6% and 7% (well controlled)
3.	Texas classification of DFU till B2 (i.e., wound penetrating to tendon with infection)
4.	Wound sites at plantar surface of foot (metatarsal heads and mid foot), toes (dorsal interphalangeal joints or distal tip), dorsum of foot, and ankle.

Exclusion criteria

1.	The patients aged below 40 and above 70 years
2.	Hba1c above
3.	DFU more than B2 Texas classification
4.	Wound elsewhere except the foot and ankle region
5.	Patient having other systemic pathology (TB, HIV/AIDS, hbs Ag, VDRL, pregnancy, malignancy, any arterial disease
6.	Patient on other medications such as steroids were excluded.

Based on "T.I.ME." Strategy[8], it can also be explained as follows

T— Removal of non-viable tissue—Properties such as Lekhana and Chedhana helps in scrapping out the unwanted tissues (slough) from the wound.

I— Infection and inflammation control—Features of infected wound includes local rise of temperature, slough, excess discharge from the wound and pain. Properties such as Kleda-Puya *Upashoshanam* and *Sodhana* help in localized cleaning of the wound thereby decreasing the infection and inflammation.

M—Moisture balance—*Rasa Prasadana* helps in maintaining the moisture balance.

E—Epithelialization—*Ropana*, *Sandhana*, and *Dhatu Vardhaka* help in angiogenesis, and epithelialization, thereby granulation tissue formation thus healing of the wound

Drug review[9]

Order Rutales

Suborder Rutinae

Family Meliaceae

Subfamily Melioideae

Tribe Melieae

Genus Azadirachta

Species indica.

Ras	***Guna***	***Virya***	***Vipaka***
Tikta, Kashaya	*Laghu, Ruksha*	*Sheeta*	*Katu*

Classification according to Charaka, Susrutha & Vagbhata

Charaka *: Kandughna, Tiktaskandha*

Susrutha *: Aragvadhadi, Guduchyadi , Lakshadi*

Vagbhata : *Aragvadhadi, Guduchyadi, Lakshadi*

Karma *: Kapha-pittahara, Dipana, Grahi, Krmighna, Netrya,* antimicrobial, antifungal, anthelmintic, insecticidal, antiviral, antipyretic, antimalarial, antiperiodic, mosquito larvicidal, anti-inflammatory, antifertility, spermicidal, hypoglycaemic.

Preparation of *Kalka*

The drugs needed for the preparation of *Nimbadi Kalka* should be collected. The *neem* leaves should be collected fresh. The *Kalka* (Paste) should be prepared on daily basis, as per the textual reference.

Wound Healing Effect

Numerous plants/their constituents play an important role in the wound healing effect. A study was made to evaluate the wound healing activity of the extracts of leaves of A. Indica and T. Cordifolia using excision and incision wound models in Sprague Dawley rats and results revealed that extract of both plants significantly promoted the wound healing activity in both excision and incision wound models. Furthermore, in incision wound, tensile strength of the healing tissue of both plants treated groups was found to be significantly higher as compared to the control group. Other results showed that leave extracts of Azadirachta indica promote wound healing activity through increased inflammatory response and neovascularization.

DISCUSSION

Neem helps in reducing the inflammation, bacterial invasion, slough, and wound size. *Sarpi* (Ghee) maintains the wound moisture by its *Snehana* (lubricating) property and reduces wound pain with its *Shoolla Prasamana* (pacifying pain or tranquillizing) property. A study evaluated on the wound-healing activity of the extracts of leaves of A. Indica was found effective and very usefull than any other line of treatment. *Nimba* has shown significant anti-microbial and anti-inflammatory activity. Anti-inflammatory activity occurs via nimbindin which suppresses the neutrophil and macrophage functions thereby reducing inflammation.[10]

CONCLUSION

In this study, the topical use of *Neem kalka* was found effective in healing the chronic wound. It has proven value in the management of non-healing wounds. It also angiogenic property and potency to increase DNA content as well. The *kalka of Neem* is best to treat diabetic chronic wounds in a better way, it shows remarkable effect in leprotic, venous, and decubitus ulcer as well. In view of no any adverse effects and affordable economically by all, it can be recommend forthe treatment of chronic non healing wound**.**

REFERENCES

1. Kaveeshwar SA, Cornwall J. The current state of diabetes mellitus in India. Australas Med J 2014; 7: 45-8.
2. World Health Organisation. Global report on diabetes, 21 April 2016.
3. Boulton AJM, Whitehouse RW. The diabetic foot. [Updated 2020 Mar 15]. In:Feingold KR, Anawalt B, Boyce A, et al, editors. South Dartmouth, MA: mdtext.com;2000.
4. Unnikrishnan R, Anjana RM, Mohan V. Diabetes mellitus and its complications in India. Nature Rev Endocrinol, 2016; 12: 357-70.
5. Muduli IC, Ansar PP, Panda C, Behera NC. Diabetic foot ulcer complications and its management—a medical college-based descriptive study in Odisha, an Eastern State of India. Indian J Surg., 2015; 77: 270-4.
6. Vaidya Jadvji, Trikamji Acharya, editor. Sadyovrana Chikitsitam. In: Susruta Samhita of Susruta, Chikitsa Sthana. 1st ed.; Chapter 2, Verse 94.Varanasi, India: Chaukhambha Sanskrit Sansthan; 2013. P. 414.
7. Vaidya Jadvji, Trikamji Acharya, editor. Dvivraniyachikitsa. In: Susruta Samhita of Susruta, Chikitsa Sthana. 1 st ed.; Chapter 1, Verse
8. Halim AS, Khoo TL, Saad AZ. Wound bed preparation from a clinical perspective. Indian J Plast Surg., 2012; 45: 193-202.
9. Dravya Guna Vigyana by P.V. Sharma., Vol. II, Chaukhambha Bharati Academy, Varanasi Revised Golden Jublee Edn 2006.
10. Kaur G, Sarwar Alam M, Athar M. Nimbidin suppresses functions of macrophages and neutrophils: Relevance to its antiinflammatory mechanisms. Phytother Res., 2004; 18: 419-24.