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Case Report

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MANAGEMENT OF DIABETIC NEUROPATHY BY *IRSAL-e-ALAQ* (HIRUDOTHERAPHY): A CASE REPORT

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ABSTRACT

Background: Diabetic Neuropathy is a serious and common complication of diabetes and causes substantial morbidity as well as increases mortality. The primary underlying cause is a thickening of the capillary basement membrane with associated increased vascular permeability and micro-thrombi. In the *Unani* System of Medicine, no direct concept of diabetic neuropathy is mentioned; but neuropathy has been described under the caption of *Khidr*. *Razi* (Rhazes) has mentioned in his book *Al Ḥawi Fit Tib* the concept of *Khidr* and its occurrence in those tissues, which are somato-sensory in nature. The conventional system of medicine offers limited clinical evidence for its effectiveness. Hence, it can be managed well by one of the *Unani* regimens, i.e., *Irsal-e-Alaq* (Hirudotherapy). **Objective:** The purpose of this case report is to provide insight into the effects of *Irsal-e-Alaq* (Hirudotherapy) in Diabetic Neuropathy. **Intervention:** A 61-year-old male who has complaints of numbness in the left foot with neuropathic ulcer and was a known case of diabetes mellitus for 15 years on insulin. Two leeches were applied once in a week for nine weeks. Telephonic follow-ups were continued for two and a half months after completion of treatment for any re-occurrence of any of the signs and symptoms again. **Results:** Michigan Neuropathy Screening Instrument (MNSI) was used to find out the improvement in neuropathy. On day 0, the MNSI was 4 and 1 on 58th day. The sensation in the foot was restored completely within 58 days as well as the size of the wound also reduced with subsequent sittings of *Irsal-e-Alaq*. **Conclusion:** *Irsal-e-Alaq* is found effective in the treatment of diabetic neuropathy as well as in improving the quality of life in such patients. Hence, rigorous, controlled, randomised, blinded and long duration follow up studies on large sample size need to be conducted by trained clinicians or researchers to establish the efficacy of *Irsal-e-Alaq* in the treatment of diabetic neuropathy.

KEYWORDS: Diabetic Neuropathy; *Irsal-e-Alaq;* Hirudotherapy; *Ziyabetus.*

INTRODUCTION

Diabetic Neuropathy is one of the serious and common complications of diabetes which causes substantial morbidity and increases mortality. It is a very broad and heterogeneous term that encompasses a number of mono and polyneuropathies.[1] The most common diabetic neuropathy is symmetric, predominantly sensory, affects distal regions of lower and upper limbs. The prevalence varies greatly, ranging from 6% to 51%.[2] It is a type of nerve damage caused by long term high blood sugar levels.[1,3] The condition is significantly associated with age, duration of disease, diastolic blood pressure, smoking status, low HDL cholesterol level, high triglyceride level, and HbA1C.[4] The life-time risk of foot amputation is 15% in patients with diabetic polyneuropathy.[5] Polyneuropathy is the first step in the generation of diabetic foot ulcers. It produces an anesthetic foot, defective in proprioception, and therefore exposed to inappropriate loading.[6] Symptoms include paraesthesia, numbness, loss of sensitivity, and in some patients burning and stabbing pain in lower limbs.[7] Clinical signs are diminished perception of vibration sensation distally, glove and stocking impairment of sensation, loss of tendon reflexes in lower limbs, paresthesia in feet, pain in lower limbs, burning sensation in soles, numbness in feet, abnormal gait, clawing of toes, foot ulcers, wasting of proximal muscles of lower limbs.[3]

As far as the *Unani* System of Medicine is concerned, the concept of diabetic neuropathy is not mentioned in classical literature as such; but has been described under the caption of *Khidr*, the relative symptoms are available whereas diabetes mellitus is being treated successfully by *Unani* physicians.[8] Diabetes is derived from a Greek word meaning "a passer through; a siphon," and "Mellitus'' derives from the Greek word for "sweet".[9] In the *Unani* System of Medicine, *Ziyabetus* is the term

used for diabetes. *Unani* philosophers considered it as a disease of the kidney. It is known by various names like *Ziyasqoos, Qaramees,* and in Arabic, it is known as *Dulaab, Dawarah,* and *Zalaqul Kulliya*. Avicenna (*Ibn Sina*) in the canon of medicine (*Al-Qanoon fit tib*) has mentioned two specific complications of diabetes, which are gangrene and loss of sexual functions.[8] Infact, they are closely related to vascular and neurological complications, as described in the modern pathology of diabetic neuropathy. Further, Rhazes (*Razi*) has mentioned in his book *Liber Continens* (*Al Hawi Fit Tib)* the concept of *Khidr* (neuropathy) and its occurrence in those tissues, which are somato sensory in nature.[10,11] In the *Unani* system of medicine, the pathogenesis of disease is attributed to three factors: Temperament (*Mizaj* in Arabic), Structure *(Tarkeeb* in Arabic),and continuity (*Ittesal* in Arabic*)*, abnormalities in any of these factors are considered as temperamental disarrangement (*Sue Mizaj* in Arabic), Structural disarrangement (*Sue Tarkeeb* in Arabic) *and* discontinuity (*Taffaruq e Ittesal* in Arabic), respectively.[12] According to *Rhazes* obstruction of nerves occur due to the accumulation of viscous substances (*Imtila of Galeez Akhlat*). It is said that frequent exposure of nerve to cold due to excess intake of water, excess sleep, more sexual intercourse, and taking a bath after meals, etc. can lead to the accumulation of toxic matter (*fuzlat*) in nerves. Ultimately, it results in weakness of nerves and impairs nerve conduction like in *Khidr*. Moreover, viscous humour (*Galeez Khilt*) also obstructs small vessels that supply nutrients to nerves. This results in the disturbance of nerve conduction. When continuous exposure to cold accompanies with nerve weakness, it increases the chance for the dysfunction of nerves as seen in the early stage of neuropathy and with chronicity, symptoms like numbness and loss of sensation appear.[10,11] Diabetic neuropathy can be treated on par with the principles of *Khidr* along with the drugs possessing properties like a hypoglycaemic, analgesic, anesthetic, nervine tonic, anti-inflammatory, anti-oxidants, etc. *Usool-e-ilaj* is *Izala-e-sabab* by controlling glycemic level, *Tanqiya-e-mawad* by *Istifragh* (evacuation) and *Tadil-e-mizaj* by *Taskin* (to provide warmth).[13]

In the *Unani* system of medicine, there are three methods of treatment viz; *Ilaj Bit Tadbeer wa Ghiza* (Regimenal therapy and Dietotherapy), *Ilaj Bil Dawa* (Pharmacotherapy) and *Ilaj Bil Yad* (Surgery).[14,15] Amongst these, *Ilaj Bit Tadbeer* is one of the most popular methods of treatment practiced by ancient *Unani* physicians for ages. *Ilaj Bit Tadbeer* means treatment through regimens, which is done by doing modification in *Asbabe Sitta Zarooriya* (six essential factors for life) in order to attain general health. It includes regimens like *Hijamat* (Cupping), *Dalk* (Massage), *Irsal-e-Alaq* (Leeching/Hirudotherapy), *Fasd* (Venesection), *Qai* (Emesis), *Idrar* (Diuresis), *Hammam* (Bathing), *Tareeq* (Diaphoresis), *Nutool* (pouring of medicated water slowly over an affected part from a distance).[14] These regimens are actually meant for the *Istefragh* (evacuation) of *Akhlate raddiya* (morbid humours), from the body or affected site. As soon as these morbid humors get evacuated, normal health gets restored, and vitality of the body gets increased.[16] Ancient Egyptian, Indian, Greek-o-Arab physicians used leeches for a wide range of diseases starting from conventional use for bleeding to systemic ailments such as skin diseases, nervous system abnormalities, inflammation, cardiovascular problems, cancer, and infectious diseases. Leech application has been used traditionally for the treatment of diabetes mellitus complications. Leech saliva contains bioactive peptides and proteins involving antithrombin (hirudin-prevents clotting, converts fibrinogen into fibrin and relieves ischaemic events, bufrudin), antiplatelet (calin-obstruct thrombi formation, saratin), factor Xa inhibitors (lefaxin), antibacterial (theromacin, theromyzin) and others, so it is used as a protective tool for venous congestion and prevents limb amputation and disabling neuropathic pain.[17] Present work is an attempt to highlight the role of *Irsal-e-Alaq* in alleviating diabetic neuropathy.

It is also mentioned in *Jarahat-e-Zohrawia* that more often leeching can be done in those areas of the body where other procedures of bloodletting (viz., venesection, and wet cupping) are not possible.[16]

CASE REPORT

This patient was a 61-year-old male who attended our outpatient department of the National Institute of Unani Medicine on 16/01/2020 with type 2 diabetes from the past 15 years and was managing the condition with Insulin (30/20 IU/ml Human Mixtard injection). His present fasting blood sugar was 271 mg/dl. His Hb% was 13gm%, BT 2 minutes, CT 3 minutes; blood pressure was 140/80mmHg. His ECG was normal. He had complaints of numbness in the left foot with neuropathic ulcer beneath the great toe, which was treated with debridement and systemic antibiotics for a prolonged time.

The general examination of the patient was done, and all the vital parameters were found within normal limits. The patient was hemodynamically stable except for an increase in blood sugar levels. X-ray of the foot shows no bony involvement.

Local examination of the foot shows non-healing ulcer on the plantar aspect of the left foot for which no treatment was responding satisfactorily. He was confirmed diagnosed case of Diabetic Neuropathy with Neuropathic ulcer. Accordingly, his treatment was planned.

NEUROLOGICAL STATUS OF THE FOOT

The neurological status of the patient was tested with a vibrating tuning fork at the great toe, and fine touch testing on the toes with a 10 g monofilament.[3,18,19]

The vibration perception and fine touch of the patient were absent, indicating abnormal sensory status and stocking impairment of left foot with loss of ankle jerk and plantar reflex.

INTERVENTION

After the assessment, the left foot of the patient was cleaned with normal saline, and two Leeches were applied around the lesion, when leeches left the site by their own(after sucking blood for approximately 20 minutes) wound was cleaned with betadine solution this was followed by dressing by gauze piece. Finally, roll bandage was wrapped around.

The dressing was done on an alternate day, while leech therapy was repeated once a week for nine weeks.

The patient was advised to continue with anti-diabetic treatment (Insulin). Telephonic follow up was done for two and a half months and the patient was instructed that if he experienced any of the reoccurrences of symptoms in the future, he should immediately report to the hospital, but there was no re-occurrence of any of the signs and symptoms again.

RESULT

According to Michigan Neuropathy Screening Instrument, the result is plotted in Figure 1:

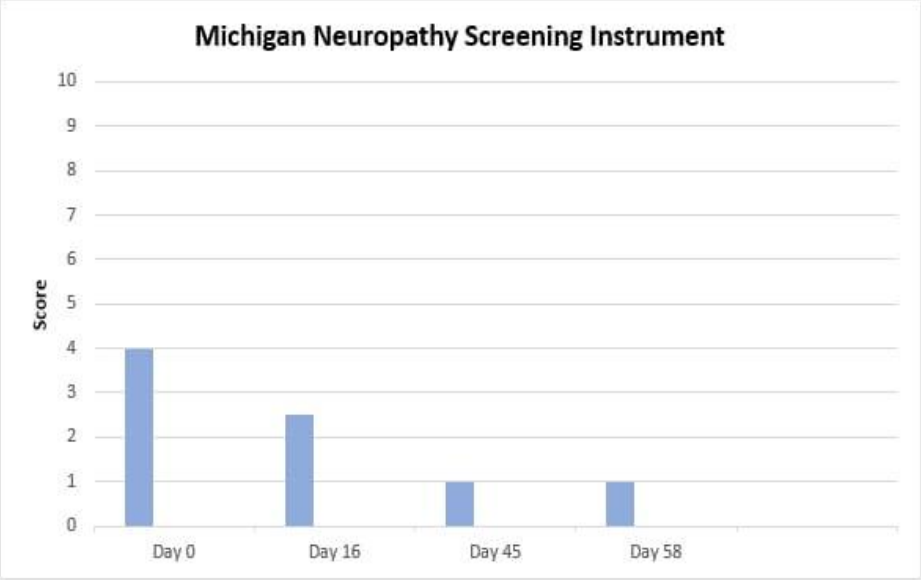

Figure 1:

A neuropathic foot usually scores 3 or higher, a normal foot 2.5 or lower.[19-20] On day 0, the patient had a score of 4 on MNSI, 2.5 on day 16, 1 on day 45, and lastly 1 on day 58.

With, *Irsal-e-Alaq* the sensation was restored completely within 58 days, as it is visible from Fig.1, the symptoms of the patient improved a lot and the size of the lesion reduced with subsequent sittings of *Irsal-e-Alaq*.

Figure 1: 6th Sitting.

Figure 2: Day 58th.

DISCUSSION

In our case report, 61 years old man who had diabetic neuropathy in left foot was studied for 58 days. The patient was given Leech therapy for local application.In the conventional system of medicine, certain medicines and surgery can improve symptoms in some cases but not completely. So it is the need of the hour to develop a treatment that can provide long term relief from the symptoms without any side effects. With the advances made in the medical sciences, leeches can work wonders in such circumstances. Considering the above-mentioned aspects, *Irsal-e-Alaq* was selected in order to evacuate morbid humors from the blood vessels and hence found effective in this case. The reasons by which leech therapy has worked is that the presence of a number of pharmacologically active substances in the leech's saliva, i.e., hirudin, hyaluronidase, Eglin, calin, bdellins, etc. The hyaluronidase increases the membrane permeability, reduces the viscosity, and promotes the diffusion of injected fluids. Eglin c is well tolerated on the central nervous system and prevents neutrophil infiltration (adhesion, penetration, and migration) into inflamed vessels and neutrophil-mediated injury to the microvascular endothelium, thus corrects Neuropathy.[21]

As per the *Unani* concept, impure blood is extracted from the body, thus releasing the body from toxins, and the circulation of fresh blood takes place at the site of the lesion, which makes the healing process easier.

Since it is considered that diabetic patients have thick blood, which makes them more prone to develop clots, Leech suppresses the formation of clots by thinning the blood of these patients; thus, this therapy has a long-lasting effect in diabetic patients.

The salivary component of Leech, Hirudin, inhibits platelet aggregation and coagulation cascade results in relief of venous congestion. Histamine like substances acetylcholine corrects the microangiopathy.[22]

The patient was asked to follow up in OPD. However, no re-occurrence of any signs and symptoms were seen. *Irsal-e-Alaq* proved very effective in this patient of Diabetic Neuropathy. However, further evaluation with a large sample size is required to show its significance for Diabetic Neuropathy.

CONCLUSION

To conclude, *Irsal-e-Alaq* has been used as a popular therapeutic practice throughout the ages for a wide range of diseases. It is a relatively simple and inexpensive treatment modality when it comes to many chronic diseases. On the basis of the results of the present case, it appears that such cases of Diabetic Neuropathy can be managed with *Irsal-e-Alaq* and can improve the quality of life with a relative long-term clinical efficacy in such patientswithout any side effects, but the investment is urgently needed for advanced research of this therapy. The use of this therapy on a scientific basis is the need of the hour. Therefore, robust clinical trials using appropriate endpoints need to be conducted. Leech therapy will result in speedy and effective management in diabetic neuropathy and will thus discourage the risk of amputation in diabetic patients.

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CONFLICT OF INTEREST

The authors report no conflict of interest.

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