



ISSN: 2395-1958
IJOS 2018; 4(1): 933-935
© 2018 IJOS
www.orthopaper.com
Received: 06-11-2017
Accepted: 08-12-2017

Dr. Misbah Mehraj
Shri Guru Ram Rai Institute of
Medical & Health Sciences,
Uttarakhand, India

Dr. Iqra Shah
Shri Guru Ram Rai Institute of
Medical & Health Sciences,
Uttarakhand, India

A review of Wagner classification and current concepts in management of diabetic foot

Dr. Misbah Mehraj

DOI: <https://doi.org/10.22271/ortho.2018.v4.i1n.133>

Abstract

Diabetic foot is a common complication of diabetes mellitus which affects 15% of diabetic patients in their lifetime. Effective management of diabetic foot can reduce severity of complications such as preventable amputations and possible mortality, and can also improve overall quality of life. The Wagner classification is most commonly used for grading diabetic foot ulcers. Wagner developed a classification system and a treatment algorithm for each grade of ulcer. He asserted that ischemic index derived from Doppler flow pressures is an essential baseline test to predict ulcer healing.

The aim of this study was to evaluate and manage different lesions of diabetic foot according to Wagner classification. We propose a treatment-oriented assessment of diabetic foot ulcers based on a cross-examination of the medical, foot, and wound history; a systemized and detailed physical examination; and the results of complementary diagnostic procedures. The pathophysiology and treatment of diabetic foot ulcers are reviewed. While these guidelines cannot dictate the care of all affected patients, they provide evidence based guidance for general patterns of practice.

Keywords: Wagner's classification, diabetic foot, surgical management

Introduction

Diabetic foot ulcers are main cause of hospitalization in diabetic patients. Patients with diabetes mellitus are at higher risk of lower extremity complications than their non diabetic counterparts. Every year approximately 5% of diabetic patients develop a foot ulcer. Approximately 15% of all diabetics develop foot problems during course of their illness. Diabetic foot ulcers carry a significant risk of amputation. Therefore diabetic foot disease has major medical, economic and social consequences. It is very difficult to treat if proper protocol is not followed, resulting in longer hospital stay.

Patients with diabetes have increased risk of lower extremity amputations and main cause is diabetic peripheral arterial disease accelerated by direct damage to nerves and blood vessels by high blood glucose levels. Wound healing is also impaired from affected collagen synthesis. Diabetic vascular disease has three main components: arteritis, neuropathy and large vessel atherosclerosis the diabetic foot ulcers are often deeper and more frequently infected than other leg ulcers reflecting severe end vessel ischemia and opportunistic infection which is common affliction of diabetes. Factors such as age and duration of the disease will increase its incidence. Once tissue damage has occurred in form of ulceration or gangrene, aim is preservation of viable tissue.

Diabetic foot ulcers are commonly classified according to Wagner classification. Wagner classification assesses ulcer depth and presence of osteomyelitis or gangrene.

Correspondence
Dr. Misbah Mehraj
Shri Guru Ram Rai Institute of
Medical & Health Sciences,
Uttarakhand, India

Standard treatment of diabetic foot according to Wagner classification

Grade - 0	Foot at Risk	Prevention
Grade-I	Localized, superficial ulcer	Antibiotics & glycemic control
Grade-II	Deep Ulcer to bone, ligament, or joint	Debridement, Antibiotics and glycemic control
Grade-III	Deep abscess, osteomyelitis	Debridement, some form of amputation
Grade-IV	Gangrene of toes, forefoot	Wide debridement and amputation
Grade-V	Gangrene of entire foot	Below knee amputation

Materials and Methods

This was a prospective study conducted at Shri guru ram rai institute of medical sciences and hospital and included 100 patients with diabetic foot ulcer presenting from January 2017 to December 2017. The patients were enrolled from surgical and medical outdoor clinics, emergency units, and from other wards of the hospital. A detailed history was obtained regarding the duration of the diabetes and its type whether insulin dependent (type I) or on oral hypoglycemic agents (type II). They were asked about compliance and control of diabetes. A detailed history was obtained about the foot ulcers, its onset duration and progression. A detailed foot examination was performed and ulcers were classified according to Wagner's classification. Vascular evaluation was performed checking capillary refill and distal pulses of the foot which included dorsalis pedis, posterior tibial, popliteal and femoral arteries. Neurological examination included light touch, pinprick, position sense and vibration sense on every patient, and data was recorded on the specified proforma. The patients were evaluated and managed by classifying their disease according to Wagner's classification for diabetic foot.

Statistical Analysis

Data was compiled and analyzed using SPSS version 16.0, and frequencies were calculated.

Results

The data revealed that diabetic foot diseases affected males somewhat more frequently (66%) as compared to females (34%); the male to female ratio was 1.94:1. The most common age groups of diabetic patients with foot involvement were the 4th and 5th decades. 38 patients (38%) had insulin dependent diabetics; and 87 (87%) of them were on irregular treatment. Other 58 patients (58%) had non-insulin dependent diabetes; out of which 19 (70.0%) were on irregular treatment. Remaining 4 patients (4%) were not getting any treatment for their disease.

The grade frequency of diabetic foot according to Meggitt and Wagner classification is shown in above table. The commonest disease was Grade 4 that comprised of 34 patients, followed by Grade 2 in 22 patients, followed by Grade 3 in 16 patients.

These patients were managed according to Wagner classification as shown above. Conservative management with good diabetic control, antibiotic cover and foot care was carried out in 25 patients. Surgical intervention was carried out in rest of 75 patients. The commonest procedure was incision & drainage of foot abscess and debridement, that was performed in 41(41 %) of patients; while 35 (35.0%) patients needed some form of amputation. Multiple amputations were performed in 5 (5%) patients.

Table 1: Classification of diabetic foot study population

Wagner Classification	N (%)
Grade – I	18
Grade – II	22
Grade – III	16
Grade – IV	34
Grade - V	10

Table 2: Epidemiological profile of study population

Parameters	Variables
Male to female ratio	1.94 : 1
Urban Vs Rural	65(65%) Vs 35(35%)
Common age groups	4th & 5th decades
Smoking Vs Non smoking	29(29%) Vs 71(71%)
Alcohol Vs Non alcoholics	12(12%) Vs 88(88%)
PVD Vs No PVD	8(8%) Vs 92(92%)
Glycemic control: poor Vs fair Vs good	79(79%) Vs 15(15%) Vs 6(6%)
Not getting any treatment Vs on OHA Vs on insulin	4(4%) Vs 58(58%) Vs 38(38%)
Normal weight Vs Overweight Vs underweight	59(59%) Vs 39(39%) Vs 2(2%)
Duration of diabetes in years: >5 Vs <5	67(67%) Vs 33(33%)
Co morbid conditions: present Vs absent	37(37%) Vs 63(63%)

Table 3: Management of diabetic foot study population

Treatment	No. of patients (%)
Conservative	25
Surgical	
Incision and drainage	4
Debridement	36
Amputations	35
rye's	4
trans metatarsal	7
below knee	12
above knee	10
multiple	2



Fig 1 & 2: Showing Diabetic Foot Pre & Post Debridement



Fig 3-6: Phased debridement and amputation of digits followed by flap closure

Discussion

In the study of Viswanathan *et al.* [5] while evaluating post amputation outcome and associated complications in type 2 diabetic patients who had undergone major amputations in developing countries. The prevalence of minor amputation and foot deformity was high among Bangladesh population. Recurrence of foot ulceration was more in Tanzania (30%) than in India (9%) and Bangladesh (11%). Re-amputation rate was similar in all groups (3%). The use of artificial limb was most in Bangladesh (97%). The causes of death were infection due to septicemia and cardiovascular events which finally led to multisystem organ failure. The results of the current study are in accordance with the study of Ali SM *et al.* [6] as there were 65% males and 35% females. Ninety nine patients were type II diabetics, 38% were either smokers or had other addictions (or were addicted to tobacco). Awareness about risk factors causing foot problems was lacking among all patients. Fifty percent patients were on oral hypoglycemic agents, 48% were insulin treated, while 2% were on diet and exercise alone. Glycemic control was poor in 70%, fair in 16% and was good in 14%, 31% were overweight and 5% patients were underweight. Duration of diabetes was greater than ten years in 58%, toes were affected in 44%, sole/metatarsal in 18%; rest included malleoli, heel etc. Eleven patients had ulcers on both feet. Neuropathic ulcer were 42%, neuro ischemic 58%, Sixty nine percent patients were in the age group between 40-60 years. Cause unknown 29% blisters and boil 14%, trauma/cutting 17%, burns 8%, dry skin/callus 10%. Fundal changes were present in 37%; proteinuria in 37%, ischemic heart disease in 20%, hypertension 18%, In 60% more than one antibiotic was used. Foot ulcers of fifty nine patients healed on conservative management, six patients had below knee amputation, fifteen had toe amputation; nine were still on treatment, eleven lost contact. In the study of Viswanathan *et al.* [7] while determining the prevalence of foot complications such as neuropathy, peripheral vascular disease (PVD), amputations and infections and the associated diabetic complications and practice of foot care among these subjects reported that the

prevalence of infection was 6-11% and prevalence of amputation was 3% in type 2 diabetic patients. Neuropathy (15%) was found to be an important risk factor for diabetic foot infections. Further study suggested that effective foot care advice should be propagated to reduce the burden imposed by diabetic foot complication particularly in developing countries like India. In the study of Ahmad W *et al.* [3] male dominated the study population with majority in the age range of 40-70 years. Right foot was more commonly involved (65.3%).

91.3% patients had diabetes of more than 5 years duration. No treatment had been received by 47.4% patients while 41.3% were on oral anti-diabetics; 11.2% patients were on insulin. All patients had type 2 diabetes mellitus. Neuropathy was present in 51% patients, 62.8% had absent or diminished peripheral pulses, 43.4% had poorly controlled diabetes. According to the Wagner classification 30.6% patients had grade 1, 26.5% had grade 2, and 42.9% had grade 3 diabetic foot. Evidence of infection was seen in 85.7% patients: staphylococcus aureus was isolated in 43.4% patients. Osteomyelitis was present in 42.9% patients. Surgical intervention was performed in 85.7% patients. Direct relation was found between the duration of diabetes, sugar control, peripheral neuropathy, peripheral arterial disease, grade of diabetic foot, evidence of osteomyelitis, intervention and the outcome of the disease.

Conclusion

Diabetic foot disease usually presents in older age group and is source of great morbidity. We stress the need for a clinical diagnosis of diabetic foot ulcers. Regarding treatment, we propose a multidisciplinary approach prioritizing invasive infection drainage, necrosis debridement, and the prompt start of empirical antibiotic therapy, followed by complete and appropriate vascular reconstruction. For severe Diabetic foot ulcers, we suggest that negative pressure wound therapy (NPWT) be included in the treatment pathway. We also provide rules for managing particular situations, such as osteomyelitis.

References

1. Boulton AJ, Vileikyte L, Ragnarson-Tennvall G, Apelqvist J. The Global Burden of Diabetic foot disease, *Lancet*. 2005; 366:1719-21.
2. Shearman CP, Widhaber R. Foot Complications in patients with Diabetes, *Surgery*. 2010; 28:288-92.
3. Ahmad W, Khan IA, Ghaffar S, Al-Swailmi FK, Khan I. Risk factors for diabetic foot ulcer. *J Ayub Med Coll Abbottabad*. 2013; 25(1-2):16-8.
4. Mugambi-Nturibi E, Otieno CF, Kwasa TO, Oyoo GO, Acharya K. Stratification of persons with diabetes into risk categories for foot ulceration. *East Afr Med J*. 2009; 86:233-9.
5. Viswanathan V1, Wadud JR, Madhavan S. Comparison of post amputation outcome in patients with type 2 diabetes from specialized foot care centres in three developing countries. *Diabetes Res Clin Pract*. 2010; 88(2):146-50.
6. Ali SM1, Basit A, Sheikh T, Mumtaz S, Hydrie MZ. Diabetic foot ulcer-a prospective study. *J Pak Med Assoc*. 2001; 51(2):78-81.
7. Viswanathan V1, Thomas N, Tandon N, *et al.* Profile of diabetic foot complications and its associated complications-a multicentric study from India. *J Assoc Physicians India*. 2005; 53:933-6.