



Treatment of Diabetic Foot Ulcer in a 58-year-old Turkman Patient based on Iranian Traditional Medicine

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Received: 18 July 2016

Revised: 1 Sep 2016

Accepted: 14 Sep 20

Abstract

Introduction: Diabetic foot ulcer is among serious problems for diabetic patients and its treatment is very complicated and requires great care. Inappropriate responses to various medical and surgical treatments have made this complication problematic.

Case Presentation: The patient was a 58-year-old man with diabetes for more than twenty five years and hospitalized with complaint of diabetic foot ulcers, uncontrolled blood sugar, and sepsis at Shohadaye Gonbad Kavus hospital in June 2015. The patient's foot ulcer did not respond to conventional treatments, and amputation order was made by his treating orthopedist. The patient referred to traditional medicine clinic for counselling. The patient had two wounds on the right foot in Zone 1 (Right 11 X and 1 XR) with a diameter of approximately 5 cm by 6 cm and Zone 2 (Right 9 Y and 6, 7, 10 X) with a diameter of approximately 12 cm by 5 cm which was equivalent to STAGE D/GRADE III according to clinical examination by traditional medicine physician based on the standards of Texas University Diabetic Wound Classification System, and equivalent to GRADE 4 based on the standards of Wagner Comprehensive System for Wound Diabetic Foot. The patient's health and nutrition was under control. Pharmaceutical measures in this patient were including the herbal medicines (including both uni- and multi-component medicines), and conventional antihyperglycemic drugs. The manual actions were including full back cupping every night until the end of therapy, massage therapy, and leech therapy inside and around the wound with 10 to 12 fine, medium and big leeches in 16 sessions every 2 to 4 days. The diabetic foot ulcer healed completely, the patient's physical and mental states improved, and his blood sugar was controlled after 60 days of treatment

Conclusion: It seems that combining the modern and traditional medicine can treat most of the common diseases especially diabetic foot ulcer and it is essential to perform a wide range of assessments and studies in different diseases based on the Iranian effective medicine.

Keywords: Diabetic Foot Ulcer, Traditional Medicine, Modern Medicine, Leech Therapy

Citation: Hajtalebi H, Khani Iurigh H, Hajtalebi HR. Treatment of Diabetic Foot Ulcer in a 58-year-old Turkman Patient based on Iranian Traditional Medicine. Trad Integr Med 2016; 1(4): 151 - 159

Introduction

Diabetes is the most common metabolic, and malignant endocrine disease with an increasing prevalence. This disease has complications such as ischemic heart disease, hypertension, retinopathy, neuropathy, nephropathy and

diabetic foot ulcer [1]. Based on the available information, it is estimated that the prevalence of diabetes will 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 [2]. The diabetic foot ulcer is among the serious

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problems in these patients. According to studies, the annual incidence of this problem is from 0.1% to 4.1% in diabetic patients, so that its lifetime risk is over 25% for diabetic person. This complication leads to amputation in 15 to 20 percent of patients [3]. Based on a 22-year retrospective study in Iran, this figure has been increased to 30% [4]. Due to hard-to-treat response, the diabetic foot ulcer is among the common problems in diabetic people. These wounds, which are caused by impaired blood circulation, have high morbidity and their costs for individual and society is unjustifiable. Pathophysiological mechanisms of this complication are not known precisely yet [5-9]. The features of diabetic foot ulcers include infection, wound and corruption of organ. In other words, the causes of diabetic foot ulcer include the structural deformities, peripheral neuropathy, ischemia, infection, edema and callus. In most of the patients, a set of neuropathy, minor trauma and structural deformities lead to ulceration; the ischemia and edema occur at the later levels. The peripheral neuropathy is among the leading cause of diabetic ulcers and is seen in more than 50% of diabetics over 60 years of age with different degrees [10].

The treatment of diabetic foot ulcer is very complicated and requires excessive care. Furthermore, the strategy of 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 diabetic foot. The current treatments for diabetic foot ulcers include adequate control of blood sugar, appropriate antibiotic treatment, debridement of necrotic tissues, reducing mechanical stress, washing and dressing regularly, and improving the blood flow situation if possible [11-13]. 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. Several therapies have been introduced for treatment of diabetic foot ulcers [14]. The infection around the wound often occurs as a result of different organisms and needs to cover some kinds of pathogen. Since, most of the pathogens are resistant to various antibiotics, the use of non-antibiotic therapies may be effective both in prevention of antibiotic resistance and patients' satisfaction as well as spending less money [15]. Most treatments for diabetic foot ulcers have partial effects in healing the wound or preventing the amputation. Therefore, it is necessary to adopt an effective combination of drugs and procedures to reach the highest therapeutic effect in the shortest time.

Case Presentation

Medical history and examination according to modern medicine

The patient was a 58-year-old man with a history of diabetes over twenty-five years and also hyperlipidemia. The patient was farmer, resident and born in Gonbad City, weighing about 80 kg, and a height of 160 cm. He was hospitalized at Shohadaye Gonbad Kavus hospital in June 2015 with complaint of inflamed and deep right foot diabetic foot ulcers, with destruction of skin and muscle tissue as the ligaments and part of bone is seen, along with fever, malaise and lack of blood sugar control and sepsis. He received treatment including blood sugar and infection control medicines. The patient had diabetic foot ulcers since a month before admission. His foot ulcers did not respond to current treatments and the orthopedist ordered for patient's foot amputation. Guided by an acquaintance, the patient was referred to Haj-Taleb Integrative Medical Center which offers both traditional and modern medicine.

The patient received oral treatment with Glibenclamide 5 mg tablet three times daily and Metformin 500 mg tablet twice a day, and Atorvastatin 20 mg once a day. He had Fasting Blood Sugar (FSB) of 250 and Glycosylated

hemoglobin of 11%. The patient had cardiovascular risk factors including 1) smoking 10 cigarettes per day, 2) body mass index of 31.25; (obesity and hyperlipidemia for 15 years and taking 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 160 mm Hg to diastolic 90 mm Hg. The patient had two wounds on the right foot in Zone 1 (Right 11 X and 1 XR) with a diameter of approximately 5 cm by 6 cm and Zone 2 (Right 9 Y and 6, 7, 10 X) with a diameter of approximately 12 cm by 5 cm which was equivalent to STAGE D/GRADE III according to clinical examination by traditional medicine physician based on the standards of Texas University Diabetic Wound Classification System [16], and equivalent to GRADE 4 based on the standards of Wagner Comprehensive System for Wound Diabetic Foot [17].

The patient had two infected wounds in the right foot and the severe inflammation continued to the ankle. The wound was severely infected started in 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 small but 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 his right leg; also he 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 know temperament of food and the principle of balance preservation and cleaning the body and keeping the essential materials; in other words, he did not observe the advice of physicians about life style modifications. The patient's general status was

not good; he had weakness, physical force, fever, lethargy and severe anxiety in admission. In terms of temperament, the coldness and dryness was higher (melancholic), and this temperament was due to the patient's age, diabetes and wound. According to traditional medicine, the patient was out of balance in terms of temperament and had a severe reduction of physical force because of higher age. Therefore, his physical forces needed to be reconstructed and his temperament to be reformed. Unfortunately, due to unsuccessful treatments of modern medicine (such as the ineffective antibiotics and bandages) and traditional medicine (including the unscientific and inaccurate leech therapy by a non-physician), the patient had a spate of inflammatory and infection of wound, and a sharp decline in his physical force which generally led to disappointment and distrust in recovery in him. The patient seemed warmer in innate temperament (congenital) and had overcome melancholic and phlegmatic temperament in acquired temperament (current) including the simple melancholic non-temperament (cold and dry) and phlegm (cold and wet) and melancholic non-temperament in the whole body. He did not perform the health practices based on Iranian traditional medicine. He looked pale and weak physically. The touch of patient's body mostly indicated coldness and dryness, but his organ was mostly cold and wet. Patient's pulse was weak and slow. He was extremely anxious mentally and neurologically and this enhanced the melancholic accumulation. The body had not any other problem in extra examination.

Treatment

The treatment of patients according to Iranian traditional medicine consists of several steps including behavioural therapy, strengthening physical forces, modification of temperament and nutrition, herbal therapy, leech therapy, cupping, massage, honey therapy, daily washing with serum and debriding wound if necessary. Interventions used for treatment of case patients are discussed in detail below.

Life style modifications

Treatment of patient started on 28/06/2015. Given that this patient has been under unsuccessful treatments of modern and traditional medicine for several months and several physicians had ordered for amputation, he was severely depressed and disappointed, and thus we tried to give him hope by behavioral therapy and counselling and a full description of treatment during the first session. His companions were advised to be happy with him in their commands due to his depressed state. He was advised not to use cigarette. The next stage included nutritional advice and six essential recommendations. A CD including the nutrition practices was given to the patient to help the treatment by learning manners and principles of nutrition in traditional medicine. In changing the nutrition, the patient was advised to avoid eating cold and dry foods (melancholic) and cold and wet (phlegmatic). Furthermore, he was fully avoided from sugary foods according to modern medicine protocol. Due to the patient's weak physical force, he was advised to eat nutritious foods and at the same time comply with six essential principles. In these patients, since the treatment is delayed by constipation, they receive laxative and melancholic eliminator to treat it.

Pharmacological interventions

The medical herbs and combination drugs were used in this patient due to her temperament and condition. Herbs were used for this patient as the melancholic eliminator, expectorant, laxative, and especially for disposing the wound moisture. The active ingredients of plants were used for treating wounds, strengthening the patient force, and treatment of depression. The most important plants used for patient in different situations during two months were as follows:

Chamomile, thyme, mallow, mint and black cumin were used as the melancholic and phlegmatic eliminators and also *Securigera varia* and rose as laxatives. These herbs were given with the aim of reforming the temperament and as the anti-inflammatory, antiseptic, wound dryer and for patient force strengthening. These plants

were chosen as an effective material as we called this method the effective plant therapy. Furthermore, cinnamon, as one of the best plants which can be used in all diabetic ulcers, was boiled and given to the patient three cups per day. For treatment of diabetic foot ulcer, cinnamon is drier, antiseptic, sedative, refreshing and most importantly the best anti-mucus and anti-phlegm and rapidly improves the patient's physical force. Lavender and valerian were used in this patient as anti-anxiety and antidepressant. In general, the herbal treatment is a complex and effective measure in diabetic foot ulcer though arrangement and order of herbs of this plant is single or combined and is different for every patient. The patient was advised dressing the wound by honey in the morning and evening. According to our experience, honey is one of the best medicines for disinfecting wounds and recovering the tissue and has significant impact especially on deep wounds.

The important thing about using honey is that it does not have any complication for diabetics. It should be noted that the above pharmacological interventions were used in adjuvant to conventional treatment including Glibenclamide 5 mg tablet twice daily.

Manual interventions

Cupping: Full cupping of back is recommended for every other day because it strengthens the body force and increases the blood flow in patient and also helps to eliminate corrupted mucus and heal the wound, and most importantly, strengthens the immune system and even can help to make waste materials ready for elimination from the body.

Massaging the patient's body: In patients with diabetic foot ulcer especially those who are physically weak and have more intense wound, the massage can increase the blood flow, recover the tissues, and strengthen the body forces as it is accepted in traditional and modern medicine. In traditional medicine, massage should be performed according to the type of patient's dystemperament and physical strength. In this patient, massage was given in two forms with low

pressure in the entire body and around the wound once every night until the end of treatment.

Leech therapy inside and around the wound with 10 to 12 small, medium and large leeches in 16 sessions every 2 to 4 days: In this case, leech therapy was tougher than all treatment measures because there were two large and infectious wounds one of which was deep and highly inflamed and infected in one leg, and also over aging and unsuccessful prior treatments had weakened the patient's physical strength. Because of body conditions in this patient, blood sampling was impossible. There was a need for more sessions of leech therapy with less intervals because any delay in treatment would worsen the wound. Therefore, 16 sessions of leech therapy within two to four days were implemented, and the number of leeches varied from 10 to 12 in each session and also their sizes varied according to patient's temperament and physical forces. As to effectiveness in treatment, the location of leeches was one of the most important issues for this patient, and thus the place of leeches changed

every session. During 16 sessions of leech therapy, which led to complete wound healing, there was no damage to patient's overall health and physical strength and temperament and his good recovery process boosted his morale and improved his depression and anxiety clearly.

Treatment results

Given the combination of modern and traditional medical methods, the patient's general condition was tangibly improved after the third week as there were not any fever, malaise, depression, stress and anxiety. His vital symptoms and blood sugar were controlled and recorded at the normal range. After two weeks of treatment, the granulation tissue was created in wound, and the wound was completely healed in two months. Inflammation, infection and gangrene conditions of right leg were fully recovered after sixty days of treatment. Figures 1 to 3 show the treatment processes of diabetic foot ulcer. The patient situation was followed for 2 months and no recurrence was observed.



Figure 1: The patient's foot before the treatment in June 2015



Figure 2: The patient's foot during the treatment in July 2015



Figure 3: The patient's foot after the treatment in August 2015

Discussion

Due to hard-to-treat response, the diabetic foot ulcer is among the common problems in complications of type 2 diabetes [1]. Morbidity and high cost of treating these injuries impose a significant burden on individual and community health system [2-3]. Therefore, we need more effective and less expensive therapies due to the high prevalence of diabetic foot ulcers in Iranian diabetic patients. Considering the high cost of treatment and prolonged hospitalization and also high percentage of amputation, numerous methods have been utilized to treat diabetic foot ulcers worldwide and new therapies are being explored [18] and this article can be assessed in this regard. In this report, the examined patient had diabetic foot ulcer which did not respond to common treatments. Nowadays, all treatments of diabetic foot ulcers have partial effects on wound healing to avoid amputation. Current report attempted to use the most effective and safest methods by integrating modern and traditional medicine treatment by procedures.

It should be noted that there is no specific definition of diabetic foot ulcer. Its possible causes, as well as any evidence for specific diagnosis and treatment methods in traditional medicine books. Accordingly, diabetes in traditional medicine is called diabetes mellitus which is quite different from physiopathology of diabetes. Therefore, despite lack of special definition for diabetes, patients with diabetes can be helped by traditional medicine knowledge. 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 and also knows the traditional medicine, can effectively combine these two schools of therapy to deal with this disease and its complications. New solutions have been introduced for treatment of diabetic foot ulcer during the past decade and they reduce the size of ulcers and eventually treat the diabetic ulcers. Some topical drugs introduced and studied for healing diabetic foot ulcer include growth factor gel, Tretinoin, and Angi Pars. In line with current study findings, several other studies have found the positive effects of herbal medicines on treatment of diabetic foot ulcers [19-29].

A number of studies have found that the modified lifestyle including healthy diet, proper nutrition, exercise, not smoking, and mental health can enhance the health indices even in a diabetic person, and thus the risk factors and diabetic complications can be significantly reduced [30-32]. During this study, we provided the patient with some nutritional advice and six essential recommendations including food practices in a CD to help treatment by complying with principles of eating in traditional medicine. Furthermore, the herbs such as the chamomile, mallow, thyme, mint, black cumin, and cinnamon were used as the anti-inflammatory and mucus herbs, and rose and *Securigera varia* leaves as

laxatives. The active ingredient is more important in choosing the treatment methods in traditional medicine of Iran, and the temperament is the next priority. In other words, we first select plants which are strong in terms of antimicrobial and anti-inflammatory active ingredient compatible with patient's temperament. In effective cleaning and reforming medicine, we do not prescribe according to the method in traditional medicine sources, but we prefer to treat the simple dystemperament using active ingredients. We believe that if the dystemperament is treated properly with active ingredients from the herbs, the recovery will be achieved like that of the reported patient. In general, the herbal treatment is a complex and very effective measure in diabetic foot ulcer though the arrangement of herbs is different for every patient. For the first time, we reported an herbal therapy, considering both the active ingredient of the plant and the patient's temperament. The novelty was in combining modern and traditional medicine knowledge, because there was not any subject about temperament in modern medicine and, also, no subject about active ingredient in traditional medicine books.

Honey has been used in healing wounds for centuries. Despite the fact that there are numerous reported cases for effectiveness of honey in healing wounds, there is a little scientific evidence supporting this treatment. Several clinical assessment have indicated the effectiveness of honey in treatment of wounds and burns, however, the use of honey is limited to non-standard treatment. A number of studies have found that the honey also prevents the growth of bacteria, but the mechanism of this effect is not fully understood. In this patient, the everyday dressing with honey accelerated the wound recovery and thus the infection was fully treated [23, 28].

Unfortunately, there is not any conducted study on leech therapy in Iran. Due to aging and lack of physical ability, and also according to the patient's phlegmatic temperament, it was not permissible to get more blood sample. Relative contraindications were blood and leech therapy in traditional

medicine. Essentially, with leech therapy the cased patient received saliva therapy, and thus, there was no need for getting blood, but since the leech do not secrete saliva until it gets blood, we were keen to use following measures: A) the patient's fluids intake was enhanced and the smaller leeches used. B) The interval between leech therapies was increased to give the patient's body the opportunity of natural reconstruction. The active ingredient of leech saliva treated the diabetic ulcers by its anti-inflammatory, revascularization, antimicrobial and increasing blood's flow properties. Given the history of medicine over the last century, it can be concluded that there is no perfect medical school in the world. Hence, the medical schools, such as Iranian modern and traditional medicine, Ayurveda in India, Chinese medicine etc., are proportionally effective in protecting the human health and bringing them proper treatments and medical services, but they surely have numerous strength and weakness points and also they lack comprehensiveness.

Conclusion

Effective medicine as a combined school of modern and traditional medicine schools can have effective clinical results in treating some diseases such as diabetic foot ulcers. The use of effective medicine in treatment of diabetic foot ulcer will cut the costs and reduce the use of antibiotics. Therefore, the focus of attention should be on the effective medicine school with its non-invasive treatment strategies which reveals has the largest therapeutic effect in the short term.

Conflict of interests

The authors have no conflict of interest.

Acknowledgment

The authors appreciate the studied patient and his family's cooperation to participate and complete all treatment processes, and also all nurses in Haj-Taleb Medical Center of Traditional and Modern Medicine to perform treatment processes for the patient.

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