



## Outcome of Diabetic foot with team approach during Lockdown

**Dr. Mohammed Riyaz, Dr. Dilip Kumar Kandar**

<sup>1</sup>Consultant Physician & Diabetologist Esani Diabetes and Multispecialty Centre, Hyderabad, Telangana, India

<sup>2</sup>Chief Consultant Diabetologist & CEO Kandar Diabetes Centre, Tarnaka, Hyderabad-500017

**\*Corresponding Author:**

**Dr. Mohammed Riyaz**

Esani Diabetes and Multispecialty Centre, 8-1-21/41 Surya Nagar Colony, Seven Tombs Road, Tolichowki  
500008 Hyderabad, Telangana, India

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

### ABSTRACT

**Aim:** The aim is to study the clinical profile and outcome of patients presented with diabetic foot infections (DFI) not willing for amputation during the crisis of lockdown.

#### Methods:

This was a prospective study recruiting patient of 72 years of age, with DFI. The patient underwent a detailed history and clinical examination. Patient was classified as per the International Working Group on the Diabetic Foot -IDSA classification. The patients were followed up before and during the lockdown till the healing.

**Result:** Prompt treatment and strict glycemic control and proper antimicrobial therapy in patient with Diabetic foot helps in better healing of wound. Lockdown had prevented the proper dressing which was the major issue to be tackled; we had properly planned vacuum therapy for the patient with each cycle of therapy lasting for 5 days and patient required 4 cycles of vacuum therapy. During this the visit was restricted once in 5 days but daily assessment was done with multimodality approach, once the vacuum was connected this helped in better healing of a bad wound. Target of therapy was to make the wound healing, once the wound was halted and healing was occurring, patient was planned for skin grafting, which eventually helped the patient and prevented the patient from amputation.

#### Conclusion:

A great saying, when there is a will there is a way. In this difficulty time of pandemic, we did not want the patient to suffer, so by all mean we tried alternatives way of getting the wound healing without any further progression of it. A team work of Vacuum therapist, Surgeon, and Diabetologist has led to better and quick recovery from the Diabetic foot and preventing the complication like sepsis and amputation of patient. It is well known that a minor and major amputation poses a huge burden on existing healthcare of the country. Hence, in developing countries there should be good healthcare education and large scale screening programs should be done to prevent Diabetic Foot. Healthcare should cost effective and easily accessible, to facilitate early diagnosis of Diabetic Foot and its complications, to minimize the rate of amputations.

**Keywords:** Diabetic Foot, Diabetic wound, lockdown, Glycemic control, Vacuum therapy

### INTRODUCTION

The aim is to study the clinical profile and outcome of patients presented with diabetic foot infections (DFI) not willing for amputation during the crisis of lockdown.

Diabetic foot is termed as Infection, ulceration or destruction of tissues of the foot associated with neuropathy and/or peripheral artery disease in the lower extremity of a person with (a history of) diabetes mellitus.

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. According to the deaths and disabilities caused by complications of diabetes and its enormous economic burden, this disease is considered an important health problem.<sup>[1-3]</sup>

Diabetes prevalence is increasing in developing and developed countries. It is well known that diabetes itself can cause macro- and micro-vascular complications which eventually increase the morbidity and mortality.<sup>[4-5]</sup> One of serious issues is Diabetic foot ulcer, if proper wound care is not taken on time it can lead to complications, which could be life threatening. According to various studies, the incidence of Diabetic foot disease is between 0.1% and 4.1%, and it is also been observed that in 20% of patient with Diabetic foot may require amputation.<sup>[6-9]</sup>

In India, Diabetic foot disease is mainly due to diabetic peripheral neuropathy which could be due to barefoot walking, lack of knowledge regarding complication of diabetic foot, and the socioeconomic status of patients.<sup>[10]</sup> Nearly 10% of hospitalization in relation to diabetes is due to diabetic foot disease. Shobhana R et.al (2000) study was done in Southern part of India; it was found that expenditure of patient with diabetic foot was nearly 32.3% versus 9.3% in patient not having diabetic foot disease.<sup>[11]</sup>

The commonest features of diabetic foot ulcers are trophic ulcers or pressure ulcer on plantar surface. Various factors leading to diabetic foot ulcer like structural deformities, callus, peripheral neuropathy, ischemia, infection. In most diabetic patients, minor trauma, neuropathy and structural deformities eventually lead to ulceration; and the ischemia and oedema can occur at later levels. The major leading cause for diabetic foot ulcer is peripheral neuropathy in nearly 50% of patient whose age is higher than 60 years. Other mechanism for Diabetic foot ulcers are, increased microvascular permeability and decrease in arteriolar response to various stimuli.

The current treatments for diabetic foot ulcers include the optimal glycemic control with minimal glucose variability, appropriate treatment of infection with specific antibiotics, debridement of necrotic tissues,

reducing mechanical stress, dressing and washing of wound regularly with additional nutritional supports, and improving the blood flow situation if possible. The impaired wound healing is one of the major problems in treatment of diabetic foot ulcers despite the medical and surgical interventions, and it may last for several months and even years. These ulcers of chronic duration can create disability and are more prone for infections particularly deep infections such as osteomyelitis, which can lead to amputation.

### Methods:

This is a prospective study of a 72 year old with diabetic foot infection. The patients detailed history and clinical examination was done at baseline including details of ulcer, peripheral pulses evaluation (i.e., femoral artery, popliteal artery, anterior posterior tibial artery, and Dorsalis pedis artery) and Ankle-brachial index (ABI). The discharge from ulcer wound was sent for microbiological examination. Patient was classified as per the International Working Group on the Diabetic Foot -IDSA classification. The patients were followed up before and during the lockdown during this pandemic disease of corona infection till the healing of wound. Outcome was assessed in terms of ulcer healing, readmission, minor/major amputation

### Result:

72-year-old male patient approached the Diabetic foot unit of our centre on 27/02/2020 with a h/o of non-healing small ulcer at left heel since 2019, it was painless, but patient didn't visited any doctor from September 2019 despite having non healing ulcer, as it was not causing any problem for the patient (patient version). Since September 2019 slowly the wound size increased and there was oozing from the wound which foul smelled and the size of wound was increased when the patient visited to the Diabetic foot centre. Patient was advised immediate admission for wound debridement.

Image 1



General examination: Appearance- Distressed, Body built & strength- Moderate, Orientation-well oriented to time, place and person. Pallor- present, no signs of Icterus, Edema- Mild swelling over the leg lower 1/3<sup>rd</sup> extending to the dorsum of foot, Lymph nodes- 2–3 inguinal lymph nodes discrete, palpable and non-tender. Gait- limping gait. Height: 172cm, Weight 70kg, BMI: 23.7, Pulse: 90/min, BP: 120/80mm of Hg, R/R: 18/min

Medication history: He was a known case of diabetes since 30 years which was not under control in spite of using tablet Metformin 1500mg Gliclazide 60 mg, Teneligliptin 20mg orally all these years.

According to the history of the patient, the wound discharge was foul smelling and intermittent which increased since February 2020, and visited our centre, patient was admitted for wound debridement. Local examination of wound: Location- left Heel of the foot, extending to infero-lateral aspect, Size- 10 x 7 cm, Floor-sloughed, tendons were exposed, Edges-sloped and well defined in nature, Margins are poorly defined at the distal ends, proximally it is thick and fibrosed, Discharge-purulent, foul Smell, Mild Blackish discoloration on the heal area, Surroundings are is edematous with slight rise in local temperature, Peripheral pulses like Dorsalis pedis artery, posterior tibial artery and popliteal artery pulsation well felt, Touch on bleed-absent.

Systemic examination: Respiratory system- Normal Vesicular breath sounds, CVS: normal S1, normal s2, no adventitious sound, no additional sounds. CNS: No FND, Limping due to swelling and pain at the site of wound.

On evolution, when the patient first visited the Centre, his hemoglobin was 9.8 gm %, Total count was 13,100 and ESR 32, Fasting blood sugar 140 mg/dl and post prandial blood sugar was 262 mg/dl. HbA1c: 7.8%, Blood urea: 27mg/dl, Serum creatinine: 0.8mg/dl, LFT : within normal limits, 2dEcho: EF:66%, Normal size cardiac chambers, Grade 1 Diastolic dysfunction, Good LV Systolic function, No MR/TR/AR. Prothrombin time: Test 15.0, Control: 13.5 INR: 1.2

Arterial Doppler – mild atherosclerotic disease with no obvious obstruction. Common femoral, popliteal, anterior tibial, posterior tibial, dorsal pedis arteries are normal in course and normal flow pattern.

Chest X ray- normal study, X-ray Foot: Tarsal metatarsals, phalange's normal, rest of the bones of foot are normal.

Patient was having leukocytosis and wound swab was send for culture and sensitivity, patient was started on broad spectrum antibiotic and wound dressing was done under aseptic precaution. Patient was advised admission and Immediate debridement of wound, patient delayed the admission for 3 days without inform the diabetic foot specialist unit doctors and took antibiotics at home by a local doctor, wound conditioned worsened and again patient revisited, patient was clearly explained and patient was admitted immediately as the wound condition had worsened. The patient was managed with a team of Diabetologist; vascular surgeon Internal medicine had taken proper care. Patient was explained that patient may require Extensive debridement with high risk concern of amputation may require latter, if not healing and infection spreading. Patient underwent

extensive debridement of wound and patient was discharged from hospital by 6<sup>th</sup> march 2020 and subsequently followed up with diabetic foot opd where patient was undergoing regular dressing with additional nutritional support. Meanwhile Patient was continued with basal bolus regimen for continuous strict glycemic control. After 2 weeks despite improving all additional factors wound was not satisfactory healing, patient was having persistent oozing from wound, wound swab for c/s was collected and it was pseudomonas, patient received

antibiotics despite on antibiotic's wound was not healing neither the oozing was reducing, patient and attenders were counselled that patient may require amputation, patient and attenders were not willing for amputation. Meanwhile there was lockdown declared in India due to pandemic of corona infection, due to lockdown patient was not able to get dressing done due to logistical problem, Instead of wound dressing the patient was placed on vacuum therapy by a great difficulty (Image 2).

Image 2



Vacuum therapy device was once connected and it was lasted for 5 days i.e. considered as 1<sup>st</sup> Cycle, this procedure was done under proper care. The amount of discharge collected at the end of 1<sup>st</sup> cycle (Image 3)

Image 3



This vacuum therapy procedure showed fantastic results, the wound healing was better after completion of 4 cycles. After 4<sup>th</sup> cycle patient wound sized reduced and well granulated. (Image 4)



Image 4



Patient was planned and posted for skin grafting with the help of plastic surgeon and it was successfully done.

#### Discussion:

Diabetes can cause damage to the nerve and vascular supply in the feet and legs. Patients with neuropathy usually presents with reduced sensation or no sensation and, therefore, might be unaware of any trauma to their feet. Various factors which can lead to this are as follows, ill-fitting footwear or an object in their shoes, such as a piece of glass, a stone or a drawing pin. Continued walking on an injured foot will damage it further and minor lesions can become more serious. A simple examination of the feet, feeling inside the shoes before wearing them and not walking barefoot can help to prevent minor injuries. Many of the patients who attend the diabetes clinic are older and some of these patients will have so bad involvement of nerves of feet that they cannot feel the feet and some of them even can't reach their feet, which means finally means that they are unaware of injuries. Diabetic foot ulcers should be treated promptly and the goal should be to maintain good health status, improve quality of life and reduce the number of amputations.

Various Techniques are there to prevent lower limb extremity amputation in diabetic patients such as regular and proper foot inspection to limb salvaging complicated vascular and reconstructive surgery. Risk factors should be identification early, proper and

regular careful evaluation to be done, and aggressive treatment in a multidisciplinary team approach prevent amputation in most cases of diabetic foot ulcer. This case history demonstrates the adverse effects of diabetes on feet. The patient had a dense neuropathy, which meant that he was unaware of the injury in his foot. He continued to put weight on the foot, which resulted in a minor foot injury developing into a serious health problem. Poor blood supply to his feet and legs hindered wound healing. In patients with diabetic foot problems, often a combination of factors cause the tissue to breakdown; in this case it was neuropathy, vascular disease and a minor foot lesion that became infected. All of the co-existing factors must be addressed when treating patients with diabetic foot ulcers.

Gadepalli et al.(2006) studied 80 diabetic foot ulcer specimens were observed in which it was seen that 23 patients (28.7%) had Gram-negative organism and only 11 patients (13.8%) were having Gram-positive infections.<sup>[12]</sup>

Various studies like Turhan V etal (2013), Brodsky JW etal (1991), Criado E et.al (1992), Grayson ML et.al (1995) have reported that Gram-positive organisms to be more predominant organisms in Diabetic Foot. The difference observed in the prevalence of Gram-negative versus Gram positive is still unknown. However, environmental factors such as sanitary habits, for example, use of water after defecation for perianal wash (ablution) can results in

hand contamination with fecal flora; which eventually be responsible for increased Gram-negative infections in the developing countries than compared with the West.<sup>[13-16]</sup>

### Conclusion:

A great saying, when there is a will there is a way. In this difficulty time of pandemic, we did not want the patient to suffer, so by all mean we tried alternatives way of getting the wound healing without any further progression of it. A team work of Vacuum therapist, Surgeon, and Diabetologist has led to better and quick recovery from the Diabetic foot and preventing the complication like sepsis and amputation of patient. It is well known that a minor and major amputation poses a huge burden on existing healthcare of the country. Hence, in developing countries there should be good healthcare education and large scale screening programs should be done to prevent Diabetic Foot. Healthcare should cost effective and easily accessible, to facilitate early diagnosis of Diabetic Foot and its complications, to minimize the rate of amputations.

### References:

1. Alberti KG, Zimmet PZ. Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: diagnosed and classification of diabetes mellitus, provisional report of WHO Consultation. *Diabet Med* 1998; 15(7): 539-53.
2. King H, Aubert RE, Herman WH. Global burden of diabetes, 1995-2025: prevalence, numerical estimates, and projections. *Diabetes Care*. 1998; 21(9): 1414-31.
3. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care*. 2004; 27(5): 1047-53.
4. Levin ME. Pathogenesis and general management of foot lesions in the diabetic patient. In: Bowker JH, Pfeifer MA, editors. *The Diabetic Foot*. 6th edition. New York: St. Louis, CV Mosby; 2001.
5. Boyko, E.J., Ahroni, J.H., Stensel, V, Forsberg, R.C., Davignon, D.R., Smith, D.G. (1999) A prospective study of risk factors for diabetic foot ulcer. *Diabetes Care*, 22:1036–1042.
6. Boulton, A.J.M. (1996) The pathogenesis of diabetic foot problems: an overview. *Diabet. Med*, 3: S12– S16.
7. Boulton, A.J.M., Malik, R.A., Arezzo, J.C., Sosenko, J.M. (2004) Diabetic Somatic Neuropathies. *Diabetes Care*, 27(6): 1458–1486.
8. Most RS, Sinnock P: The epidemiology of lower extremity amputation in diabetic individuals. *Diabetes Care* 6:87–91, 1983
9. Vijay V, Snehalatha C, Ramachandran A: Sociocultural practices that may affect the development of the diabetic foot. *IDF Bulletin* 42:10–12, 1997
10. Sathe SR: Managing the diabetic foot in developing countries. *IDF Bulletin* 38:16–18, 1999
11. Shobhana R, Rao PR, Lavanya A, Vijay V, Ramachandran A: Cost burden to diabetic patients with foot complications: a study from Southern India. *J Assoc Physicians India* 48:1147–1150, 2000
12. Gadepalli R, Dhawan B, Sreenivas V, Kapil A, Ammini AC, Chaudhry R, et al. Aclino-microbiological study of diabetic foot ulcers in an Indian tertiary care hospital. *Diabetes Care* 2006;29:1727-32
13. Turhan V, Mutluoglu M, Acar A, Hatipoğlu M, Önem Y, Uzun G, et al. Increasing incidence of gram-negative organisms in bacterial agents isolated from diabetic foot ulcers. *J Infect Dev Ctries* 2013;7:707-12
14. Brodsky JW, Schneider C. Diabetic foot infections. *Orthop Clin North Am* 1991;22:473-89.
15. Criado E, De Stefano AA, Keagy BA, Upchurch GR Jr., Johnson G Jr. The course of severe foot infection in patients with diabetes. *Surg Gynecol Obstet* 1992;175:135-40.
16. Grayson ML. Diabetic foot infections. Antimicrobial therapy. *Infect Dis Clin North Am* 1995;9:143-61