INTERNATIONAL JOURNAL OF CURRENT ADVANCED RESEARCH
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 12; Issue 06(A); June 2023; Page No. 2127-2129
DOI: http://dx.doi.org/10.24327/ijcar.2023.2129.1466

Research Article

REVIEW ON FOOT ULCER- A DIABETIC COMPLICATION AND IT'S SURGICAL TREATMENT

Nithyakala P*, Kalpitha Mrinali VB, Kowsalya V, Kritika K, Lavanya S and Madhumitha V

Dept, of Pharmacy Practice, Swamy Vivekanandha College of Pharmacy, Tiruchengode, Tamilnadu-635 205

A R T I C L E I N F O

Article History:
Received 13th March, 2023
Received in revised form 11th April, 2023
Accepted 8th May, 2023
Published online 28th June, 2023

Key words:
Diabetic Foot Ulcer (DFU), Amputation, Wagner Classification, Risk Factors

A B S T R A C T

Background: Diabetes mellitus causes both major and minor complications, of which the most common is the diabetic foot ulcer (DFU). Diabetic foot ulcers are clinically associated with lower extremity amputations (LEA). There was a significantly higher degree of re-amputation and mortality in those who undergo amputations due to diabetic foot ulcers in addition to impact on quality of life. Data on long-term outcomes in these patients were limited and requires further research to better understand the long-term outcomes in this subset of patients.

Aim: To highlight the long term complication of diabetes mellitus and it's most common surgical therapy

Conclusion: There was a significantly higher degree of re-amputation and mortality in those who undergo amputations due to diabetic foot ulcers in addition to impact on quality of life. Data on long-term outcomes in these patients were limited and requires further research to better understand the long-term outcomes in this subset of patients.

INTRODUCTION

Diabetes mellitus is a group of metabolic illnesses characterised by chronic hyperglycemias brought on by abnormalities in insulin production, insulin action, or both [1]. One of the main health issues of the twenty-first century is diabetes mellitus. Diabetes patients run a significant risk of having serious health issues that shorten life spans, degrade quality of life, and raise medical care expenses. The diabetic foot (DF) syndrome is a significant late consequence of diabetes that is closely linked to peripheral artery dysfunction and diabetic neuropathy. When tissue necrosis occurs, lower extremity amputation (LEA) may be necessary [2]. The two most significant diabetic consequences are neuropathy and foot ulcers. Complications can present in a variety of ways, from the most straightforward to the most difficult, such as limb amputations and infections that pose a serious threat to life [3].

Amputation

The term "amputation" or "lower extremity amputation" can refer to any type of surgery or only to an amputation at or below the knee [4].

Major Amputations

This include procedures close to the tarsometatarsal joint or above the ankle, and a global WHO study on lower extremity amputation also included cases of gangrene without surgery [5].

Major Amputation Levels

Amputation through the tibia and fibula is known as a "below knee amputation" and is designated by the abbreviation (TT). Amputation through the knee (often referred to as "through knee amputation") is known as knee disarticulation (KD).

Amputation through the femur is known as a "transfemoral amputation" (TF) and is sometimes known as an "above knee amputation".

Minor Amputations

Minor amputations are crucial medical procedures because they can prevent catastrophic amputations such below- or above-knee amputations. Compared to major amputations, they offer patients a higher quality of life. MJMS

Minor Amputation Levels

1. Toe amputation
2. Metatarsal-phalangeal disarticulation
3. Distal transmetatarsal amputation
4. Proximal transmetatarsal amputation
5. Tarso-metatarsal disarticulation
6. Midtarsal disarticulation
7. Ankle disarticulation [4].

Causes of Amputation in Diabetic Patients

The reasons for amputations differ between and within nations. According to a number of researches from

Corresponding author:* **Nithyakala P
Dept, of Pharmacy Practice, Swamy Vivekanandha College of Pharmacy, Tiruchengode, Tamilnadu-635 205

underdeveloped nations, neuropathic foot ulcers predominate and are typically accompanied by severe infections. For diabetics, foot issues are a common reason for hospital admission. Amputations impact patients' physical and functional condition but also their mental well-being and financial burden [6]. The main causes of ulcer complications and lower limb amputation in diabetes patients include peripheral neuropathy, ulceration, infection, and peripheral vascular disease. One of the most effective methods for lowering the risk of diabetic foot amputation is structured healthcare [7]. To be the most frequent reason for amputation is moist gangrene. The most frequent type of amputation performed on a diabetic foot is amputation of the toe. The majority of cases (83.8%) of amputations were minor ones, with toe amputations being the most frequent [8].

Risk of Diabetic Foot Ulcer

Individuals with DFU also have a significant mortality rate, which is roughly twice as high as that of individuals without ulceration. In addition to morbidity and mortality, persons with DFU also bear a heavy economic burden in terms of direct and indirect expenditures [9]. Particularly for those from lower socioeconomic strata and those residing in rural areas, there is a danger of acquiring gangrene and experiencing a subsequent foot amputation [10]. Peripheral vascular diseases and neuropathy are the precursors to diabetic foot ulcers. Patients' feet are more prone to injuries and infections than non-diabetics' feet due to neuropathy and vascular abnormalities [11]. The main risk factors for DFU include trauma, PAD, and a lack of protective feeling brought on by diabetic peripheral neuropathy (DPN). Male gender, prior foot ulceration or amputation, foot deformities, calluses, Charcot arthropathy, and high plantar pressures are some other risk factors that have been linked to an elevated risk for foot ulceration [9].

A multimodal etiology for diabetic foot ulceration is aided by information that certain foot deformities, decreased skin oxygenation and foot perfusion, poor vision, increased body mass, and both sensory and autonomic neuropathy independently influence foot ulcer risk [12].

Independent Risk Factors for Ulceration

Three major independent risk factors for ulceration are

- Historical data
- Diabetes co morbidities and
- Physical examination.

Historical data

Male sex, duration of diabetes, previous amputation, alcohol abuse, lower extremity bypass, current or past tobacco use, etc are the main historical risk factors for diabetic foot ulcer.

Diabetes co morbidities

Nephropathy, Microalbuminuria, Macroalbuminuria, End-stage renal disease, Retinopathy, etc are the main diabetic co morbidities may cause diabetic foot ulcer.

Physical examination

Loss of protective sensation, plantar pressure, ankle equines, transcutaneous oxygen pressure, etc is the major physical examination may cause diabetic foot ulcer [13].

The most accurate way to determine a patient at risk for foot ulceration is to combine a clinical assessment with SWF testing. As an alternative, VPT measures can be employed and are similarly beneficial. In addition to providing suitable footwear, foot pressure measurements can be utilized as a post screening test because they have a much greater specificity [14].

One of the studies demonstrates that the risk of diabetic foot ulcers increases with age, the length of diabetes, HbA1c, lack of prior education, and retinopathy. Other characteristics such as gender, smoking, BMI, or nephritis were linked to an increased incidence of foot ulcers [15].

Diabetic Foot Ulcer- Classification

The given table is the classification based on "WAGNER-MEGGITT SYSTEM" [16].

Grade	Lesion of foot
0	No ulceration/ lesion
1	Ulceration will be present but not deeper (Superficial)
2	The ulcer present will be deeper which may extend to tissues of joint and tendons
3	The ulcer will be deep with sepsis of joint, inflammation of bone (osteomyelitis), abscess
4	Forefoot or heel found with gangrene
5	The gangrene spreads to entire foot

The following table is based on "KING'S CLASSIFICATION SYSTEM" [16].

Stage	Lesion
1	Foot that doesn't have lesion (normal)
2	Have higher risk
3	Foot that contains ulcer
4	Foot that contains infection
5	Foot that has undergone necrosis

Foot Care Education

In order to prevent DFA, patients should receive regular foot washing and instruction on how to preserve blood flow in their lower limbs [17].

DM foot requires long-term monitoring and care. A higher frequency of smoking and drinking alcohol, along with poor DM medication compliance, increases the risk of developing diabetic foot. The physiological factors, such as an abnormal body mass index (BMI) and an inconsistent glucose level, could exacerbate the condition of diabetic foot [17].

The incidence of diabetic foot problems and eventually amputation is lower with good knowledge and practice of DFU. Knowledge and practice had a clear and significant association with one another in DFU. Patients who receive foot care advice and whose feet are routinely examined by doctors adopt better foot care habits [18].

CONCLUSION

One of the most common and serious complication of diabetes mellitus is the foot ulcer. Evidences show that it cures at a much faster rate. Most of them were found to recover within 2 months. For the patients who were given with antibiotic therapy which were considered as inappropriate and those with foot ulcers of higher grade was found to have rapid rate of amputation. The occurrence of gangrene promotes the risk of diabetic foot associated amputation. It was found that factors like hypertension, level of HbA1C, diabetes type and age does not promote the amputation. The understanding of

risk factors that cannot be altered is considered important for developing protocol and management for the diabetic foot ulcer patients. There is a need of strict observation of the patients who have diabetic foot ulcer of higher grade. The patients who followed strict hygienic self- management were found to improve faster.

Reference

1. Kharroubi AT, Darwish HM. Diabetes mellitus: The epidemic of the century. World journal of diabetes. 2015 Jun 6; 6(6):850.
2. Rossboth S, Rossboth B, Schoenherr H, Ciardi C, Lechleitner M, Oberaigner W. Diabetic foot complications—lessons learned from real-world data derived from a specialized Austrian hospital. Wiener klinische Wochenschrift. 2022 Jan; 134(1-2):7-17.
3. Mariam TG, Alemayehu A, Tesfaye E, Mequannt W, Temesgen K, Yetwale F, Limenih MA. Prevalence of diabetic foot ulcer and associated factors among adult diabetic patients who attend the diabetic follow-up clinic at the University of Gondar Referral Hospital, North West Ethiopia, 2016: institutional-based cross-sectional study. Journal of diabetes research. 2017 Jul 16; 2017.
4. Jeffcoate WJ, Harding KG. Diabetic foot ulcers. The lancet. 2003 May 3; 361(9368):1545-51.
5. van Netten JJ, Bus SA, Apelqvist J, Lipsky BA, Hinchliffe RJ, Game F, Rayman G, Lazzarini PA, Forsythe RO, Peters EJ, Senneville E. Definitions and criteria for diabetic foot disease. Diabetes/metabolism research and reviews. 2020 Mar; 36:e3268.
6. Viswanathan V, Kumpatla S. Pattern and causes of amputation in diabetic patients—a multicentric study from India. J Assoc Physicians India. 2011 Mar 1; 59(3):148-51.
7. VerroneQuilici MT, Del Fiol FD, Franzin Vieira AE, Toledo MI. Risk factors for foot amputation in patients hospitalized for diabetic foot infection. Journal of diabetes research. 2016 Feb 22; 2016.
8. Jain AK, Tejasvitaa RS. To determine the pattern and type of amputation done in diabetic foot patients in a teaching hospital. EAS J Med Sci. 2019;1(3):94-9.
9. Banik PC, Barua L, Moniruzzaman M, Mondal R, Zaman F, Ali L. Risk of diabetic foot ulcer and its associated factors among Bangladeshi subjects: a multicentric cross-sectional study. BMJ open. 2020 Feb 1;10(2):e034058.
10. Alex R, Ratnaraj B, Winston B, Devakiruba DN, Samuel C, John J, Mohan VR, Prasad JH, Jacob KS. Risk factors for foot ulcers in patients with diabetes mellitus-a short report from vellore, South India. Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine. 2010 Jan;35(1):183.
11. Syauta D, Hendarto J, Mariana N, Kusumanegara J, Faruk M. Risk factors affecting the degree of diabetic foot ulcers according to Wagner classification in diabetic foot patients. Medicina Clínica Práctica. 2021 Apr 1; 4:100231.
12. Boyko EJ, Ahroni JH, Stensel VI, Forsberg RC, Davignon DR, Smith DG. A prospective study of risk factors for diabetic foot ulcer. The Seattle Diabetic Foot Study. Diabetes care. 1999 Jul 1; 22(7):1036-42.
13. Lavery LA, Armstrong DG, Vela SA, Quebedeaux TL, Fleischli JG. Practical criteria for screening patients at high risk for diabetic foot ulceration. Archives of internal medicine. 1998 Jan 26; 158(2):157-62.
14. Pham H, Armstrong DG, Harvey C, Harkless LB, Giurini JM, Veves A. Screening techniques to identify people at high risk for diabetic foot ulceration: a prospective multicenter trial. Diabetes care. 2000 May 1; 23(5):606-11.
15. Shahbazian H, Yazdanpanah L, Latifi SM. Risk assessment of patients with diabetes for foot ulcers according to risk classification consensus of International Working Group on Diabetic Foot (IWGDF). Pakistan journal of medical sciences. 2013 May; 29(3):730.
16. Ghotaslou R, Memar MY, Alizadeh N. Classification, microbiology and treatment of diabetic foot infections. Journal of wound care. 2018 Jul 2;27(7):434-41.
17. Hanley G, Chiou PY, Liu CY, Chen HM, Pfeiffer S. Foot care knowledge, attitudes and practices among patients with diabetic foot and amputation in St. Kitts and Nevis. International Wound Journal. 2020 Oct;17(5):1142-52.
18. Pourkazemi A, Ghanbari A, Khojamli M, Balo H, Hemmati H, Jafaryparvar Z, Motamed B. Diabetic foot care: knowledge and practice. BMC endocrine disorders. 2020 Dec; 20:1-8.

How to cite this article:

Nithyakala P *et al* (2023) 'Review on Foot Ulcer- A Diabetic Complication And It's Surgical Treatment', *International Journal of Current Advanced Research,* 12(06), pp. 2127-2129. DOI: http://dx.doi.org/10.24327/ijcar.2023. 2129.1466

****