

AN INTEGRATED APPROACH ON DIABETIC FOOT ULCER MANAGEMENT- A
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ABSTRACT

Diabetic foot ulcer (DFU) is the most common complication of Diabetes Mellitus requiring hospitalization. The reasons for the increased incidence foot ulcers in DM involve the interaction of several pathogenic factors: neuropathy, abnormal foot biomechanics, peripheral arterial diseases, and poor wound healing. DFU is a one of the serious challenge to physicians, general surgeons and podiatrists too contributing economic burden to the patients and the country. It is correlated with *Dusta Vrana* in Ayurveda medicine. In this study, a case of DFU presented with a complaint of discharging sinus superficially on medial aspect of 1st metatarsophalangeal joint of left foot which was horizontally extending up to the base of 4th phalanx. The wound was explored, debrided and subsequently managed with integrated modalities (Ayurveda and Allopathy) of treatment.

KEYWORDS: Ayurveda, *Dusta vrana*, Diabetic foot ulcer, Sinus.**INTRODUCTION**

Diabetes Mellitus (DM) is a group of metabolic disorder which is associated with metabolic dysregulation and secondary pathophysiologic changes in multiple organ system.^[1] Diabetic foot ulcer (DFU) is one of the most serious complications of Diabetes mellitus. It is defined as a foot having an ulcer and associated with neuropathy and/or peripheral arterial diseases of the lower limb in a patient with diabetes.^[2] The reasons for the increased incidence foot ulcers in DM involve the interaction of several pathogenic factors: neuropathy, abnormal foot biomechanics, peripheral arterial diseases, and poor wound healing.^[1] In Ayurveda system of medicine the diabetic foot ulcer correlates *Dusta Vrana*^[3] and 60 modalities of treatment are explained according to the stages and features of *Vrana*^[4] (Ulcer).

CASE STUDY**Chief complaints**

- Swelling in left fore-foot from 1 month
- Discharge from an opening in left foot from 15 days

History of present illness

- According to the patient he was apparently well before 1 month, then he noticed swelling in dorsal aspect of left foot. Onset was gradual associated with pain, burning sensation, numbness and difficulty in walking. The condition was aggravated by walking, heavy work, exposure to cold and water

and foot end elevation whereas relieved by taking rest, cold compression, lowering of foot. The pain was more severe in evening and night.

- There was also a history of discharge from an opening in medial aspect of left fore-foot, discharge is watery mixed with blood and pus, extending from great toe to 4th toe associated with pain and burning sensation and aggravated on exposure to water and walking.

History of past illness

- History of Diabetes mellitus (Type II) for 20 years, Essential hypertension from 10 years
- No history of similar kind of wound, swelling, discharge in past, no history of TAO, Dyslipidemia, Trauma, Varicose veins, TB, Epilepsy etc.

Treatment history

- Took analgesics from a local medical (Details not available)
- Taking Oral Hypoglycaemic agents (Metformin 1000mg +Glimepiride 2mg) 1-0-1 B/F, taking anti-hypertensive agent (Amlodipine 5mg) 1-0-0 A/F
- Did not get relief, symptoms increased gradually

Personal history

- Diet: Non-vegetarian
- Appetite: reduced due to pain
- Bowel: once a day, normal

- Micturition: 7-8 times in day times, 1-2 times in night
- Sleep: Disturbed due to pain
- Habits: No h/o alcohol intake, no h/o smoking, no h/o tobacco chewing

Examination of patient

General examination

- General Condition: Fair
- Built: moderate
- Pallor: Absent
- Icterus: Absent
- Lymphadenopathy: Absent
- Cyanosis: Absent
- Clubbing: Absent
- Oedema: Absent
- Dehydration: Absent

Vitals

- BP: 140/80 mm of Hg
- Temperature: Afebrile, 98.4°F
- Pulse: 86bpm, Regular, Normovolaemic
- Respiratory rate: 18/min

Systemic examination

- CVS: 1st and 2nd heart sound heard, no murmurs
- CNS: Intact, Conscious, oriented to time, place and person
- Per Abdomen: Soft, non-tender, no organomegaly
- Respiratory system: B/L equal air entry, Normal vesicular breath sounds, no added sounds

Local examination of Left Foot

Inspection

- Erythematous distal plantar aspect and distal medial aspect
- Mild swelling is observed
- Sinus opening in medial aspect at the level of 1st metatarso-phalangeal joint
- Serosanguinous discharge with little pus mixed
- Movement of the toes and foot are not hampered
- Gait is limping, No claudication
- Right foot is normal

Palpation and probing

- Raised temperature present
- Tenderness present
- Induration is palpated extending from medial aspect of great toe to 3rd web space (sinus track)
- Length of the track is about 6 cm
- Serosanguinous fluid comes out while pressing the sinus track
- Dorsalis pedis artery, Anterior tibial artery and posterior tibial artery are feeble
- Right foot is intact

Investigations

- Hb-11.2 gm%
- TLC- 12,000 cells/cmm
- DC- N67, L30, M1, E2

- ESR- 28mm 1st hour
- Serum creatinine: 1.2 mg/dl
- Lipid profiles: within normal limits
- FBS- 226 mg/dl PPBS- 286mg/dl
- FUS- 1% PPUS- 2%
- HbA1c- 8.2%

Arterial Doppler of left lower limb

- Diffuse atherosclerotic changes on left lower limb arterial system

X-ray left foot AP and Lateral

- Soft tissue inflammation, no osteomyelitis

Diagnosis

- Diabetic foot ulcer (Can be correlated to *Dusta Vrana* in Ayurveda)
- Type II DM
- Essential hypertension

Treatment executed

- Sinus track was explored surgically under local anaesthesia, laid open followed by following medications:
 1. Daily Vrana Prakshalana (cleaning of ulcer) with Panchavalkala Kvatha (decoction of barks of Nyagrodha (*Ficus bengalensis*), Udumbara (*Ficus glomerata*), Ashvatha (*Ficus religiosa*), Parishha (*Thespesia populanea*), Plaksha (*Ficus lacor*))
 2. Dressing with fermented cow's urine (*Gomutra*)
 3. Pranayama for 30 minutes in morning and evening
 4. Diabetic diet from *Pathyahara* (diet kitchen)
 5. Continuing OHA and anti-hypertensive drugs

OBSERVATIONS

- The sinus tract was probed and laid open. (fig 3 and fig 4) The discharge and inflammation was markedly decreased by the end of 7th Post-operative day (POD) (fig 5). Healthy granulation tissue formation along with shrinkage in size of ulcer was observed from 14th POD.(fig 6) The size of ulcer was gradually shrinking in size and ulcer was almost healed within 28th POD.(fig 8)The ulcer healed completely on 35th POD.(fig 9)
- There were no any complications associated with the treatment during and after the treatment.
- All previous signs and symptoms were completely reduced.



Fig 1: Sinus associated with left diabetic foot at the time of admission



Fig 2: inflammation extending from left hallux to the base of 4th toe on plantar aspect



Fig 3: Intraoperative probing



Fig 4: post op day 1



Fig 5: post op day 7



Fig 6: post op day 14



Fig 7: post op day 21



Fig 8: post op day 28



Fig 9: Post op day 35, complete healing of sinus tract

DISCUSSION

In Ayurveda, management of wound involves taking care of both patient (*Vranita*) and wound (*Vrana*). Blood sugar control was the first step and proper diabetic diet, oral hypoglycemic agents, *yoga* and *pranayama* were combined together to achieve it. Practice of *yoga* and *pranayama* leads to parasympathetic activation and the reduction of stress which improves the metabolic and psychological profiles, increases insulin sensitivity and improves glucose tolerance and lipid metabolism.^[5]

Panchavalkala kvatha cleaning of ulcer helped in mechanically debriding the ulcer along with it, in decreasing the microbial load of it.^[6] Regular dressing with fermented cow's urine also helps in decreasing the microbial load of the ulcer.^[7]

Maintaining the blood sugar level by integrated approach of food, lifestyle (including *yoga* and *pranayama*) and medications along with proper dressing of the wound can help to treat diabetic foot ulcers.^[8]

CONCLUSION

- Diabetic foot ulcer is one of the serious complication of DM which can lead to various severe manifestations can be successfully managed through integrated approach of treatment.
- This approach leads in prevention of further complications associated with DFU like osteomyelitis, gangrene, auto-amputation which may require amputation.
- This approach found to be having minimal or no adverse events, well tolerated by patient and economically affordable to the patient.
- Hence, this can be adopted as one of the best modalities for the management of DFU.

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