



A New Classification (Grading System) of Debridement in Diabetic Lower Limbs - an Improvisation and Standardization in Practice of Diabetic Lower Limb Salvage Around the World

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Abstract

Debridement is one of the most common and also a most underestimated surgical procedure performed by surgeons. For specialist like Podiatric surgeons and qualified wound care nurses, debridement of diabetic foot wounds has been an essential day to day common surgical practice. In spite of being such a common procedure, there is no classification of debridement when it comes to diabetic limb salvage practice till date. The word debridement is used loosely and equally for all diabetic foot lesions without specification. The author, being one of the few handful specialist podiatric surgeons in India, proposes a new simple classification [grading system] for surgical debridement of diabetic lower limb wounds which could be used in day to day practice and which will help in standardizing the practice of diabetic lower limb salvage in developed, developing and underdeveloped countries and thus can form a language of medical communication in field of diabetic limb salvage. There is currently an urgent need for newer concepts, standardization and recent advances in diabetic foot practice in developing countries where this speciality is neglected. This new grading system is one such novel step by the author towards improvisation of diabetic foot practice around the world.

Key Words: Diabetic foot, debridement, Amit Jain's grading, Type 1 diabetic foot complications

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Introduction

Surgical debridement is being viewed as the ‘gold standard’ for debridement [1]. There are various methods of debridements like autolytic debridement, enzymatic debridement, chemical debridement, biological debridement, etc [1].

The word debridement comes from a french word ‘debrider’ which means to unbridle [1-3]. Debridement is defined medically as removal of foreign material and devitalized or contaminated tissue from or adjacent to a traumatic or infected lesion until surrounding healthy tissue is exposed [1,2].

Various specialist like general surgeons, podiatric surgeons, certified wound care nurses, general practitioners, etc do debridement of different types of wounds. There have been various different attempts to classify debridement of wounds as whole. In one classification debridement is classified into 3 types namely excisional, selective and non selective [4] whereas in another classification debridement is classified as marginal, incomplete, complete, undebrided, etc [5]. These are unnamed and broad classification of debridement of wounds on whole. They are also not very popular.

However when it comes to diabetic foot wounds, the above classification holds no specific meaning. With increasing incidence of diabetes around the world, the diabetic foot wounds have become a common occurrence [1]. Around 15% of all the patients with diabetes will develop foot ulcers during their lifetime and the foot ulcers precede 80% of all non traumatic amputations [6]. Around 11-24% of the patients with diabetic foot ulcers will progress to atleast partial amputations [6]. It is just not the diabetic foot but the whole lower limb that can be affected and hence the word diabetic lower limb is nowadays frequently used. Infact in countries like USA, podiatric surgeons and qualified wound care nurses are well known specialist dealing with diabetic foot whereas this is not the scenario in developing countries like India and different South East Asian countries where both these qualified specialist are very few.

It thus becomes important to have an independent classification (grading system) of debridement of diabetic lower limb wounds for an effective communications across institutes and countries.

Need for the newer classification

There is undoubtedly a need for newer classification of the debridement in diabetic lower limb wounds for the following reasons.

1] There is no classification for debridement of diabetic foot wounds. The term debridement in diabetic foot wounds is actually vague. Even today, in developing countries, the author frequently comes across various discharge summaries, notes, teachings, audits, research work, chapters in surgery textbooks [7-10], national conference proceedings and discussions, workshops, journal articles, etc where health care professional including surgeons and nurses diagnose lesions on foot as 'Diabetic foot' and surgery done is 'Debridement'. Both technically and scientifically, this has no specific meaning and this is still continuing. The authors new classification would definitely break this blind practice.

2] The existing classifications are non specific and also are difficult to remember and forms a huge table list especially when you try classifying debrided wounds as S4,C4,M2 and B1 etc [5].

3] There is no teaching tool for debridement in diabetic foot which is essential if the practice of diabetic foot care has to improve in developing and underdeveloped countries.

4] In many western countries, the qualified podiatrist/podiatric surgeons confine themselves only to foot without dealing beyond it whereas in India, the podiatric surgeons deal with entire diabetic lower limb salvage because of their broad surgical expertise. This new classification would definitely help in improvising the practice from diabetic foot to diabetic lower limb across different countries.

Advantages of the new grading

1] It is very simple

2] Easy to understand

3] Reproducible

4] Practical in clinical practice

5] Can also be applied in non diabetic lower limbs and upper extremities, though it is suggested for diabetic lower limb in particular

6] Useful as a teaching tool to disseminate the knowledge of diabetic lower limb problems among different specialist and paramedical staff.

7] It shall be easier to explain the patient and attenders also. With growing world of internet information, it can also become easier for patients to understand.

8] It can be used in for research purposes.

9] It shall standardize the practice and form a communicative tool in diabetic foot across the countries.

10] This classification also helps in defining the role of the qualified wound care nurses/podiatry assistants/general practitioners who can perform grade 1 debridement. The remaining grades of debridement should be performed by surgeons to avoid medico-legal issues.

Understanding the grading system

This grading system [Table 1] is very easy to understand and one can start describing debridement done by the treating professional.

Grade 1 debridement [Figure 1] can be done by qualified nurses, general practitioners/physicians, trained podiatric assistants, etc apart from the treating surgeons.

Grade 2 debridement and above should be done only by the trained surgeons or under their supervisions as it requires expertise and surgical qualification. Further, most of this grade and above must be done in operation theatre under anaesthesia. Grade 2 debridement [Figure 2] involves removal of unhealthy skin and subcutaneous tissues. When more than one site is involved then it should be subgrouped as A/B. For example, in figure 2, grade 2 debridement is done and it involves only leg.

Grade 3 debridement involves removal of unhealthy skin, subcutaneous tissue along with infected tendons, retinaculas or deep fascias. Figure 3 shows an example of grade 3

debridement. It has to be termed Grade 3-A as it involved foot/ankle + leg. Such debridement requires surgical expertise and operating theatre.

Table 1 showing Amit Jain’s Grading of debridement in diabetic lower limb wounds.

Grades of debridement	Description
Grade 1	Removal of sloughs from the ulcer, callus removal, deroofing the large blisters/blebs, removal of dessicated tendons,etc
Grade 2	Removal of necrotic/unhealthy skin and subcutaneous tissue
Grade 3	Removal of infected/necrotic skin, subcutaneous tissue along with either tendons/retinaculum/deep fascia
Grade 4	Removal of infected/necrotic skin,subcutaneous tissue , tendon/retinaculum/deep fascia along with necrotic/ infected muscle
Subgrouping	A – when 2 sites are involved. Ex – foot+leg or leg+thigh. B – when 3 sites are involved. Ex – foot+leg+thigh. R – repetative debridements – r1- repeated once, r2 – repeated twice, and so on.



Figure 1 showing deroofing of a large blister/bleb in a cellulitis. It is Grade 1 debridement.

Original Investigation



Figure 2 showing a patient with Grade 2 debridement who had a necrotic patch and cellulitis in a diabetic lower limb. Very simple and easy to grade when the surgeon perform the surgery primarily.



Figure 3 showing status post Grade 2A debridement [involving the foot and leg]. Note the dessication of tendons and retinaculum. Patient needs debridement again and he has to be upgraded to Grade 3A debridement if the treating surgeon does the surgery. If There was only slough and no removal of tendon or retinaculum, then it would be termed as Grade 1A-R1[debridement repeated once again, only slough removed that's why Grade 1a].



Figure 4 showing grade 4 debridement as lot of infected foot muscles has also been removed. Note that the patient still requires another debridement [mostly Grade 4-R]. Such cases are prone for major amputations.

Grade 4 debridement [Figure 4] involves removal of unhealthy skin, subcutaneous tissue along with tendons, fascia and infected/unhealthy muscles. Patients who undergo Grade 4 debridement have high propensity of partial foot/major amputations.

Original Investigation

According to author, grade 3-A and above can be considered as radical debridements. Grade 3 and 4 patients are prone for partial foot/ major amputations.

When patients undergo debridement along with amputations, they should be categorized along with type of amputation. For example figure 5 shows a diabetic foot patient with necrotizing infection. Patient underwent 1st, 2nd toe amputation along with grade 3 debridement [Figure 6].

Any procedure done along with debridement should be mentioned accordingly.



Figure 5 showing necrotizing infection in the left diabetic foot.



Figure 6 showing the above patient [figure 5] after 1st and 2nd toe amputation and grade 3 debridement. [Patient was not willing for transmetatarsal amputation]. Wound granulating well.

Peculiarities

The grading of debridement would be easy when the patient is operated primarily. Grading difficulties can arise when the treating surgeon encounters incompletely debrided diabetic wounds or when the patient already has undergone multiple debridement. In such cases the treating surgeon should decide how to grade it based on extent of debridement. For example, if he gets an non healing ulcer with infected tendons and he debrides them all along with unhealthy tissues then the dilemma is whether to place the patient as grade 1 –R or Grade 3-R. Its better to grade on the higher side based on the extent of debridement. Many a times, a surgeon may encounter peculiars wounds or incompletely debrided diabetic limb wounds for which he might have to redebride to ensure good healing. In such cases, it is upto the treating diabetic foot surgeon or expert general surgeon/surgical specialist to decide the grading [upgrading or grading as repetitive debridements like R1, R2, etc].

Discussion

Debridement is the most important step for successful wound healing [11]. Debriding wounds like diabetic foot wounds will help in removing infected tissues, reduce bioburden, transforms chronic wound into acute wound, etc [11]. According to Madan et al [12], debridement is the most common surgical procedure performed in around 54% of patients with diabetic foot problems, whereas in Solanki et al series it is as high as 64% [13].

Being an important procedure that requires strong skills, yet it is frequently underestimated and many a times the debridement of diabetic foot wounds is left on the junior most staff as it is considered to be unimportant by most senior faculties in many institutions. In the west, even for the wound care nurse to perform basic debridement, one has to show specialized education and skill training for competency in it [2].

When one looks at speciality books on diabetic foot [6,14,15] articles [16] or journals on diabetic foot, the term debridement is frequently used for diabetic foot wounds, yet without any classification on debridement, which is one of the common surgical procedure done in diabetic foot.

This new simple grading for debridement of diabetic lower limb wounds would definitely standardize the practice of diabetic lower limb salvage around the developing and underdeveloped countries where the diabetic foot is neglected even today by physicians and patients [17]. Most of the patients with type 1 diabetic foot complications [17] especially cellulitis with large necrotic patch, abscesses and necrotizing fasciitis will require major debridements and amputations.

One should not get confused this new grading system with the grading (1-mild, 2- moderate , 3- extensive debridement) or coding system used in hospital for billing [18].

Conclusion

Diabetic foot wounds are the most complex and one of the devastating complications of the diabetes. Unfortunately, debridement which is the most important skilled procedure does not have any specific classification even today. This new grading system for debridement is undoubtedly going to help in standardization of practice of diabetic lower limb complications around the world.

Conflict of interest – None Declared

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