INTERNATIONAL
AYURVEDIC
MEDICAL JOURNAL

IAMJ

Case Report ISSN: 2320 5091 Impact Factor: 5.344

AYURVEDIC MANAGEMENT OF DIABETIC FOOT- A CASE STUDY

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Published online: May, 2019

ABSTRACT

Diabetes is a deadly disease if uncontrolled. Its day by day rising prevalence worldwide is a major worry. Data shows approximately 425 million people suffered in the year 2015 and by 2045 about 629 million of the people are going to be affected. It is a lifestyle disorder besides being hereditary. Diabetic foot develops due to neuropathy, a complication of Diabetes Mellitus. The condition once developed is difficult to cure. It converts into a non healing wound despite all possible methods of wound management. Both conservative treatment and surgical treatment often become failure later. Modern science ultimately suggests amputation of the affected part. A case study has been conducted for the management of diabetic foot by the help of leech therapy and regular dressing with *panchavalkal kwath*. Total 20 sittings of leech therapy were given and dressing was done with the *kwath* regularly. Total duration of the treatment was 6 months. The patient's response to the treatment was excellent and his wound was completely healed within six months. Patient is still under observation and follows up. In follow up, Leech therapy is advised every 15th day as a preventive measure.

Keywords: Diabetic foot, Diabetes Mellitus, Leech Therapy, *Panchavalkal kwath*, non healing wound

INTRODUCTION

Diabetic foot is a complication of Diabetes Mellitus. Data shows approximately 425 million people suffered in the year 2015 and by 2045 about 629 million of the people are going to be affected[1]. It is the 6th leading cause of death and killed 1.6 million people in 2016[2]. According to IDF (International Diabetes Federation), 2017 about 69.2 million people are affected with diabetes in India[3].

According to WHO and International Working Group on the Diabetic Foot, it is defined as the foot of diabetic patients with ulceration, infection and/ or destruction of the deep tissues, associated with neurological abnormalities and various degrees of PVD (Peripheral Vascular Disease) in the lower limb[4]. Around half of patients with a Diabetic foot have co-existing PAD (Peripheral Artery Disease)[4].

RISK FACTORS FOR DIABETIC FOOT[5]

(1) Diabetes Mellitus of more than 10 years Duration. (2) Genetic factors. (3) Dyslipidaemia. Hypertension. (4) Smoking. (5) Male above 50 Years of age. (6) Uncontrolled Blood glucose levels (7) Peripheral vascular disease. (8) Peripheral neuropathy. (9) Decreased resistance to infection due to altered immune system. (10) Atherosclerosis.

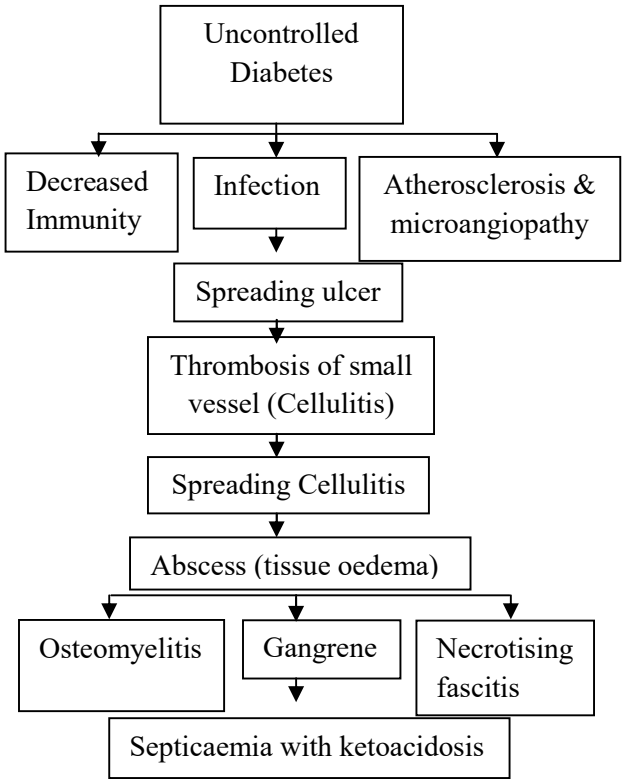
AYURVEDIC ASPECT[6]

Diabetic foot is similar to *Madhumehaj Vrana*. According to *Maharshi Sushruta Vrana* in *Madhumehi* is *krichhrasadhya*.

SAMPRAPTI OF *MADHUMEHAJ VRANA*[7]

The lower limb vessels become weak to expel *Doshas* resulting in their accumulation (*Meda* and *Rakta* along with other *dosh-dushyas*) in chronic patients of *Madhumeha*. This develops into *Prameha pidika*. The putrification of *Prameha pidika* leads to formation of a non healing wound. This is quite similar to Diabetic Foot.

DIABETIC FOOT PATHOPHYSIOLOGY[8]



CASE REPORT

A male patient of age 62 yrs from Lakshar, Haridwar, Uttarakhand reported to the OPD No 07 (*Shalya*) of Gurukul Campus, Uttarakhand Ayurved University Haridwar on dated 12 May 2018 with;

C/O

1) Wound of amputated index toe of right foot for 4 months
2) Discoloration of left foot dorsal part for 1 month
3) Numbness of B/L foot for 3 months

H/O Present illness

- According to the patient he was asymptomatic 6 months back, and then he developed a traumatic wound in index toe of right foot. He visited Synergy Private Hospital Haridwar and got investigated. He was diagnosed with Diabetic foot. The patient was suffering from Diabetes Mellitus for past 6 years. But he withdrew anti-diabetic medicines himself before 6 months and within 2 months of drug withdrawal he developed wound in index toe of right foot. At that time his Fasting Blood sugar level was 250 mg/ dL. Due to gangrenous changes his index toe of right foot was amputated. In spite of antibiotics and anti-diabetic drugs, the wound of amputation was not healed. Also there was discoloration of dorsal part of left foot. Spontaneous Wound dehiscence was observed in big toe and little toe of left foot for 15 days. So he came to the Hospital at Gurukul Campus, Uttarakhand Ayurved University Haridwar for complete cure.

H/O Past illness

- According to patient he was injured in his big toe of right foot 2 yrs back. The injury was at lateral side of big toe nail of size- 0.5 cm length, 0.3 cm breadth and 0.2 cm depth. He got it treated in Bhumanand Hospital, Haridwar. The injury took 7 months to heal.
- Type 2 Diabetes Mellitus for 6 yrs
- Hypertension for 2 yrs
- PAD (Peripheral Artery Disease) of right lower limb for 2 months

Treatment history

1) Patient was kept on insulin therapy before and after amputation for the total duration of 4 months. Regular dressing was no more effective in both foot despite of regular insulin injections and controlled blood sugar reports.
2) Patient was on Anti-Diabetic medication

Xiaten-M 500 1 BD after the stoppage of insulin therapy.

Investigations

1) Peripheral vascular Doppler

Examination was done on dated 24 February 2018 prior to amputation. 2D Color Doppler of Right Lower Limb Vessels (Arterial) revealed-

1. Diffuse atheromatous changes present in right lower limb arteries seen as intimal thickening, spectral broadening and diffuse circumferential vessel wall calcifications.
2. Absent blood flow in distal third right anterior tibial artery and dorsal pedis artery.

2) Blood investigations done on 21 Feb 2018

Fasting Blood Sugar- 295 mg/ dL

Post prandial Blood Sugar- 331 mg/ Dl

HbA1C- 7.1

3) General Examination

All vital parameters were within normal limits.

4) Local Examination of B/L foot

- **Site-**

Rt. Foot: Wound at amputated 2nd toe and medial side of 3rd toe

Lt. Foot: Wound dehiscence of big toe and little toe

- **Size-**

Rt. Foot*:* length- 3cm, width- 2cm, depth- 0.5cm;

Lt foot*:* length- 2cm, width- 0.5cm, depth- 1cm (big toe); length – 0.5 cm, width- 0.3 cm, depth- 0.2 cm (little toe)

- **Shape**- Rt foot: elliptical
- **Edge**- irregular, rough, fibrosed (wound of both left and right foot)
- **Discharges**- absent in wound of both foot
- **Floor**- slough present in wound of both foot
- **Smell**- odourless wound of both foot
- **Surrounding area**- discolouration B/L
- **Classification**- wound of both foot-Superficial ulceration of skin and subcutaneous tissue (Grade 1)


Right Foot


Left foot (Big toe)


Left foot (5th toe)

Figure 1: Clinical Presentation Day 1

MANAGEMENT PLAN

MATERIALS AND METHOD

MATERIALS

The study was conducted on single case of Diabetic Foot admitted in the Shalya IPD of Gurukul Campus, Haridwar. This was an observational study. 4 leeches were applied in B/L lower limbs just above the non healing wound, 2 in each foot. The patient was asked to lie in supine position. The site selected for leech application was cleaned with Normal Saline and mild fomentation was done.

METHOD

- **Leech application** – It was advised weekly for 1 month and then every 15th day for 6 months. Total 4 leeches were applied, 2 in each foot.

Procedure:

1. *Purva karma*- Collection and preservation of leeches; *Shodhan* of leeches with *haridra jal*
2. *Pradhana karma*- Application of leech after pricking/ or taking patient's blood sample the site on both legs; Provide moist environment for efficient sucking; Remove leech after 45 minutes with *haridra* or by itself
3. *Paschaata karma*- Vomiting of leech by applying *haridra* to its mouth; Tight Bandaging of lesion after applying *haridra* on lesion; Preservation of leech

- **Wound dressing**- It was advised daily

1. *Parishek* done with fresh *panchavalkal kwath*

2. *Jatyadi* oil gauge is placed over the wound
3. Cotton bandaging is done

- **Drug therapy**-

1. Pt. was advised to continue Anti-Diabetic Drug<Xiaten-M 500> 1 tab BD
2. Insulin discontinued
3. Anti Hypertensive drug continued
4. Ayurvedic Drugs- *Vasantkusumakar ras* 1 BD, *Chandraprabha vati* 2 BD, *Kaishore guggulu* 1 TDS, *Gandhak Rasayan*- 250 mg 1 BD, *ras maanikya*- 125mg 1BD.

- **Diet plan** was advised and the patient was asked to follow it strictly.

Figure 2:
Right foot (AT 1 month) Left foot (AT 2months)

Figure 3:
Right foot (AT 3months) Left foot (AT 1 month)

Figure 4:
Right foot(AT 4 months) Left foot(AT 1.5 months)

Figure 5: Right foot (AT 5 months)

Wagner Grading System for Diabetic Foot Infections[9]

0 - Intact Skin
1 - Superficial ulcer of skin or subcutaneous tissue
2 - Ulcers extend into tendon, bone, or capsule
3 - Deep ulcer with osteomyelitis, or abscess
4 - Gangrene of toes or forefoot
5 - Midfoot or hindfoot gangrene

ASSESSMENT CRITERIA

Signs & symptoms B/ L Foot	BT Day 1	AT (month) 1	2	3	4	5	6
Size	+++	++	++	++	+	+	-
Pain	+++	++	++	+	+	-	-
Edge	+++	++	+	+	+	-	-
Floor	+++	++	+	+	+	+	-
Discolour-ation	+++	++	+	+	+	+	-
BS- Fasting	121mg/ dL	98 mg/ dL					

Figure 6 Right foot (AT 6 months) Left foot (AT 2months)

Figure 6: Left foot (AT 2months)

RESULTS

Ayurvedic management with leech therapy completely cured the non healing wound of the patient. However duration of complete treatment was 6 months. Patient is still under follow up and leech therapy has been advised twice a month to avoid relapse.

Some components of leech (Hirudo medicinalis)[10]

1. *Hirudin*: An active principle in the salivary gland that inhibits blood coagulation by binding to thrombin.
2. *Hyaluronidase* (spreading factor): Facilitates the penetration and diffusion of pharmacologically active substances into the tissues, especially in joint pain and has antibiotic properties.
3. *Calin:* Inhibits blood coagulation by blocking the binding of the Von Willebrand factor to collagen. It inhibits collagen-mediated platelet aggregation
4. *Bdellins*: Anti-inflammatory effect
5. *Anesthetic-like substances*: Reduce pain during biting by a leech
6. *Histamine-like substances*: A vasodilator increases the inflow of blood at the bite site

PROBABLE MODE OF ACTION OF LEECH THERAPY

1. It enhances the blood circulation, reduces congestion with above components correcting Diabetic microangiopathy.
2. Vasodilation effect corrects ischaemia due to Atherosclerosis.
3. Anti-inflammatory action corrects Diabetic neuropathy.

AYURVEDIC CONCEPT OF MODE OF ACTION

1. ***Vrana Shodhan***- bloodletting technique through leech application expels the vitiated *doshas* along with impure blood
2. ***Vrana ropan***- it is enhanced with neovascularisation and fresh blood supply. Healthy granulated tissue formation occurs.
3. ***Samprapti ghatak*** is disturbed at cellular level, putification stops. *Panchawalkal kwath* has the property of *shodhan- ropan* promoting the wound healing. Bacterial growth is checked at micro level.

Further to evaluate the efficacy of leech therapy a large sample size can be studied.

DISCUSSION

Though the patient's little toe of left foot could not be saved but the entire process was painless, safe, affordable, acceptable and easy for the patient. This little toe got shed off automatically within 1month. No amputation was required. However big toe of same foot was recovered successfully. Also the main point was that the wound of left foot was healed within a very short span of time i.e. one and half months, whereas it took 6 months for the amputated wound of right foot to get healed.

CONCLUSION

Hence we can conclude that leech therapy along with proper Ayurvedic regime for wound care is quite effective with 100% success.

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Source of Support: Nil
Conflict Of Interest: None Declared

How to cite this URL: Rakhi Joshi et al: Ayurvedic Management Of Diabetic Foot- A Case Study. International Ayurvedic Medical Journal {online} 2019 {cited May, 2019} Available from: http://www.iamj.in/posts/images/upload/1776_1781.pdf