



Research Article

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A CASE REPORT ON THE SIDDHA MANAGEMENT OF DIABETIC FOOT ULCER (DFU): LEFT PLANTAR FOOT

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ABSTRACT

Background: Diabetic foot ulcer (DFU) is quoted as Madumegapun (Diabetic Ulcer) in the Siddha literatures. Diabetic foot is one of the most significant and devastating complications of diabetes and is defined as a foot affected by ulceration that is associated with neuropathy. **Case Report:** Sixty-one years old male from sub-urban area of Chennai, Tamil Nadu, a farmer by occupation was admitted in the In-patient Department of Siddha Hospital with complaints of ulcer in the left plantar aspect of foot with foul odor, pus discharge from the ulcer, swelling in the peri-wound area, Pain, altered gait along with a mild gangrene with osteomyelitis for the past 12-months associated with history of Diabetes mellitus for the past 20 years. Severity of the ulcer was measured by the Diabetic Ulcer Severity Score (DUSS), Classification of Ulcer by the 'Wagner Ulcer Classification System' (WUCS), prognosis by 'Leg Ulcer Measurement Tool' (LUMT). And, it emphasizes on the importance of proper medication for DFU and to focus on the Siddha management with D5 Chooranam (Anti-diabetic Siddha drug) and Maththan Thailam (Wound healing Siddha external Oil) and Palagaraiparvam. **Conclusion:** Intervention of Siddha medicine can potentially heal the Diabetic foot ulcer with regulating the blood sugar level. They could have a massive impact, in reducing infection rates, amputations, plastic surgeries and improving the overall quality of life and lower the economic burden in treating DFU.

Keywords: Siddha System of Medicine, Diabetic Foot Ulcer (DFU), Madhumegapun, Maththanthailam, Palagaraiparvam.

INTRODUCTION

According to the World Health Organization's 'The World Health Statistics 2012' report, India has the largest number of diabetics in the world and is now being called the "Diabetic Capital of the World"¹. It is estimated that there are 40 million people with diabetes in India currently and by 2025 this number will swell to 70 million. A study that assessed 3,619 events of all-cause mortality found that there were an additional 58 deaths per 1,000 each year of patients with diabetic foot ulcer². Peak prevalence is between 60 and 80 years³. Approximately 15 % of persons with diabetes will develop foot ulceration during their lifetime⁴. 5–24 % of them will finally lead to limb amputation within a period of 6–18 months after the first evaluation⁵.

Diabetic foot is one of the most significant and devastating complications of diabetes and is defined as a foot affected by ulceration that is associated with neuropathy and/or peripheral arterial disease of the lower limb in a patient with diabetes⁶⁻⁸. The development of neurotrophic foot ulcers in patients with diabetes mellitus has several components, including neuropathy, biomechanical pressure and vascular supply disorders. Peripheral neuropathy is clearly the dominant factor in the pathogenesis of diabetic foot ulcers⁹.

The Siddha system is the most ancient medical system practiced by the Dravidians. Many herbals and herbo-mineral Siddha drugs have been used for the management of Diabetes as well as Diabetic ulcers. Diabetic ulcer is correlated to Madumegapun or 'Valicilaippun' in Siddha system of medicine. According to the Siddha fundamental theory,

wounds are classified into 16 types; these types are comprised in the 3 major divisions that are Vali Viranam, Azhal Viranam and Iya Viranam. Vali and Azhal category of wound are treated with oil based (Thailam) medicines and Iya category of wounds are treated with oil (Thailam) or powder-based (Chooranam/Parvam) medicines. Wound care management in Siddha system is unique, because of its 32 type of external therapeutic care. Ulcers are also treated by various external therapies like Kattu (Bandage), Poochu (Liquide application), Podi (Powder), Kalimbu (Ointment), Kaaram (Chemical cautery), Seelai (Medicated gauze), which is mentioned in the Siddha system.^{10,11}. According to this theory, treating medicines are neutralize the Iyam.

This case report validates the Siddha medicine's contribution to the successful management and healing of a compound foot lesion. Here, we report the case of Madhumega Pun or Valicilaippun¹¹ (chronic non-healing diabetic foot ulcer) in the left plantar, which was treated with topical application of Siddha medicine. Case patient was treated by internally D5 Chooranam¹² and Thiripala Chooranam¹³ (Anti-Diabetic Siddha drugs), externally by Maththan thailam (Wound healing Siddha external oil) and Palagaraiparvam (Processed *Cypraeamoneta* containing Ash)¹³ externally.

Declaration of Patient consent

The authors certify that they have obtained all appropriate written informed consent from the patients for the publication of this case report and accompanying images.

Case study

Sixty-one years old male from sub-urban area of Chennai, Tamil Nadu, works as a farmer was admitted in the In-patient Department of Siddha Hospital with the complains of ulcer in the left plantar aspect of foot, foul odor, pus discharge from the ulcer, swelling in the peri-wound area, Pain, altered gait along with a mild gangrene with osteomyelitis in the past 12-months. He had a mild trauma on foot of 12-months back due to the unknown sharp object. The ulcer developed as deep within the month and affects the quality of life because of without proper treatment. The case patient went to Nearby Government hospital for the further treatment, there is nil improvement in the patient condition even after taken the 3 months of treatment. Due to insignificant relief of the therapy, doctors decided for amputation of the foot. By reason of disinclination of the patient, he visited the Siddha hospital. He had a history of 20 years of Diabetes mellitus with poor control. He was taking Insulin by injection 20 unit at the morning and 12 unit at the night for diabetes in past 6 years and he was also taking Amlodipine 2.5 mg tablet orally for Hypertension for the past 7 years. He was diagnosed as Madhumega pun (Chronic Non-Healing Left diabetic foot ulcer) in the plantar aspect. There is no relevant family history was observed. He had 3-4 cigarettes per day for the past 30 years and an alcoholic for past 30 years. Recently he was diagnosed as Chronic Kidney Disease (CKD) by the Modern Doctors of Government Hospital.

Patient was admitted in the IPD male ward, and wound was cleaned and dressed with Maththan Thailam and Palagarai Parpam after complete the appropriate examinations. Wound was analyzed in the following three ways. Severity of the ulcer was measured by the DUSS (Diabetic Ulcer Severity Score)¹⁴, In the DUSS assessment, patient has probing to bone, foot ulcer numbered in multiple, he scored about 3 out of 4. Classification of Ulcer was measured by the 'Wagner Ulcer Classification System (WUCS)¹⁵, In the WUCS assessment, patient has Grade-3 (Deep ulcer with abscess and osteomyelitis). Characters of Ulcer and patient's satisfaction were measured by 'Leg Ulcer Measurement Tool (LUMT)¹⁶, it has 14 assessment questions rated by the clinician. One more is Patient Rated Domain (PRD),

it has 3 assessment questions rated by the patients. The analysis of the LUMT, the analysis scored about 35/68 (Figure 1). Urine and blood samples were collected for investigations on the second day and daily wound was cleaned and dressed with Maththan Thailam and Palagarai Parpam. According to the Siddha system, purgative is the initial procedure to neutralize the Mukkutram (Three humors in Siddha). The patient was prescribed oral administration of Agasthiyar Kuzhambu -200 mg with ginger juice for the mild Purgative on early morning of the third day. After the five times of loose stools, bowel rest was advised. On the fourth days, D5 Chooranam (Anti-diabetic Siddha Formulation) - 2 g thrice a day and Thiripala Chooranam (Anti-diabetic Siddha Formulation) - 2 g twice a day are prescribed for oral administration. Siddha medicines were administered for 4 weeks concomitantly with modern medicines (Table 1). Every day the ulcer was cleaned and dressed. Foul odor, pus discharge in the wound was completely stopped. Swelling in the Peri-wound area was reduced on the eighth day. Pain was around the wound area. Bony abrasives were expelled from the wound at the time of dressing on the tenth day (Figure 2). On 17th day, Depth was reduced, granulation tissues developed in the edges of the ulcer (Figure 3). Swelling and pain in the peri-wound area were disappeared. Pain reduced and the gait comes normal on 20th day. Depth of the wound was closed. Necrotic tissues were completely disappeared and granulation tissues were covered the wound area on 23rd day of treatment (Figure 4). On 29th day, blood and urine were collected for the investigation. There was reduction in raised ESR and raised the level of Hemoglobin (Table 2). In Biochemical marker, Blood sugar level comes to normal limits, Blood Urea, Total Protein and Albumin levels were slightly elevated, Serum Creatinine was reduced (Table 3). On the day of discharge (Figure 5), ulcer was analyzed by the measuring tools of DUSS, WUCS, LUMT. DUSS comes to nil, WUCS comes to Grade-0 and LUMT comes to 5/68. Those were indicating the complete heal of the ulcer and similar ongoing treatment was prescribed on the day of discharge. This showed good results. Similar medicines were continued for 2 months in the follow up period. During follow-up period, no recurrence was observed. No adverse drug reaction was noticed during treatment and follow up period.

Table 1: Siddha Treatment

Day	Treatment and Observation
1 st Day (5 th Sep 2017)	Patient was admitted in IPD Male ward. Wound was cleaned and dressed with Maththan Thailam and Palagarai Parpam regularly.
2 nd Day (6 th Sep 2017)	Urine and Blood sample were collected for investigation
3 rd Day (7 th Sep 2017)	Agasthiyar Kuzhambu -200 mg was given at the morning as a single dose with ginger juice for purgation therapy to regulate the Mukkutram (Three humors).
4 th Day (13 th Sep 2017)	D5 Chooranam-2gm thrice daily and Thiripala Choorana-2gm was twice Dily were prescribed orally.
8 th Day (13 th Sep 2017)	Foul odor, pus discharge in the wound was completely stopped. Swelling in the Peri-wound area was reduced
10 th Day (15 th Sep 2017)	Pain around the wound area. Bony abrasives were expelled from the wound at the time of dressing.
17 th Day (21 st Sep 2017)	Depth of the was reduced, granulation tissues developed in the edges of the ulcer. Swelling and pain in the peri-wound area were disappeared.
23 rd day (27 th Sep 2017)	Depth of the wound was closed. Necrotic tissues were completely disappeared, and granulation tissues were covered the wound area.
30 th Day (6 th Oct 2017)	Blood and Urine samples were collected for the Investigations
31 st Day (7 th Oct 2017)	Wound was completely closed by the epithelial cells
Follow up (October and November 2017)	No recurrence was observed

Table 2: Comparative Hematological Parameters of the Patient

Hematological Parameters	At the time of Admission (on 6 th Sept 2017)	Before Discharge (on 6 th Oct 2017)
Total Count (Cells/Cumm)	7200	7500
Neutrophils (%)	69	70
Lymphocyte (%)	19	25
Basophils (%)	0	1
Eosinophils (%)	12	10
Monocytes (%)	0	0
Hemoglobin (g%)	8.3	10
ESR (mm/h.)	140	80

*ESR- Erythrocyte sedimentation rate

Table 3: Comparative biochemical parameters of the Patient

Biochemical Parameters	At the time of Admission (on 6 th Sep 2017)	Before Discharge (on 6 th Oct 2017)
FBS (mg/dl)	101	70
PPBS (mg/dl)	302	183
HbA1c (%)	7.3	7.3
Serum Cholesterol (mg/dl)	91	100
HDL (mg/dl)	26	30
LDL (mg/dl)	49	66
Triglyceride (mg/dl)	77	40
Blood Urea (mg/dl)	42	47
Serum creatinine (mg/dl)	1.8	1.4
Uric Acid (mg/dl)	4.1	4.0
SGPT (IU/L)	16	15
SGOT (IU/L)	17	16
Total Protein	6.6	7.4
Total Albumin	2.9	4.0
Bilirubin Total (mg/dl)	0.4	0.3
Alkaline phosphatase (IU/L)	88	61

*FBS: Fasting blood sugar, PPBS: Postprandial blood sugar, HbA1c: glycated Hemoglobin HDL: High-density lipoprotein, LDL: Low Density Lipoprotein; SGPT: Serum glutamate pyruvate transaminase, SGOT: Serum glutamic oxaloacetic transaminase



Fig-1: Ulcer on 05-09-2017



Fig-2: Ulcer on 13-09-2017



Fig-3: Ulcer on 21-09-2017



Fig-4: Ulcer on 27-09-2017



Fig-5: Ulcer on 07-10-2017

DISCUSSION

Sixty-one years old male former from sub-urban area Tamil Nadu was admitted in the In-patient Department for the complains of ulcer in the left plantar aspect of foot, foul odor, pus discharge from the ulcer, along with a mild gangrene with osteomyelitis in the past 12-months. He referred for amputation of the foot by the doctors, but the proper observation and Siddha therapeutic procedures were helped to relieve from the amputation and improve the QoL.

Commonly, antibiotics, anti-inflammatory drugs were preferred for the wound healing. If the ulcer was severe with deep or gangrene, they referred for amputation¹⁷. In this intervention, Maththanthailam is the commonly used Siddha topical medicine for wound healing; Palagarai Parpam was quoted for internal medications in the Siddha literatures¹⁸ to use for the topical application. This is the modified and simple therapy to use for wound healing.

Coconut oil, Copper sulphate, *Datura metel* and *Acalypha indica* are the ingredients of Maththanthailam. A histopathological study showed an increase in fibroblast proliferation and neo vascularization in Virgin Coconut Oil-treated wounds compared to controls¹⁹. *Datura metel* extract using in the wound, it has significant amount of inhibition on *Staphylococcus Aureus*, *Pseudomonas Aeruginosa*²⁰. And Copper is an essential mineral that plays a key role in angiogenesis, skin generation and expression and stabilization of extracellular skin proteins²¹. *Acalypha indica* plant extract have the sufficient wound healing property²². So, these studies confirm the wound healing process of Maththan Thailam.

In Palagaraiparpam, Palagarai (*Cypraeamoneta* Linn) contain 91.35 % of calcium substance²³. Calcium released from dressings to the circulation, it influences cell migration and remodeling in skin wounds²⁴. Calcium ion might have a significant role on granulation tissue development, possibly the Ca⁺⁺ remarkable action on the wound healing process²⁵.

The combination of Maththan Thailam with Palagarai Parpam were might be assessed in this study. It has the satisfactory improvement in the non-healing chronic diabetic foot ulcers based on the assessment tools of LUMT, DUSS, WUCS which compared the before and after treatment. And supportively, showed the blood sugar level varying between fasting 70 mg/dl and post prandial 183 mg/dl, and Serum Creatinine was

concurrently reduced within the limit is 1.4 mg%, being remarkably reduced compared to the initial levels along with 98 % healing of the wound with normal gait, absence of pain and QOL of patient was satisfactorily improved.

CONCLUSION

Intervention of Siddha medicine can potentially heal or reduce the size of these foot ulcers with diabetes. They could have a massive impact, in reducing infection rates, amputations, plastic surgeries and improving overall quality of life and lower the economic burden in treating DFU. The most significant result from this case study is the management of Diabetic complications, short span recovery from DFU at a low cost compared to the other system of medicines.

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