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INTEGRATIVE MANAGEMENT OF *DUSHTA VRANA* (NON HEALING DIABETIC FOOT ULCER WITH OSTEOMYELITIS) – A CASE REPORT

[1]Shekhar B Patil, [2]Ramesh.S. Killedar, [3]Pradeep. S Shindhe, [4]Harishankar P V

[1]Assistant Professor, Dept of Shalya Tantra,Vasantdada Patil Ayurvedic Medical college, Sangli, Maharasthra, India

[2]Associate Professor, Consultant, Dept of Shalya Tantra, KAHER'S Shri B M Kankanawadi Ayurveda Mahavidhyalaya, Shahapur, Belagavi, Karnataka

[3]Professor and HOD , Dept of Shalya Tantra, KAHER'S Shri B M Kankanawadi Ayurveda Mahavidhyalaya Shahapur, Belagavi, Karnataka

[4]PG Scholar, Dept of Shalya Tantra, KAHER'S Shri B M Kankanawadi Ayurveda Mahavidhyalaya, Shahapur, Belagavi, Karnataka

ABSTRACT

Background - Neuropathy, ischemia, and infection are the classical triad of Diabetic foot. Studies on DM states that 15% of patients ends up with Diabetic foot ulcers (DFU)during their lifetime among that 15 – 20% undergoes amputation due to osteomyelitis. *Acharya sushruta* has mentioned *shasti upakrama* (60 treatment procedures) for management of chronic non healing ulcer which are major guidelines for wound management.

Objective – Integrative management of diabetic foot ulcer with Osteomyelitis

Materials and Methods – Here, a case of diabetic foot ulcer occurred due to infection and complicated with osteomyelitis of calcaneal bone was managed with integrated approach i.e initially with empirical Antibiotics, Insulin therapy as he was in septicemia followed with Ayurveda i.e *chedhana* (Surgical debridement), oral medicines and local wound care for a period of 5 months. The pus culture and sensitivity reported that he was resistant to maximum antibiotics which were evident due to recurrent infection and hospitalization. The wound was showing good signs of healing so the *Ayurveda* management was continued. At the end of five month conservative management infection was not controlled so amputation was opted as life saving procedure.

Conclusion – Integrative management helped in proper assessment and treatment of diabetic foot ulcer with osteomyelitis.

Key words – Diabetic foot ulcer, Ayurveda, Osteomyelitis, Integrated approach

INTRODUCTION: Diabetic foot infection remains the most frequent diabetic complication, affecting 60% of DFUs[1].Osteomyelitis is the most frequent infection associated with diabetic foot ulcers and is associated with high rates of amputation i.e. 50-60% in severe infections[2]. Approximately 40,000 legs in India are being amputated every year[2]. *Acharyasushruta* has elaboratively explained the concept of wound and dedicated many chapters which emphasize the different aspects of wound care. The clinical features and treatment principles of *Dustavrana* (nonhealing ulcer) i.e.*shastiupakrama*[3] (60 treatment procedure) can be incorporated in the diabetic foot management.

Diabetic foot osteomyelitis (DFO) is considered to be a complex and difficult-

to-treat infection, with a high rate of relapse[2]. No agreed treatment guidelines are available in the management of DFO, still it remains a controversial and challenging problems in the field[2].Surgical treatment involves the resection of necrotic and infected bone but nowadays, there is an increasing tendency toward nonsurgical therapy for DFO[2]. Diabetic foot should be managed using a multidisciplinary and integrated approach which helps in better treatment outcome and improve patient quality of life[4]. *Ayurveda* is a potential and accepted alternative system of medicine which can be a solution for treatment of various non healing ulcers. Integration of Allopathy and *Ayurveda* treatment procedures at various stages of wound healing is the need of hour which can minimize the toxicity and adverse effects of prolonged administration of the antibiotics in DFO[2].Here we report a case of diabetic foot ulcer managed with integrated approach.

Patient Information and clinical findings

A 56 years male patient who was recently diagnosed with diabetes mellitus and Hypertension came with complaints of wound at left heel, pus formation, foul smell, difficulty in walking and fever since 2 months. The case was treated at Vasantdada Patil Ayurvedic Medical college, Sangli from 6/04/2021 to 05/09/2021. (OPD - 4645/IPD- 333). Patient had history of occurrence of boil later developed into cellulitis, pus formation and necrosis of tissue.Conservative treatment was done with prescription of antibiotics, dressing and later underwent surgical debridement at modern hospital. No significant improvement was seen after debridement instead the condition of patient still worsened with development of fever(100^0F), chills and rigor. Past history suggested that patient underwent bilateral hip replacement 10 years ago and family history were not specific to the disease. He was thin built and moderately nourished. Systemic examination revealed tachycardia with increased pulse rate (100/min). Local examination revealed irregular shaped ulcer measuring 10 cm x 6 cm on calcaneal region of left foot(Fig.1), sloping edges, blackish discoloration with slough at centre of ulcer, Purulent discharge and depth reaching to calcaneal bone. Pitting odema,Local rise of temperature along with tenderness was present. Dorsalis pedis, Anterior tibial and posterior tibial artery pulsation was feeble. Neurological examination suggested that touch sensation was normal. Blood investigations showed WBC count – 18,200 cells/cumm (Neutrophil – 71 % , Lymphocyte – 19 %,Eosinophil – 07%), FBS – 120 mg/dl, PPBS – 210 mmg/dl, HbA1c – 7.1, Hb – 11.3gm%. rest of the other blood parameters were under normal limits.X - ray left foot revealed major destruction of calcaneal bone indicating osteomielitis.

Timeline

Patient developed complain of boil, pain, swelling at calcaneal region of left foot associated with fever on 26thMarch 2021 since then he was diagnosed with DM and HTN. Initially he took conservative treatment for 10 days from modern hospital. He consulted other hospital for not getting relief where he underwent surgical debridement, IV Antibiotics and dressing for 30 days. and

on 06/04/2021 patient consulted our hospital for further treatment.

Diagnosis

Clinical diagnosis based on size, shape, margin, floor, depth assessment along with recent diabetes history of ulcer and bony destruction it was diagnosed as Diabetic foot ulcer with osteomyelitis as per Wagner classification[5] (Grade IV) (Fig. 1). *Ashta vidha pareeksha* revealed *nadi* (pulse) as sarpagati (snake like movement), *prakruta mutra* (urine), *malam* (stool), *Lipta jihva* (coated tongue), *prakruta sabda*(normal sound), *ushna sparsha* (increased local temperature on touch), *prakruta drik* (normal vision), *madhyama akriti* (normal built). On analyzing the *laxana* (signs) as per Ayurveda principles we came to diagnosis of *Dustavrana* (Non healing ulcer) and accordingly treatment was planned.

Therapeutic Intervention

The treatment was focused considering the grade of ulcer (Wagner classification) and *Dosha* Bodily humour) *(Pitta and Kapha). Dushya (tissue) (Twak, Rakta, Mamsa, Meda, Asthi*) (Skin, blood, muscle, fat, bone) involved in manifestation of disease so integration of Allopathy and Ayurveda treatment was planned in order to control septicemia. DM and enhance wound healing. Empirical Ingtravenous antibiotics, *Chedana karma* (Surgical debridement) (Fig. 2), *Vrana shodhana* (wound cleansing) (Fig. 3,4) and *Ropana* (healing) (Fig. 5,6) (Table No.1) were planned along with oral medications. Pus was sent for cultural and sensitivity to select proper antibiotic because the condition was not improved in previous admissions.

Table no 1: Therapeutic intervention and oral medicines

Plan of care	**Procedure**	**Duration (Days)**								
		1-10	**11-20**	**20-40**	**41-52**	**53-78**	**79-88**	**89-119**	**120-130**	**131-140**
Antibiotics (Inj ceftriaxone with salbactum)	Intravenous	✓								
Insulin therapy (Inj Human mixtard)	Subcutaneous (8units – 0 – 10 units)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chedana	Surgical debridement	✓								
Vrana Shodhana	*Prakshalana* with *Panchavalkala Kashaya*	✓	✓		✓		✓			
Vrana Ropana	*Vimlapana* with *Jatyadi taila*	✓	✓		✓		✓		✓	
Vrana Bandhana	Bandaging	✓	✓	✓	✓	✓	✓	✓	✓	
Vrana Dhupana	(Wound	✓	✓		✓		✓			

(vacha,gaura sarshapa,nimbi twak,haridra,yashti madhu,lodra)	fumigation)									
Kaishore Guggulu	250 mg 2BD A/F with luke warm water	✓	✓	✓					✓	
Triphala Guggulu	2BD B/F with luke warm water				✓	✓	✓			
Manjistadi kashaya	4TSF TID A/F with water					✓	✓	✓	✓	
Aragwadadhi kashaya	4TSF TID A/F with water	✓	✓	✓						
GandhakaRasayana	2BD B/W with luke warm water	✓	✓	✓			✓	✓		
Asanadi kashaya	4TSF TID A/F with water	✓	✓	✓	✓	✓	✓	✓	✓	
Dressing	*Jatyadi Taila*	✓	✓	✓	✓	✓	✓	✓	✓	
Below Knee Amputation										✓
TID = Thrice a day BID = Twice a day A/F = After Food TSF- Tea spoon full										

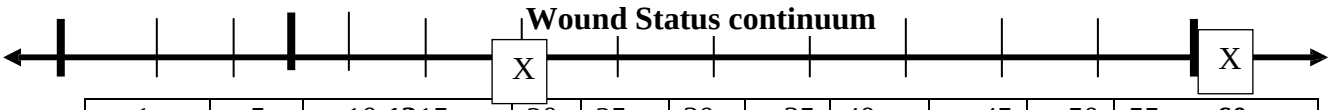
Follow up and Outcome – The patient was assessed for 5 months for changes in wound but satisfactory improvements in healing was not observed (Fig.7). Culture and sensitivity report revealed that he was resistant to many antibiotics which was evident by recurrent infection making treatment difficult. Below knee amputation (Fig. 8) was planned and performed as lifesaving procedure at 6th month by Orthopedician as wound was turning into sinus formation.

Table no 2: Assessment of various Wound parameters by Bates Jensen tool[6].

Sl no.	Wound parameters	Assessment of wound parameters in Days							
		1-10	11-20	20-40	41-52	53-78	79-88	89-119	120-130
1.	Size	4	4	4	3	3	3	2	2
2.	Depth	5	5	4	4	4	3	3	2
3.	Edges	3	3	2	2	2	2	1	1
4.	Under- mining	5	5	4	4	3	3	2	2
5.	Necrotic Tissue type	4	4	3	3	2	2	1	1
6.	Necrotic Tissue	5	4	4	3	2	2	2	1

	Amount								
7.	Exudate Type	5	5	4	4	3	3	1	1
8.	Exudate Amount	5	4	4	3	2	2	2	1
9.	Skin Color SurroundingWound	5	5	4	4	4	4	4	4
10.	Peripheral Tissue Edema	5	5	4	4	3	3	2	2
11.	Peripheral Tissue Induration	3	3	2	2	2	2	1	1
12.	Granu- lation tissue	5	4	4	3	3	2	2	1
13.	Epithe-lialization	5	5	4	4	3	3	2	2
	Total Score	59	56	47	43	36	34	25	21

Table No. 3 – Wound healing status assessment as Bates Jensen tool



1	5	10 **13**15	20	25	30	35	40	45	50	55 **60**
Tissue Health		**Wound Regeneration**								**Wound degeneration**

DISCUSSION: The case was diagnosed as *dustavrana* and it was treated on *shastiupakrama* principle based on analysing *dosha*(bodily humour) and *dushya* (tissue) with incorporating modern medicine principles of diabetic foot care. Multidisciplinary approach is to be adopted for comprehensive and integrated care due to the multifaceted nature of foot ulcers and numerous comorbidities associated with the patients[7]. Published literatures have highlighted the importance of integrated approaches for diabetes foot ulcer management in terms of better outcome and improved quality of life[8].Administration of intravenous antibiotics was done for initial 5 days but the infection was not under control due to the antibiotic resistance of patient as evident by pus culture and sensitivity report which was a major obstacle in conservative treatment. Insulin therapy with Human mixtard was continued throughout treatment period for controlling hyperglycemia which has deleterious effects on granulocyte chemotaxis, phagocytosis and local tissue ischemia leading to spread of infection[9].

Chedana (Wound debridement) was done under local anaesthesia which involves removal of necrotic and devitalized tissue that is incompatible with healing which aids in granulation tissue formation, re-epithelialization and infection

control[10].*VranaShodhana* (Wound cleansing) was performed with *Panchavalkalakashaya* (decoction of stem barks of five trees) which is proved to possess wound cleansing action thus reduces wound infection[11]. Published research works have proved it possess Antimicrobial, Anti-inflammatory, Analgesic and wound healing properties[11]. *Vranaropana* (Wound healing) (Table No.2) was promoted with application *jatyaditaila* and *vimlapana*(Kneading). *Vimlapana* is a procedure among *Shastiupakrama* which includes mild circulatory movements with thumb and pulp of finger around the wound edges[12]. *Vimlapana* relives vasoconstriction, improves local circulation and helps in supplementation of nutrients and oxygen thus promoting wound healing[12]. *Kaishore Guggulu* is a herbal formulation indicated in wounds which is proved to possess anti-inflammatory, antibacterial and blood purifying activity and supportive herbal supplement in condition like diabetes[13].*Researches have proved Aragwadhadi Kashaya* has properties like *KushthaghnaI(removes skin disease)*, and *Vrana shodhana*. It relieves symptoms like itching, discharge and helps in elimination of toxins[14].*Asanadi gana kashaya* posses antihyperglycemic, hypolipidemic, antioxidant and other therapeutic properties[15].

TriphalaGuggulu is specially indicated in *vrana* (non healing ulcer), *Kushta* (skin diseases), and *prameha* (diabetes) which speeds up the healing process by removal of slough, foul smell thus reducing inflammation[16]. Researches of *Gandhakarasayana* proved its antibacterial and antifungal activity which helps in slough removal, infection control, cleansing and healing of the wound[17]. *ManjishtadiKashaya* is indicated in all skin diseases and it is a proved potent blood purifier[18]. *Manjista (Rubia cordifolia* Linn*)* is known to have alkaloids, flavonoids, saponins, glycosides, anthraquinones and sterols in root extract and also possess antioxidant,anti-inflammatory, anti-microbial, antiulcer and wound healing properties[19]. Wound assessment which was done as per Bates Jensen tool (Table No.2, 3) for a period of 130 days showed significant changes in wound regeneration but the antibiotic resistance, recurrent infection, sinus formation into deeper tissues and hospitalisation ended up in below Knee amputation.

INFORMED CONSENT

The patient provided informed consent for the documentation and publication of the case.

CONCLUSION

Integrated Approach with Allopathy and Ayurveda is essential for proper assessment and treatment of diabetic foot ulcer. Recurrent infection is major drawback of treatment which worsens the patient condition and landing into amputation after prolonged conservative management. Antibiotic resistance in certain patients makes the condition pathetic and causes hurdle in the healing process. Conservative management has shown marked improvements in wound healing in the present case with integrated approach so it was continued for 5 months later sinus formation and infection made us to opt for below knee amputation.

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Fig no.1(Diabetic foot ulcer with bone exposed)

Fig no 2 *Chedhana* (Surgical debridement)

Fig no.3 (Ulcer with bone exposure)

Fig no.4 (healing ulcer during treatment)

Fig no.5 (Healing ulcer)

Fig no.6 (Healing ulcer)

Fig no.7 (healing ulcer with sinus formation) Fig no.8 Below knee amputation

Fig no.9 X ray of Foot showing osteomyelitis of calcaneal bone

Corresponding Author: Dr Ramesh Killedar,Associate professor, Consultant, Department of Shalyatantra,KAHER'S Shri B M Kankanawadi Ayurveda Mahavidhyalaya Shahapur, Belagavi,Karnataka E-mail:drramesh39@gmail.com

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