A new classification of diabetic foot osteomyelitis

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Abstract

Introduction

Diabetic foot osteomyelitis is one of the most common entities of diabetic foot complications. Involvement of bone increases the risk of amputation in diabetes based upon the site of bone involvement. It is of surprise for one to know that in spite of it being a common condition, there is no specific known classification for diabetic foot osteomyelitis till date. The author, being one of the few handfuls of specialist podiatric surgeons in India, proposes a new classification exclusively for diabetic foot osteomyelitis, which would help in improvising and standardising the practice of diabetic foot. This is the first classification exclusively on diabetic foot osteomyelitis.

Conclusion

This new classification for diabetic foot osteomyelitis will allow a common language to be communicated among the specialist treating a diabetic foot.

Introduction

Diabetic foot is one of the most common and serious complications of diabetes. It is estimated that around 15% of all the diabetic patients will develop a foot ulcer during their lifetime¹ and more than 80% of all the non traumatic amputations are preceded by foot ulcer.² It is stated that about one third of diabetic patients who present with foot infections are found to have evidence of osteomyelitis³.

It is believed that Nelaton was the first person who coined the term osteomyelitis in 1844⁴. Since then various classifications have been proposed for osteomyelitis that includes Cierny-Mader, Waldvogel, Ger, Kelly, Solagberu, etc.⁵,⁶

The two most commonly used classifications for osteomyelitis are Waldvogel classification and Cierny-mader Staging (Table 1). Although these two classifications describe the infection and need for surgery, they do not apply for special situations⁷ (vertebral osteomyelitis, smaller bones osteomyelitis, etc).

All these classifications are basically general, and are not specific to a diabetic foot. The aim of this review is to discuss a new classification of diabetic foot osteomyelitis.

Peculiarities of diabetic foot osteomyelitis

Diabetic foot osteomyelitis is believed to be a difficult and challenging entity to diagnose and manage accurately⁸. In a diabetic foot, the osteomyelitis occurs via contiguous spread from an adjacent wound in 94% of the cases⁹. The problem is likely to get worse in a diabetic foot patient during the presence of underlying peripheral arterial disease or foot deformity⁹.

Also, bilateral foot involvement, rapidity of spread of infection, absence of systemic manifestation of disease, presence of multiple comorbidities makes the management difficult. Differentiating osteomyelitis and Charcot foot is a diagnostic dilemma even today for the surgeons and it requires expertise.

Osteomyelitis of the forefoot is the most common anatomical region involved followed by mid foot and hind foot. In one study¹⁰ from the best of the diabetic limb salvage institute of India, it was shown that osteomyelitis accounted for around 16.67% of all the digital amputations occurring in a diabetic foot.

The new classification

Owing to the fact that diabetic foot osteomyelitis is common and peculiar; it becomes quite essential to have an independent classification for diabetic foot osteomyelitis. Classification allows researchers to speak a uniform language globally with respect to a particular disease⁴. It is currently the need for an hour when it comes to the diabetic foot specificity which is neglected in developing and underdeveloped countries. In fact, one of the main aims of the author is to standardise the practice of a diabetic foot. Just as the TNM (Tumour, Node, and Metastasis) staging forms a common language in oncology, the author’s new classification of diabetic foot osteomyelitis¹¹, grading of debridement¹² and scoring¹³ and this new classification would definitely equate the diabetic foot specificity to that of the oncology speciality.

According to this simple new classification (Table 2), diabetic foot osteomyelitis is classified into three main types based on the region of foot involved. Type 1 diabetic foot osteomyelitis involves the forefoot, type 2 involves the mid foot and type 3 involves the hind foot. They are further sub grouped into A, B, C, D.

Subgroup A is a stage when there is no radiological evidence of osteomyelitis but clinically there is a positive probe to bone test. This subgroup of patients may require bone scan or MRI to confirm the diagnosis. This subgroup of patients may benefit from prolonged antibiotic treatment.
and no amputation is required in these cases. Figures 1 and 2 are examples of Type 1A osteomyelitis.

In subgroup B, there is an involvement of the cortex/medulla, as there is erosion through the cortex. These cases are detected by x-rays. Even in these subgroups, a good debridement and removal of foci along with prolonged antibiotic treatment may suffice. Figure 3 is an example of type 1B diabetic foot osteomyelitis.

The problem comes with C and D subgroups where amputation of the affected region may be needed. In subgroup C there is destruction of the bone (Figures 4 and 5). This patient requires amputation of the bone. Type 1D may end up in panmetatarsal/pantransmetatarsal amputation whereas type 2D may end up in lisfrancs/choparts amputation. Type 2D is also at high risk for major amputation based upon the extent of infection, peripheral vascular disease and other factors. In type 3 diabetic foot osteomyelitis, in which there is an involvement of hind foot, the C (Figure 6) and D subgroups are at the highest risk of major amputation.

Advantages of this new classification
It is very simple.
- Easy to understand and remember.
- It is practical in clinical practice.
- Very useful as a teaching tool.
- It can be used for research purpose.
- This classification can also be used in non diabetics.

Discussion
The author has referenced some of its own studies in this review. These referenced studies have been conducted in accordance with the Declaration of Helsinki (1964) and the protocols of these studies have been approved by the relevant ethics committees related to the institution in which they were performed.
Bone scan [Tc 99m phosphate or an osteomyelitis and in such cases, an early stages, x-rays may not reveal often needed for the diagnosis. In the specificity of 85% value of 89%, sensitivity of 66% and osteomyelitis helpful clinically in diagnosing probe to bone test has been quite the foot to a specialist centre patients presenting with an ulcer in complicating between 20–60% of treating surgeon. Osteomyelitis may be a challenge to the studies, gave informed consent to human subjects, in these referenced studies. For citation purposes: Jain AKC. A new classification of diabetic foot osteomyelitis. OA Case Reports 2013 Oct 21;2(13):121.


Figure 6: Showing the destruction of the calcaneum. This is type 3C diabetic foot osteomyelitis. This patient underwent below knee amputation.

Management of osteomyelitis of the foot in diabetes varies widely from centre to centre and country to country. Many believe in surgical excision of all the infected bones while others believe that majority of patients can be managed with antibiotics alone. The choice of antibiotics is best guided by culture report. Antibiotics are initially given parentally and then changed to oral and the duration of the therapy should be a minimum of 6 weeks.

If one looks at this new classification, then the general guidelines for the treatment would be antibiotics for subgroups A and B without any amputation until and unless the bone is deformed or destroyed and treatment for subgroups C and D would be resection/amputation based on the anatomic site and the bone involved.

Conclusion
This new classification of diabetic foot osteomyelitis has been developed due to the fact that there is no specific classification for this common foot infection till now and hence it becomes necessary to have one. This classification is very simple, easy to remember and it is practical. This new classification for diabetic foot osteomyelitis will allow a common language to be communicated among the specialist treating diabetic foot.

References