



Diabetic Foot Classifications: Review of Literature

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Abstract

Diabetic foot is one of the most serious complications of diabetes. As the global burden of diabetes is increasing, the incidence of diabetic foot is equally on a rise. However, diabetic foot has been often ignored by people and also the treating physicians leading to a rise in major amputations. Various classifications have been proposed over decades describing the diabetic foot and the clinicians are hardly aware of them especially in developing and underdeveloped countries where this disease is rampantly increasing. One of the main reason for this unawareness is the fact that this disease is often less discussed in the standard teaching curriculum. The other probable reason is that physicians show more interest in learning other classification like that in oncology compared to disease like diabetic foot which actually deserves more importance. Further, even the trainee doctors and nurses show less inclination to know about diabetic foot classification as their teachers don't teach much about them. This unique review article serves to survey for the first time the various classifications proposed for the diabetic foot thereby helping the various treating physicians to update themselves in the diabetic foot.

Key Words: Diabetic foot, complication, classification

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Introduction

The Centre for Disease Control and Prevention estimate that there are 20.8 million people in the United States with Diabetes Mellitus [1]. Among Patients with diabetes approximately 15% will develop a foot ulcer at some time in their life time and of these, 14% to 24% will subsequently require a lower limb amputation [1]. Diabetic foot complications are the most common cause of non-traumatic lower extremity amputations in the industrialized world. Hence, diabetic foot classification becomes very important. In the literature, several classification systems for diabetic foot ulcers have been proposed. To make a foot classification system clinically relevant, it must be easy to use, reproducible and effective to accurately communicate the extent of foot pathology in patients with diabetes mellitus [2].

Diabetic foot classification should also be applicable for education and communication between all care providers including nurses, general practitioners and specialist, an important factor which was often neglected by majority of the classification system. Some of the widely available old classification are Wagner–Meggits, Gibbons, Forrest, Frykberg’s and Coleman’s, Knighton, University of Texas, VAN Acker/Peter classification, etc [3].

The aim of this article is to review various commonly used classification in different countries, their advantages and disadvantages. The article also highlights on some of the recent new classifications on diabetic foot.

1. Wagner Meggitt Classification

One of the oldest and probably the most well-known classification which was proposed by Wagner and Meggitt in the 1970s. This classification is most commonly known as the “Wagner Classification” in the United States [4] and its uses six grades in classifying diabetic foot lesions (Table 1).

Table 1. Wagner-Meggitt Classification of Diabetic Foot.

Grades	Lesions
Grade0	Foot symptoms like pain,only
Grade1	Superficial ulcers
Grade2	Deep ulcers
Grade3	Ulcer with bone involvement
Grade4	Forefoot gangrene
Grade5	Whole foot gangrene

Though, Wagners classification has been the most widely quoted and utilized system of classification in the West, it has several drawbacks. First of all it does not adequately address all the diabetic foot ulceration and infection [5,6]. Only one of the 6 grades includes infection. Secondly, this system is limited in its ability to identify and describe vascular disease as an independent risk factor. In addition, superficial wounds that are infected or dysvascular are not able to be classified by this system.

2. Texas Classification

The shortcomings of this system lead to the development of the University of Texas classification [4] in the mid-1990s. The Universities of Texas system uses 16 cells made of a grid (4x4 table) consisting of 4 grades and 4 stages (Table 2).

Table 2. University of Texas Classification

	Grade 0	Grade 1	Grade2	Grade 3
Stage 1	Preulcerative or postulcerative lesions completely epithelialized	Superficial wound not involving tendon, capsule or bone	Wound penetrating tendon or capsule	Wound penetrating to bone or joint
Stage 2	Infection	Infection	Infection	Infection
Stage 3	Ischaemia	Ischaemia	Ischaemia	Ischaemia
Stage 4	Infection and Ischaemia	Infection and Ischaemia	Infection and Ischaemia	Infection and Ischaemia

This system has been validated and is generally predictive of outcome. Since increasing grade and stage of wounds are less likely to heal without revascularization or amputation. However, this is the most complicated classification and is very difficult to remember and is difficult to apply in day to day practice

3. Pedis Classification

This classification was developed in last decade to be more specific scheme to assist in the classification of DFUs for research purposes. Perfusion, extent, depth, infection and sensation are the components of interest in the Pedis system [7]. Again, the number of cells and complexity to the latter system makes it difficult to use in clinical practice.

4. King's Classification

This classification [8] was developed at Kings college, united kingdom. This simple staging system consists of 5 stages (Table 3).

Table 3. King's Classification

Stages	Lesion
Stage1	Normal foot
Stage2	High risk
Stage3	Ulcerated foot
Stage4	Infected foot
Stage5	Necrotic foot

This system of classification guides in therapy and should improve outcome in the diabetic foot. This classification however, is still not widely used in other countries.

5. Kobe's classification

Developed in Japan, this classification [9] aimed at classifying foot lesion that is more appropriate for Asian people because of the differences between Asian and caucasian populations. The system classifies wounds into four types (Table 4).

Table 4. Kobe's Classification

Types	Foot Problems
Type 1	Mainly peripheral neuropathy(PN)
Type 2	Mainly peripheral arterial disease (PAD)
Type 3	Mainly infection
Type 4	All there combined ie PN+PAD+infection

6. Amit Jain's Classification

This latest classification was proposed mainly to disseminate the knowledge of diabetic foot complications especially in developing Asian countries like India which was once known as a 'Diabetic capital of the World'. According to this classification, diabetic foot complications are classified into 3 types.

Type 1- Diabetic foot complications that are infective. It includes cellulitis, abscess, necrotizing fasciitis, wet gangrene, etc.

Type 2- Diabetic foot complications that are non-infective. It includes diabetic charcot foot, peripheral arterial disease, neuropathy, etc. belong to this group.

Type 3- Diabetic foot complications that are mixed, where both type 1 and type 2 complications can occur in combination. A common example might be a callus ulcer with underlying osteomyelitis

This latest new classification [10] is the simplest of all the existing classifications. It is not only easy to remember, but also practical.

It is a very useful tool in disseminating the knowledge of diabetic foot problems in developing and underdeveloped countries where even the regular curriculum does not discuss much on diabetic foot. Apart from being an effective teaching tool, this classification describes all the common complications affecting diabetic foot. Since it provides enough details, it can be applicable in day to day practice.

Though this classification does not predict the outcome and it dose not guide specific therapy. It definitely helps in decision making in clinical practice [10]. For example, Type 1 complications require immediate care and treatment whereas Type 2 and 3 lesions can wait for detailed investigation and treatment.

7. Van Acker/Peter Classification (VA/P)

This classification [3] is based upon the Texas classification and takes into account clinical features [horizontal axis] and physiopathological features [vertical axis]. This classification is again complex.

8. SAD classification

This classification differs from the earlier ones by including references to both ulcer area and neuropathy and has been validated by demonstrating differences between baselines variable and clinical outcome.

SAD stands for Sepsis, Arteriopathy and Denervation system. The major drawback of this classification is that it is potentially complex and is primarily intended for selecting population for prospective research [7].

Conclusion

Diabetic foot complication is the most devastating complication of diabetes. There is an urgent need for use of diabetic foot classifications to help the treating physicians and nurses to accurately describe the nature of the disease to other health care workers and patients.

Though Wagners classification is widely used, the newer classification like the Kobe's and Amit Jains classification would soon find their way in day to day practice owing to their simplicity, practicality and their ease to remember.

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