Management of Diabetic Foot Ulcer with Khadira Kashaya Dhawana and Nimba-patra-Haridra Kalka Dressing

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Abstract
Diabetic foot ulcer is a severe clinical manifestation of Diabetes Mellitus. In India, every 20 seconds, a limb is lost due to Diabetes. 200000 leg amputations occur every year due to diabetes. Diabetes affects blood circulation and diabetic neuropathy which damages nerves. These two conditions lead to complications with lower extremities in diabetic patients. It is very important for diabetic patients to take care of their foot. Once ulcers have developed, whatever may be the cause (neurogenic, ischaemic or both), any dead tissue of the surface should be debrided, the wound is cleaned, and dressings are applied. As the modern medical science has limited scope for the management of these ulcers hence, Ayurveda has the unique concept for management of Madhumehajvrana (diabetic wound). Shodhana (cleaning) and Ropana (healing) are the key factors in the management. Khadiratvaka (Acacia catechu) has the property of Vranashodhana (cleaning wound) which debrides the wound and local application of paste of Nimba-patra (leaves of Azadiractaindica) and Haridra (Curcuma longa) helps to heal the ulcer. This is due to Ropana (healing) property of Nimba and Haridra Kalka (paste). The combinations of these three drugs along with controlling blood glucose level have shown better results in healing such ulcers. Diabetic foot ulcer is quite difficult to heal in modern medical science. So, Ayurveda gives a better approach here.

Keywords
Diabetic foot ulcer, Khadira, Nimba, Haridra, Madhumehajanya Vrana
INTRODUCTION

The diabetic foot is considered one of the most significant complications of diabetes, representing a major worldwide medical, social and economic problem that greatly affects patient’s quality of life. It has been estimated that every 20 seconds a lower limb is amputated somewhere in the world because of diabetes. Diabetic foot is defined as any infection due to chronic or acute injury to the soft tissues of the foot of diabetic patient, with evidences of existing neuropathy and/or ischemia.

In Ayurveda texts, Madhumeha is described as one of the four types of Vataj prameha\(^1\). Out of eight Mahagadas described in SushrutaSamhita, Prameha is one of them, and these Mahagadas are Dushchikitsya (difficult to treat)\(^2\). If Prameha is left untreated, it gets converted to Madhumeha which is Asadhya (incurable)\(^3\). But the MadhumehajVrana (diabetic ulcer) is described as Kashtasadhya Vrana (ulcer difficult to treat)\(^4\). If any type of SadhyaVrana either Sukhsadhya or Kastasadya is left untreated, it becomes Yapya (seldom survive) and then goes to Asadhyaaawastha (incurable stage). So, special care is needed to take care of Madhumehajanyavrana (diabetic wound).

For better healing, proper Shodhan (cleansing of the wound) is required and after that Ropana (healing) occurs quickly\(^5\). Ayurveda has better management to treat these wounds. From ancient times Ayurveda Acharayas have already illustrated the proper care of wound healing with various herbal drugs. Cleaning of the wound with Khadiratwakakashaya (decoction of Acacia Catechu), then local application of Kalka (paste) made of Haridrachurna (powder of Curcuma longa) and Nimbapatra (leaves of azadirechtaindica) have better effects in healing of the ulcer. Khadira (Acacia catechu) has Shonitasthapana (hemostatic), Kandugna (Anti- pruritic), Kaphashoshaka (subsiding kapha), and Dhatushoshana (Astringent) properties. Haridra (curcuma longa) has excellent Raktaprasadaka (Blood purifier), Raktastambhaka (Hemostatic), Vedanasthapka (Analgesic) properties. Nimba (Azadirechtaindica) is Jantugna (Anti helminthic), Vranashodhaka (purification of wound). Thus, these herbal drugs can show the better effects in controlling the ulcer.

DIABETIC FOOT ULCER
Foot is a complex structure with many layers of muscle, ligaments, joints, arches, fat, thick plantar fascia, vascular arches, neurological system which maintains weight bearing, gravity, normal walk, stability and gait (swing and stance phases).

**TREATMENT**

Firstly, Diabetes should be controlled. A key feature of wound healing is stepwise repair of lost extracellular matrix ECM that forms the largest component of the dermal skin layer. The basic principle of diabetic foot ulcer management is to provide a moist, but not wet, wound bed and also to maintain good blood supply to the foot. It includes: Antibiotics (decided by pus culture and sensitivity), regular dressing of the wound, low dose aspirin; control of diabetes by Insulin only, diet control, drugs like vasodilators, Pentoxyphylline, etc.; amputations of the gangrenous area and care of the feet.

**MADHUMEHAJ VRANA**

In SushrutaSamhita, the word ‘Vrana’ originated from Dhatu’Vru-Vrunoti, Vrunute, Vrut-Varayat-Khadayat-aacchadayat’; which means to cover, to conceal and to envelope. Vrana can be defined as any pathology in which there is consumption of body tissue and formation of scar after healing that remains for a lifetime. In Sushruta Samhita, definition of Vrana (ulcer) is very vast. Such Vrana (ulcer) can be Nija (caused by vitiation of Dosha) or Aagantuja (caused by external factors) depending upon the aetiology.

When a patient suffering from Madhumeha (Diabetes mellitus), develops Vrana (ulcer), it becomes a challenge for a physician to deal with it as both the disease Madhumeha (diabetes mellitus) and the Vrana (ulcer) are needed to be treated.

In Madhumeha (Diabetes Mellitus), there is mainly Kaphadashti (vitiation of Kaphadosha). This leads to Kledavruddhi (increased levels of metabolic waste) in the body. Aasyasukham, Swapnasukham (sleeping daytime), Dadhisewan (eating curd), etc. are the etiological factors which lead to the development of Prameha. In this state, there is Prabhut-Aavil-mutratvam (increased frequency and turbidity of micturition). If such urination continues for a long time, it leads to Ojakshaya (immune deficiency) and Dhatushithilta. Bala of any person depends upon the level of Kapha and Oja (immunity) present in his body.
mellitus), patients are immune-compromised due to Oja Kshya (immune deficiency) and Kapha-dushti (vitiation of Kaphadosha). If any type of Updrava (complications) occurs to such patients, it becomes too difficult to deal with the patient. Thus, Sushruta has mentioned Madhumejanya Vrana (ulcer due to DM) as Kashtyasadhyavrana and explained line of treatment same as that of Dushta Vrana (infected wound)\(^\text{11}\). The drugs which have Tikta (bitter)-Kashaya (astringent) rasa (taste), Shodhan (cleansing)-Ropana (healing) properties can be effective in such ulcers. Carakasamhita has also described Shalyakriya (surgery), Shodhana (cleansing)-Ropana (healing) of Updravas (complications) caused due to Madhumeha such as aspidika (carbuncle)\(^\text{12}\).

**DISCUSSION**

Khadira (Acacia catechu) has Tikta (bitter)-Kashaya (astringent) rasa (taste), Katu Vipaka (metabolic property after digestion), Sheetavirya (cold potency), Ruksha (dry)-Laghu (light) Gunas (physical properties)\(^\text{13}\). Khadira is a very famous skin benefiting Ayurvedic herb. Acharya Charaka has mentioned it in Uradprashmanamahakashyaya (herbs used in urticaria)\(^\text{14}\) and in Kashyaskanda (herbs with astringent taste)\(^\text{15}\). Acharya Chakraduthas has mentioned it as Vednasthapaka (analgesic). It has excellent properties as Medoghna (anti-obesity), Shonita Sthapana (hemostatic), Kaphanashak (destruction of kaphadosha), Kodugna (antipruritic), and dhatushoshana\(^\text{16}\). Acacia catechu has twelve compounds like Catechen, Epicatechin, phenol, Mesquito, Kaempferol, Aromadendrin, etc. It is an anti-oxidant because of Methanol, Catechin. Aqueous extract of the whole plant is proved to be immune modulatory. It is also Antipyretic, Anti-inflammatory, and Anti-mycotic. Methanol extract of Acacia Catechu is Anti-hyperglycaemic and Antinociceptive. Khadira is one of the contents of Kaakolyaadigana, which are mentioned for Vrana ropana\(^\text{17}\).

Nimba (Azadiractaindica) has Tikta (bitter)-Kashaya (astringent) rasa (taste), Katu Vipaka (metabolic property after digestion), Sheetavirya (cold potency), Ruksha (dry)-Laghu (light) Guna (physical property)\(^\text{18}\). It has Krimi-Mehanut (anti-helminthic and anti-diabetic),
Vrananashak (anti-ulcer), Kaphanashaka (Kapha suppressor), Graahi (Astringent) ingunas (properties). Its leaves are Shothaghna (anti-inflammatory), Twakadosha hara (skin purifier), Vranashodhaka (ulcer cleaner), Vranaropaka (ulcer healer). Isomeldenin, Nimbin, Nimbinene, Nimbandiol, Quercetin, Beta-sitosterol, Desacetyl Nimbinene are the active ingredients of Nimba leaves extract. It is also potent anti-microbial.

Haridra (Curcuma longa) is Katu (pungent) and Tikta (bitter) in taste, Ruksha (dry) in property. It acts against Kapha and Pitta dosha. It is helpful in improving immunity. Curcumin present in it is a potent anti-inflammatory agent. It protects the skin by increased collagen deposit, angiogenesis and improved wound healing.

These three drugs have Tikta rasa in common. Tikta rasa has Vayu and Aakashmahabhuta, Kashaya rasa is composed of Vayu and Prithvi, whereas in Katu rasa Vayu and Agni is present. So, according to Panchbhautika composition of these drugs, there is combination of Vayu, Prithvi, Agni and Aakash. Vishadaguna is comprised of these Mahabhutas and this Vishadaguna has property of Kshalana Karma as explained by Hemadri. This Ksalana karma of these drugs is actually responsible for curing such ulcers. The Vishadaguna provides clearness, provides transparent nature, washes away dirt, Kledaachooshana (exploitation of metabolic wastes), Mala shoshana, lekhana and Vranaropana.

Due to Tikta Rasa of these drugs, Shodana, Kleda-medo-vasa-PuyaUpshoshana occurs. Kashaya Rasa of these drugs helps in Shodhana, Lekhana, Kledaopshoshana, and Ropana of the ulcer. Katu-rasa has also properties of kushtakanduupshamana, kaphakrimivishaupshamana, medsaamuphanta.

The formulations Kwatha (decoction) and Kalka (Paste) are advised to use here. As in Sushrutasamhita, out of 60 Vrana-upkramas mentioned, these two are especially indicated for Shodhana (Cleaning) and Ropana (healing) of Vrana.

**CONCLUSION**

Diabetic foot ulcer is such a complication of Diabetes Mellitus that it needs a lot of attention towards both the disease and the complication. If DM is not controlled, whatever treatment and care of the foot ulcer we do, the results will be zero. There are
limitations in modern medicine to deal with diabetic foot ulcer. With the help of above mentioned regimen, there can be a breakthrough approach to treat such ulcers provided sugar levels are under control. The combination of these drugs has unique property of cleaning of the wound due to its Vishadaguna (property of clearness). It proves better than allopathic strategies of cleaning and dressings of the wound. This herbal approach towards diabetic foot ulcer management underlines the healing power of nature. Let the body heal with nature.
REFERENCES