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Case Report

Integrative approach for diabetic foot management– a case report

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ABSTRACT

Non-healing diabetic foot has always demanded more attention from the surgeon due to the distinct problem it possesses. There is a constant need for the evolvement in the management and this case is one such attempt. A 62-year-old male patient with a history of diabetes mellitus since 10 years presented with a non-healing foot ulcer since 1 month. He was managed with Ayurveda internal and external interventions for *dusta vrana* combined with contemporary methods like vacuum assisted wound suction and skin grafting. The patient who presented with non-healing diabetic foot was found to have better wound healing with combined intervention. The current approach indicates the better outcome with multi-dimensional approach towards diabetic foot.

1. Introduction

Diabetic foot is usually caused by a combination of three factors-ischaemia secondary to atheroma, peripheral neuropathy which leads to trophic skin changes and immunosuppression caused by excess of sugar in the tissues which predisposes to infection [1].

Approximately 8% of diabetic patients have a foot ulcer and 1.8% has an amputation done [2]. With diabetes being a fast-growing disease, the importance of a better care has far more importance than before.

Diabetic foot management in the contemporary science include drainage of pus, debridement of dead tissue with local amputation of necrotic digits and antibiotics [1]. Similarly, in Ayurveda Shasti upakramas (60 interventions) have been mentioned to treat different types of wound based on their presenting symptoms [3].

Both the sciences have described the management in depth, but there are limitations on either side. However, when used together, better outcome was seen in terms of the wound management.

In the present case, patient was managed with both Ayurveda and Allopathy conveniently along with other techniques which latest bio-medical engineering can provide.

2. Patient Information

A 62-year-old male patient approached the surgical unit of our hospital on 23/01/16 with a foul smelling, non-healing, necrotizing ulcer over the dorsal aspect of the right foot since 1 month. He was a known case of diabetes since 10 years which was not under control in spite of using tablet Glyciphage 500 mg orally all these years.

Patient was apparently normal 1 month before. A month back he noticed a spontaneous small opening without any known external injury-over the dorsal aspect of the right foot with mild discharge which gradually increased leading to a wide-open wound. According to the patient, the discharge was foul smelling and continuous. Wound was painless and spreading in nature. History of intermittent fever, nausea, vomiting, cough, difficulty in breathing and sleeplessness was present. There was no history of injury before the onset of the ulcer. Patient took treatment from a local physician with minimal relief. Since the wound showed no signs of improvement he was referred to a vascular surgeon where he was advised to undergo above ankle amputation. Patient was unwilling to undergo amputation and hence he sought an alternative approach.

3. Clinical findings

Local examination: Location- Dorsum of the right foot, inferolateral aspect, Size- 5*9 cm, Floor-sloughed, tendons exposed, Edges-sloped and well defined, Margins – poorly defined at the

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distal ends, thick and fibrosed proximally, Discharge-purulent, Smell-foul, Blackish discoloration of the 4th toe, Surroundings-edematous with rise in local temperature, Peripheral pulsation-Dorsalis pedis, posterior tibial and popliteal artery pulsation well appreciated, Touch on bleed-absent.

General examination: Appearance- Distressed, Body built & strength- Moderate, Orientation-well oriented to time, place and person. Pallor (conjunctiva)- present, Icterus- Absent, Edema (local)- Mild swelling over the right leg lower 1/3rd, Lymph nodes-2–3 right inguinal lymph nodes discrete, palpable and non-tender. Gait-limping gait.

Systemic examination: Respiratory system- Cough-present- increases at night, Phlegm-absent, Rhonchi-present.

On 23rd of January 2016, when the patient first visited the hospital, his hemoglobin was 9.8 gm %, Total count was 15,400 and ESR 120, Fasting blood sugar 229 mg/dl and post prandial blood sugar was 342 mg/dl.

Arterial doppler revealed – moderate atherosclerotic changes with no obvious obstruction.

Chest X ray- normal study

4. Therapeutic focus and assessment

For the above clinical presentation, procedures such as *chedana* (excision) [4], *bhedana* (incision) [4], *vasti* (medicated enema) [5], *parisheka* (wound wash) [6] are indicated in Ayurveda. Initially the patient was started with *Adhoshaka abhyanga* (downward massage of the lower limbs with medicated oils), *naadi sweda* (steam) and *panchavalkala kwatha avagaha* (immersing the foot in medicated decoction) externally; *Amruthotharaam kashayam* and *Gandhaka rasayana* internally. The external treatments were done to enhance the blood circulation to the affected part, vaso dilatation with local steam therapy, wound cleansing, auto debridement and to initiate the wound healing (Table 1). Patient's regular medications for diabetes were allowed to continue. However, as the patient was continuously febrile and total leucocyte count being constantly high, to prevent the further progress of the condition and sepsis, wound debridement was planned. Disarticulation of the gangrenous 4^{th} toe with wide wound debridement was done under spinal anesthesia on 27/01/16. Antibiotics based on culture sensitivity report were administered for 7 days. Systemic symptoms such as fever, nausea, vomiting also subsided. Post procedure there was a considerable reduction in total count. To keep the wound site free from excessive discharge and soaking which would otherwise hamper the healing, VAC (Vacuum assisted wound closure) [7] dressing was done for 9 days. During this course *Vrana shodhana* (wound cleansing) [8] and *vrana ropana* (wound healing) [9] drugs were used along with insulin (Mixtard) and oral hypoglycemic (Glycephage) drugs. After vacuum dressing, for about 25 days wound care was done with *Thriphala quatha Vrana Parisheka* [6] (wound wash) and *Jathyadi taila* dressing (medicated oil) [9]. *Manjistadi kshara vasti* [10] as yoga vasti (medicated enema for 8 days) was started on 02/03/16. Skin grafting was proposed after ensuring proper approximation of the wound with healthy granulation [11]. On 05/03/15 a skin flap from right thigh was taken and grafted over the wound under spinal anesthesia under suitable antibiotic coverage. Also, K-wire fixation of the 3rd toe was done to support the loosely attached (after the disarticulation of the 4th toe) distal phalanx. Subsequent dressing showed the skin graft had taken up well and hence discharge was planned. Previous oral medications and insulin were continued. During his stay, other associated complaints such as cough, difficulty in breathing and sleeplessness were managed symptomatically. Patient was advised to continue the same internal medications for a period of 1 month along with daily dressing until the complete healing.

5. Follow-up and outcomes

Patient was followed once a month for 4 months (Table 2). The skin graft was successful with complete wound healing. There was no complaint of pain, discharge or any fresh wound.

6. Discussion

The case was managed according to Ayurveda guidelines on different types of wound management along with the use of conventional medicine. Both Ayurvedic and Allopathy science have advantages and disadvantages. Best of each science has been adopted for the better outcome in an integrative manner; hence the disadvantages of each science are left out from the discussion. In the present case the patient was administered the spinal anesthesia to perform the indicated Ayurvedic and Allopathic surgical interventions like incision, excision, wound debridement and skin grafting. This has helped to liberally and adequately handle the tissues without compromising the necessities for a healthy wound healing.

Absence of discharge and maintenance of wound in a dry state consistently is of prime importance in wound healing [12]. Vacuum dressing is one such method to achieve this status where it uses a

Table 1
Intervention.

Intervention	Ingredients	Dose	Anupana	Duration
	Oral medications			
Amruthotharam kashayam	Kashaya of fresh drugs of Nagara + Amrutha + Haritaki in (1:3:2 proportion)	60 ml-60 ml-60 ml 1 h before food	–	3 months
Triphala guggulu	Triphala, pippali, guggulu	1-1-1 1 h after food	Warm water	3 months
Gandhaka rasayana	Shudda Gandhaka, Chaturjatha, guduchi, triphala, shunti, bringaraja, sita, go ksheera	1-1-1 1 h after food	Warm water	3 months
Panchakarma procedures	Method of preparation	Method of administration		
Manjistadi kshara vasti	Triphala kwatha- 400 ml, gomutra-100 ml, Madhu- 60 ml, Yava kshara 2 g. Manjistadi taila was used for anuvasana	Given with vasti yantra		8 days in yoga vasti pattern
	External treatments			
Avagaha and prakshalana with Triphala kwatha	For 1 part of dry drug 4 parts of water is added and reduced to 1/4th part	For immersion of the affected foot and for washing the wound respectively		25 days

Table 2
Time line of events.

Date	Findings	Intervention	Outcome
23/01/2016 to 27/01/2016	Patient visited and diagnosed as *Dushta Vrana*	• *Ayurveda* internal and external treatments started (Table 1) • Started with Oral anti antidiabetics plus insulin (Mixtard) with constant blood sugar monitoring	No improvement in wound
27/01/2016 to 28/01/2018	Patient was continuously febrile and TC constantly high (15,400 to 26,500)	• Debridement of the wound and disarticulation of the 4th toe • Previous medications + Antibiotics based on culture and sensitivity (Linezolid).	• TC dropped (16,000) and blood sugar levels well controlled. • Systemic symptoms (fever, nausea and vomiting) improved • No discharge and foul smell from the wound
28/01/2018 to 30/01/2018	Wound healthy	*Ayurveda* external and internal interventions along with antibiotics and anti-diabetics continued	• Wound margins and floor healthy • Wider wound with margins much apart due to liberal debridement
30/01/2016	Decision to VAC dressing in order to reduce the wound discharge and assist the quick healing	• VAC dressing • *Ayurveda* treatment continued • Antidiabetics continued	Successful VAC dressing
30/01/2018 to 08/02/2016	Wound with healthy granulation tissue filling from beneath	• VAC dressing changed once in every 4 days (total 9 days) • *Ayurveda* and antidiabetic medications continued	• Wound with healthy granulation tissue • No discharge from wound
09/02/2018 to 04/03/2018	• Satisfactory wound healing	• *Ayurveda* wound care internally and externally • Manjishtadi kshara vasthi	Wound ready for grafting
05/03/16 to 12/03/2018	Wound margins healthy and floor filled with healthy granulation tissue	• Skin grafting done from the right thigh flap • K wire fixing on 3rd toe	Successful grafting
12/03/2018 to 18/03/2016	Graft was accepted well	• Alternate day simple dressing was started and continued for 7 days. • Advised regular Ayurveda wound care • Internal Ayurveda medications for one month	• Patient discharged with completely healed wound • After 4 months patient was reviewed and there was healthy skin without any wound

controlled suction pressure to remove the discharge from the wound [13]. This method assures the surgeon for its better outcome [Fig. 1].

Parisheka (wound wash) helps in removal of the debris from the wound [14]. *Triphala kwatha* was used for this purpose which helps in removal of the discharge and also cleanses the wound, removes the slough and assists in wound healing (*ropana*) [9]. Medicated enema is indicated in chronic ulcers of lower limbs and helpful in reducing the pain [5]. Studies have shown the

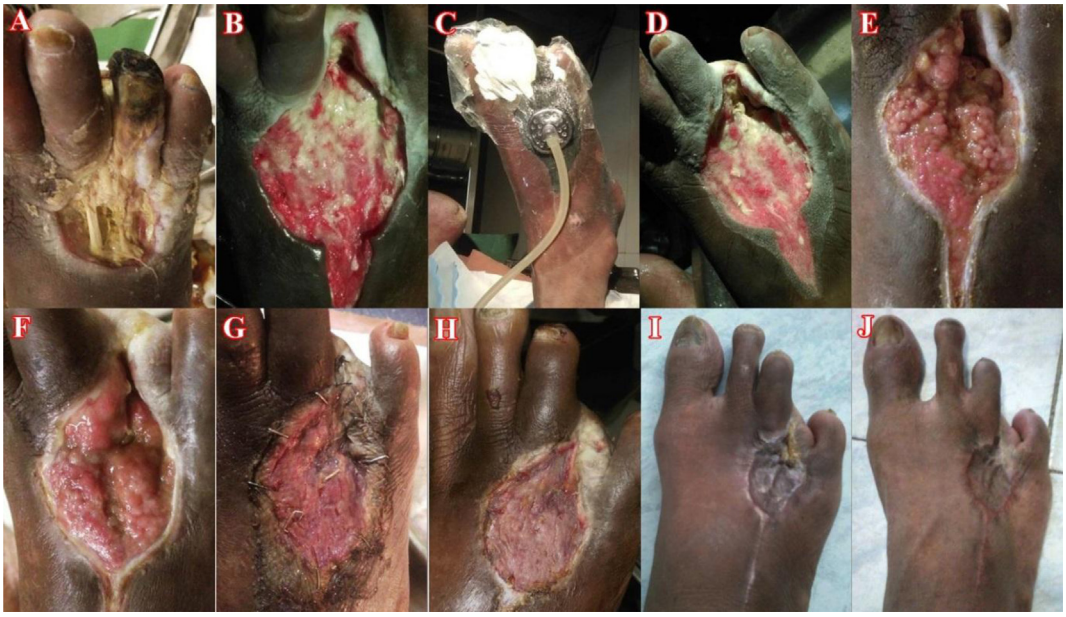

Fig. 1. Stagewise pictures of the wound during intervention. A – Wound on first day before treatment; B – Wound after debridement; C – VAC after wound debridement; D – Wound after VAC dressing; E – 15 days after VAC dressing; F – Wound just before skin grafting; G – After 7 days od skin graft; H – At the time of discharge; I – After one month of discharge; J – After 6 months of discharge.

efficacy of Jatyadi taila in wound healing [15]. *Jatyadi taila* cleanses the wound and promotes wound healing. It is indicated in different types of ulcers including those due to injury, bites and chemicals or toxins [16]. Among the internal medications *Triphala Guggulu* removes the slough from the suppurated wound along with the foul smell. It also helps in reduction of swelling and pain [14]. *Gandhaka rasayana* helps in removal of the slough, cleansing and healing of the wound. It is indicated in *vaataraktaja vrana* (ulcer due to peripheral vascular conditions), *kushta* (skin conditions), *prameha* (diabetic ulcers) [17]. *Amruthotharam kashayam* acts as *deepana*, *pachana*, *lekhana*, *pakahara*, *shophahara* (anti-inflammatory properties) and *rakta prasadana* (promotes blood supply) [18].

Thus, the combination of internal and external management was adequate in helping the wound to heal well.

7. Conclusion

The current integrative approach of adopting both Ayurvedic and Allopathy science along with advanced technique for maintaining the dry state of wound was helpful in managing the diabetic foot without undergoing a major amputation. This poses an interest in further evaluating whether this kind of integrative approaches could give new ray of hope for managing different types of chronic non-healing ulcers.

Patient perspective

Patient was satisfied to have improved without necessitating amputation.

Informed consent

Written permission for publication of this case study had been obtained from the patient.

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Not declared.

Conflict of interest

None.

References

[1] Bailey & Love's Short practice of surgery. Norman S Williams, Christopher J.K. Bulstrode, P. Ronan O'Connell. 26th ed. Pp 1435, Pg 887.
[2] Margolis David J, Malay Scot, Hoffstad Ole J, et al. Prevalence of diabetes, diabetic foot ulcer and lower extremity amputation among Medicare beneficiaries, 2006 to 2008. 2011.
[3] Sushruta, Sushruta Samhita with Nibanda sangraha commentary of Sri Dalhana Acharya and Nyayachandrika panjika of Sri Gayadaasa Acharya. In: Acharya Vaidya Jadavji Trikamji, editor. Vol. 822. Varanasi: Chaukambha Sanskrit Sansthan; 2010. p. 396.
[4] Sushruta, Sushruta Samhita with Nibanda sangraha commentary of Sri Dalhana Acharya and Nyayachandrika panjika of Sri Gayadaasa Acharya. In: Acharya Vaidya Jadavji Trikamji, editor. Vol. 822. Varanasi: Chaukambha Sanskrit Sansthan; 2010. p. 400.
[5] Sushruta, Sushruta Samhita with Nibanda sangraha commentary of Sri Dalhana Acharya and Nyayachandrika panjika of Sri Gayadaasa Acharya. In: Acharya Vaidya Jadavji Trikamji, editor. Vol. 822. Varanasi: Chaukambha Sanskrit Sansthan; 2010. p. 405.
[6] Sushruta, Sushruta Samhita with Nibanda sangraha commentary of Sri Dalhana Acharya and Nyayachandrika panjika of Sri Gayadaasa Acharya. In: Acharya Vaidya Jadavji Trikamji, editor. Vol. 822. Varanasi: Chaukambha Sanskrit Sansthan; 2010. p. 399.
[7] Meloni Marco, Izzo Valentina, Vainieri Erika, et al. Management of negative pressure wound therapy in the treatment of diabetic foot ulcers. World J Orthoped 2015;6(4):387–93.
[8] Sushruta, Sushruta Samhita with Nibanda sangraha commentary of Sri Dalhana Acharya and Nyayachandrika panjika of Sri Gayadaasa Acharya. In: Acharya Vaidya Jadavji Trikamji, editor. Vol. 822. Varanasi: Chaukambha Sanskrit Sansthan; 2010. p. 161.
[9] Sushruta, Sushruta Samhita with Nibanda sangraha commentary of Sri Dalhana Acharya and Nyayachandrika panjika of Sri Gayadaasa Acharya. In: Acharya Vaidya Jadavji Trikamji, editor. Vol. 822. Varanasi: Chaukambha Sanskrit Sansthan; 2010. p. 162.
[10] Sushruta, Sushruta Samhita with Nibanda sangraha commentary of Sri Dalhana Acharya and Nyayachandrika panjika of Sri Gayadaasa Acharya. In: Acharya Vaidya Jadavji Trikamji, editor. Vol. 822. Varanasi: Chaukambha Sanskrit Sansthan; 2010. p. 541.
[11] Sriram Bhat M, SRB's Manual of Surgery, 4th ed. Jaypee Brothers' Medical Publisher's (P) Ltd., Pp 1336, Pg 340.
[12] Sushruta, Sushruta Samhita with Nibanda sangraha commentary of Sri Dalhana Acharya and Nyayachandrika panjika of Sri Gayadaasa Acharya. In: Acharya Vaidya Jadavji Trikamji, editor. Vol. 824. Varanasi: Chaukambha Sanskrit Sansthan; 2010. p. 113.
[13] Vikatmaa P, Juutilainen V, Kuukasjarvi P, et al. Negative pressure wound therapy: a systematic review on effectiveness and safety. Eur J Vasc Endovasc Surg 2008;36:438–48.
[14] Govinda Das, Bhaisajyaratnavali with Vidothini teeka by Shri Ambika Dutta Shastri. In: Shastri Sri Rajeshwar Dutta, editor. Vol. 892. Varanasi: Chaukambha Sanskrit Sansthan; 2004. p. 594.
[15] Shailajan Sunita, Menon Sasikumar, Pednekar Suhas. Wound healing efficacy of Jatyadi Taila: in rat using excision wound model. J Ethnopharmacol 2011;138(1):99–104.
[16] Govinda Das, Bhaisajyaratnavali with Vidothini teeka by Shri Ambika Dutta Shastri. In: Shastri Sri Rajeshwar Dutta, editor. Vol. 892. Varanasi: Chaukambha Sanskrit Sansthan; 2004. p. 597.
[17] The Yogaratnakara. In: Joshi Pt Sadasiva Shastri, editor. Vol. 836. Banaras City: Jaya Ksrishna Das Haridas Gupta. The Chowkambha Sanskrit Series Office; 1939. p. 576.
[18] Sahasrayogam. In: 3rd ed.Sharma Dr Ramnivas, Sharma Surendra, editors. Vol. 318. Delhi: Chaukambha Sanskrit Sansthan; 2002. p. 4.