

CASE REPORT

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## Treatment of Diabetic Foot Ulcer in a 74-year-old Female Patient based on Iranian Traditional Medicine in Bojnurd

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### ABSTRACT

**Background:** Diabetic foot ulcer is one of the major problems suffered by diabetic patients, so much so that the annual incidence of this problem has increased from 0.1% to 4.1% in diabetic patients and the probability of its incidence is over 25% during the diabetic individual's life.

**Case Presentation:** The patient was a 74-year-old woman with diabetes for more than 20 years. She was hospitalized with complaint of diabetic foot ulcers, uncontrolled blood sugar, and sepsis at Emam Reza Hospital of Bojnurd in March 2014. She was under the primary treatment of sugar control drugs and infection control. The patient's foot ulcer did not respond to current treatments, and the orthopaedist advised amputation of the affected foot. The patient referred to traditional medicine clinic for counselling. The patient had a sore on the big toe of her right foot, and the severe inflammation was spread over the other fingers and continued to the ankle. The wound had cyanosis and severe infection for at least two months. During this time, the patient was treated with modern medicine methods, which did not give any effective result, so the patient's wound and overall health situation were getting worse every day. After entering the traditional medicine clinic, the patient was under the control of health and nutrition. Pharmaceutical measures of this patient were according to disease temperament and conditions including medicinal herbs, combination drugs, and modern blood sugar control drugs. The manual measures were utilized including full back cupping every night until the end of therapy and leech therapy inside and around the wound with six medium-to-fine-size leeches in 10 sessions once every three days. The diabetic foot ulcer healed completely, the patient's physical and mental states improved, and her blood sugar was controlled after 40 days of treatment.

**Conclusion:** Given the patient's healing process, it seems that combining the modern and Iranian traditional medicine as 'Iranian Effective Medicine' can treat most of the common diseases, and it is essential to perform a wide range of assessments and studies in different diseases based on the teachings of medicine.

**Keywords:** Diabetic Foot Ulcer, Leech Therapy, Traditional Medicine, Iranian Effective Medicine

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## Introduction

Diabetes mellitus is one of the oldest known human diseases [1] referring to a group of metabolic disorders that affects more than 150 million people worldwide and nearly three million people in Iran and has significant unknown cases [2-3]. Based on available information, it was estimated that the prevalence of diabetes would reach 300 million in 2025, so that its prevalence was 2.8% in all age groups around the world in 2000 and will reach 4.4% in 2030 [4]. According to the deaths and disabilities caused by complications of diabetes and its enormous economic burden, this disease is considered an important health problem [1-4]. Nowadays, more than 2.5 million people, equivalent to 6%, suffer from this disease in Iran. The prevalence of diabetes is increasing in Iran like other developing countries [2-3]. This disease causes death and disability by making multiple macro- and micro-vascular complications [1]. Diabetic foot ulcer is one of the serious problems suffered by these patients. According to studies, the annual incidence of this problem is between 0.1% and 4.1% in diabetic patients, so that its lifetime risk is over 25% for a diabetic person. This complication leads to amputation in 15–20% of patients [5]. Based on a 22-year retrospective study in Iran, this figure has been increased to 30% [6]. The features of diabetic foot ulcers include infection, wound, and corruption of organ. In other words, the causes of diabetic foot ulcer include structural deformities, peripheral neuropathy, ischemia, infection, oedema, and callus. In most patients, a set of neuropathy, minor trauma, and structural deformities lead to ulceration; and the ischemia and oedema are at later levels. The peripheral neuropathy is among the leading cause of diabetic ulcers and is seen in more than 50% of diabetic patients over 60 years of age with different degrees [7]. The increased microvascular permeability and decrease in arteriolar response to various stimuli are the other mechanisms that have been proposed until now [8]. The treatment of diabetic foot ulcer is very complicated and requires great care. Furthermore, the strategy

for these treatments also requires familiarity with classification of diabetic foot ulcer. Nowadays, the comprehensive Wagner and Texas' Diabetic Wound Classification properly indicates the type of treatment and prognosis of the diabetic foot. The current treatments for diabetic foot ulcers include the adequate control of blood sugar, appropriate antibiotic treatment, debridement of necrotic tissues, reduced mechanical stress, washing and dressing regularly, and improving the blood flow situation if possible [7-9]. The impaired wound healing is one of the major problems in treatment of diabetic foot ulcers despite the medical procedures, and it may last for several months and even years. These chronic ulcers create disability and are also prone to infections particularly deep infections such as osteomyelitis, which may lead to amputation. Treatment of diabetic foot ulcers is a major medical problem. Several therapies have been introduced for treatment of these wounds [10]. On the other hand, infection around the wound often occurs as a result of different organisms and needs to cover some kinds of pathogens. Furthermore, most of these pathogens are resistant to antibiotics, so the use of non-antibiotic therapies may be effective in the prevention of antibiotic resistance and are more accepted by patients and also cost less [11]. On the other hand, all treatments for diabetic foot ulcers have partial effects in healing wound or preventing amputation. Therefore, it is necessary to evaluate the new combination of drugs and methods with the highest therapeutic effect in the shortest time and report them scientifically based on an integrative school of modern and Iranian traditional medicine as Iranian Effective Medicine (IEM).

## Case Presentation

### Medical History and Examination according to Modern Medicine

The patient was a 74-year-old woman with more than 20 years' history of diabetes and high blood fat. She was an illiterate housewife, living and born in Bojnurd city, weighing about 80 kg and had a height of 150 cm. She was hospitalized with complaint of diabetic foot ulcers in the

right foot, pain and wound infections along with fever, malaise, and lack of blood sugar control and sepsis at Emam Reza Hospital of Bojnurd city in March 2014. She was put under the early treatment including blood sugar and infection control medicines. Her foot ulcers did not respond to current treatments and the orthopaedist ordered for patient's amputation. Guided by an acquaintance, the patient was referred to Hajtaleb Medical Complex of Alternative and Complementary Medicine for treatment. The patient had type-2 diabetes for nearly 20 years and was under the oral treatment with Glibenclamide 5 mg tablet three times daily and Metformin 500 mg tablet twice a day. She had fasting blood sugar (FSB) of 210 and glycosylated haemoglobin (HbA1C) of 10.5%. The patient had cardiovascular risk factors including 1) smoking 20 cigarettes per day and consumption of opium, 2) body mass index of 35.55; in other words, obesity and hyperlipidaemia for 10 years and under the treatment by Atorvastatin 20 mg once a day, and 3) lack of sufficient mobility. The patient's vital symptoms were as follows: temperature: 39 °C, respiratory rate: 18 per minute, pulse rate: 90 per minute, blood pressure: systolic 140 mm Hg to diastolic 90 mm Hg. The big toe wound in the right leg (Right 1WR) which was equivalent to STAGE D/GRADE II according to clinical examination by traditional medicine physician based on the standards of Texas University diabetic wound classification system [12] and equivalent to GRADE 4 based on the standards of Wagner comprehensive system for wounded diabetic foot [13]. In other words, the patient had an infected wound in the big toe of the right foot, and the severe inflammation reached other fingers and continued to the ankle. The wound had severe cyanosis and infection started a few months ago. The patient was treated with modern methods during this time, and they had not led to effective healing and thus the patient's health situation was getting worse every day. The wound was just a small point and it became larger due to the lack of response to treatment over time. Furthermore, the patient suffered from anxiety and depression due to the awareness of amputation in her right leg,

and she had fever, malaise, and heart palpitations due to the wound infection and inflammation.

### **Medical History and Examinations according to Iranian Traditional Medicine**

In the field of preventive medicine and maintaining health and proper lifestyle along with healthiness, the patient did not have temperament of food and drugs and the principle of balance preservation and cleaning the body and keeping the essential materials. In other words, she did not follow advice of the physicians such as avoiding and implementing the principles of health. The patient's innate temperament (congenital) was cold and wet, and her acquired temperament (current) was associated with melancholic and phlegmatic temperaments, so that her wetness was higher. Given that the patient was old and also drug addicted, her dry bowel was obvious. According to examinations, the patient had weak pulse with little intensity. In touching the patient's body, despite the dominance of phlegm, there was also clearly dryness, and she had constipation and inappropriate defecation. She had had mental and nervous depression and was highly anxious. There was no problem with respect to heart auscultation, and no any problem with abdominal examination. In general, the patient did not have any serious medical problem in clinical examination other than the infectious diabetic foot ulcer.

### **Treatment**

#### ***Measures to Protect Health and Nutrition:***

Remedial measures for patient started on 11/03/2015. These measures were first along with nutritional advice and essential recommendations. A CD including the nutrition practices was given to the patient to help with the treatment so that she could learn the manners and principles of nutrition in traditional medicine. Given that the patient had dominant cold and dry, she was prohibited from eating cold and sour foods such as buttermilk, yogurt, vinegar, ice water, and salad. Her companions were advised to be cheerful with her in their interactions due to her depressed state. Due to her diabetic state, she was advised not to smoke cigarettes, but since she was addicted to

drug and smoking, she could not completely stop it, but cut down on her smoking.

### ***Pharmaceutical Measures:***

The medical herbs and combination drugs were used on this patient due to her temperament and condition. In this case, medical herbs such as chamomile, hibiscus, thyme, mint, black seed, and marigold were used as anti-inflammatory agents, and mucus herbs, rose, and *Securigera varia* leaves were used for their cathartic properties; and the wound was dressed by honey every night until the end of treatment. Furthermore, recommendations were also given to patient for modern diabetic treatment including Glibenclamide 5 mg tablet twice a day.

### ***Manual Measures:***

1- Full cupping of back every night until the end of the treatment process.

2- Leech therapy inside and around the wound with six medium-to-small-size leeches in 10 sessions once every three days.

The patient underwent 10 sessions of leech therapy and the sensitive stages were photographed. The following cases were considered in leech therapy according to the patient's age and dominant melancholic and phlegmatic temperaments:

A) Given the patient's anaemia and dominant phlegmatic temperament and also to prevent phlegmatic disease due to blood loss by leeches, the patient drink was increased and smaller leeches were used.

B) To maintain physical force in patient during leech therapy, the periods between leech therapies were enhanced at two stages of leech therapy to give a natural reconstruction opportunity to the patient's body.

### **Treatment Results**

Given the combination of modern and traditional medical methods, the patient's general condition was tangibly improved after the second week as there were no fever, malaise, depression, stress, and anxiety. Her vital symptoms and blood sugar were controlled and recorded at the normal range. After a week, granulation tissue was created in the

wound, and the wound was completely healed in a month. Inflammation, infection, and gangrene conditions of the right big toe were fully recovered after four days of treatment. Figures 1–4 show the treatment process of the diabetic foot ulcer. The patient situation was followed for two months and no recurrence was observed thereafter.

### **Discussion**

Due to its hard-to-treat response, diabetic foot ulcer is one of the common problems caused by complications of type 2 diabetes [1]. Morbidity and high costs of treatment impose a significant burden on individual and community health system [3-2]. In this report, the examined patient had a diabetic foot ulcer that did not respond to common treatments. Nowadays, all treatments of diabetic foot ulcers have partial effects on wound healing with the scope to avoid amputation. Therefore, this report attempts to use the most effective and safest methods in modern and traditional medicine schools for the patient's healthcare and treatment by integrating these medical schools, thus reporting them scientifically as IEM.

In summary, there is no specific definition of diabetic foot ulcer in traditional medicine, and there is thus no specific diagnosis and treatment method for diabetic foot ulcer in traditional medicine based on the evidence contained in traditional medicine books. Due to the problem of diabetes in traditional medicine, it is called diabetes mellitus, which is quite different from physiopathology of diabetes. Therefore, it can be concluded that traditional medicine does not have special definition for diabetes, but these patients can be helped by knowledge of traditional medicine. In other words, if we want to treat diabetes and diabetic foot ulcer according to the texts of traditional medicine, we will not be successful. However, a physician, who knows the physiopathology of diabetes according to modern medicine as well as traditional medicine, can effectively combine these two schools of therapy to cure this disease and its complications.

New solutions have been introduced for treatment of diabetic foot ulcer during the past decade, and

**Figure 1: The Patients Foot Picture before Treatment in March 2015**



**Figure 2 & 3: The Patients Foot Pictures During Treatment in April 2015**



**Figure 4: The Patients Foot Picture after Treatment in May 2015**



they reduce the size of ulcers and treat diabetic ulcers. Therefore, several topical drugs have been now introduced and studied for healing diabetic foot ulcer such as the growth factor gel, Tretinoin, and Angi Pars. Furthermore, several studies have found the positive effects of herbal medicines on the treatment of diabetic foot ulcers [14-23].

Several studies have found that a healthy lifestyle including the use of healthy diet, proper nutrition, exercise, not smoking, and living with mental health can enhance the health indices even in a diabetic person, and thus the risk factors and diabetic complications can be significantly reduced [24-27]. This study provided the nutritional advice and essential recommendations in a CD including food practices for the patient to help treatment by complying with principles of eating according to traditional medicine. Furthermore, herbs such as chamomile, hibiscus, thyme, mint, black seed, and marigold are used on this patient as anti-inflammatory agents, while mucus herbs, rose, and *Securigera Varia* leaves were used as laxatives. The active ingredient is more important in choosing the treatment methods in Iranian traditional medicine, and the temperament is put on next priority. In other words, we first select plants that are strong in terms of antimicrobial and anti-inflammatory active ingredients and are compatible with the patient's temperament. In effective cleaning and reforming medicine, we do not follow the method of traditional medicine, but we prefer to treat the simple mis-temperament and use the active ingredients, giving effective cleaning and reforming if necessary for treating the physical mis-temperament. We believe that the mis-temperament is simple in most patients. In other words, if the mis-temperament is treated and the herbs or herbal medicines with active ingredients are then prescribed, the recovery will be achieved and there will be no need for ploughing the patient's temperament and we did the same with this patient. In other words, we first give the melancholic and choleric cleaning and reformed medicine according to the active ingredients, and then prescribe the laxative, and we do not extend the prescribed laxative.

Honey is used in healing wounds for centuries.

Despite that there are numerous reported cases for effectiveness of honey in wound healing, there is a little scientific evidence that supports this treatment. Several clinical assessments have indicated the effectiveness of honey in the treatment of wounds and burns; however, the use of honey is limited to non-standard treatment. Furthermore, studies have found that honey also prevents the growth of bacteria, but the mechanism of this effect is not fully understood. In this patient, everyday dressing with honey accelerated wound recovery, and thus the infection was fully treated [18, 23].

Unfortunately, there is no study on leech therapy in Iran. Due to her age and lack of physical ability, we could not get more blood from this patient. Furthermore, according to the patient's phlegmatic temperament, it was not permissible to get more blood, and relative contraindications were blood and leech therapy in traditional medicine. Leech therapy had a saliva therapy approach in this patient, and thus there was no need for getting blood, but since the leeches do not secrete saliva until they get blood, we had to take blood by leeches according to the following steps: A) the patient's drink was enhanced and the smaller leeches used. B) The interval between leech therapies was increased at two stages of leech therapy to give the patient's body the opportunity of natural reconstruction. In this patient, the saliva of leech was helpful for treatment and the active ingredient of leech saliva treated the diabetic ulcer by its anti-inflammatory, revascularization, antimicrobial, and blood flow increase properties. In conclusion, considering the history of medicine over the last century, it can be concluded that there is no perfect medical school in the world of medicine; hence, the medical schools such as Iranian modern and traditional medicine, Ayurveda in India, traditional Chinese medicine, etc. are effective in protecting human health and providing treatment, which are the real objectives of medicine, as well as performing medical services, but they are also numerous strengths and weaknesses due to the lack of comprehensive research in this field [28-29].

## Conclusion

Effective medicine as a combination of two medical schools, namely modern and traditional medicine, can have effective clinical findings in treating some diseases such as diabetic foot ulcers. Hence, the use of effective medicine in the treatment of diabetic foot ulcer will need lower costs and reduce the use of antibiotics in people with diabetes. Therefore, based on the principles of modern schools of medicine, traditional Iranian medicine can be investigated and evaluated as a new non-invasive treatment that has the largest therapeutic effect in the short term.

## List of Abbreviations

IEM: Iranian Effective Medicine  
 CM: Centimetre  
 KG: Kilogram  
 MG: Milligram  
 FSB: Fasting Sugar Blood  
 C: Centigrade  
 MMHG: Millimetres of Mercury  
 CD: Compact Disk  
 %: Percentage

## Competing Interests

The authors have no conflict of interest in the publication of this article.

## Contributing Authors

This article is the outcome of treatment measures by Dr. Hassan Hajtalebi. Dr. Hassan Khani and Hamid Hajtalebi cooperated in documenting and writing the article.

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