

A new classification for diabetic foot surgery

Amit Kumar C Jain

Consultant and Head, Amit Jain’s Institute of Diabetic foot & Wound Care, Brindhavvan Areion Hospital, Bengaluru, India

Abstract

Diabetic foot problems are common in clinical practice. Once a complication sets in, they many require surgeries to be done based on the type of complication. Numerous procedures are available for diabetic foot and many are frequently performed and some require expertise and training. The author extended his ‘SCC’ classification for diabetic foot surgery wherein one can categorize them into 3 type’s namely simple, complex and complicated procedures. The article aims to discuss this new classification for diabetic foot surgery.

Keywords: diabetic foot, surgery, Amit Jain, classification

Introduction

Diabetes mellitus is a public health problem that is known to affect around 20% of population in different regions of the world [1, 2]. More than 360 million people will be diabetic worldwide by 2030 [1]. India is believed to have around 69.1 million of patients living with diabetes [2].

One dreaded complication of this silent killer disease is diabetic foot which today is the commonest cause of hospitalization in diabetes [3, 4, 5]. With 2 to 6% of them developing ulcer annually, around 15% of the patients with diabetes will develop diabetic foot ulcers in their lifetime [3, 4, 6]. Apart from an ulcer, a diabetic patient can develop acute foot complications like wet gangrene, cellulitis, abscess etc which are type 1 diabetic foot complications, they can develop chronic complications like trophic ulcer, Charcot foot, toe deformities, etc which are type 2 complications as per Amit Jain’s universal classification for diabetic foot complications [5]. Even chronic complications like trophic ulcer, dry gangrene, etc can get infected (acute on chronic) and they are type 3 diabetic foot complications.

Surgical interventions are essential in diabetic foot management. There are wide ranges of surgical procedures that are done in the diabetic foot. One known classification for diabetic foot surgeries is the non-vascular diabetic foot surgery classification. This classification was proposed in 2003 by Armstrong and Frykberg [7, 8, 9, 10]. This non vascular diabetic foot surgery classification classifies the types of foot surgery into 4 classes depending on the presence of open wounds in the foot and their acuity and they are elective, prophylactic, curative and emergency [7, 8, 9, 10]. The class 1 is elective surgery aimed at correcting deformities, class 2 is prophylactic procedure aimed to decrease risk of ulceration and prevent re-ulceration, class 3 are curative surgeries that have goal of healing ulcer and class 4 are emergency procedure that are performed to arrest or limit infection [7, 8, 9].

The New SCC Classification for Diabetic Foot Surgery

The author proposes a new classification for diabetic foot surgery which is an expansion and extension of his

“SCC” classification. The Amit Jain’s “SCC” classification was first proposed in 2014 for diabetic foot ulcer and it was later applied to various different entities in diabetic foot like Charcot foot, callus, Therapeutic footwear, foot amputations, offloading etc [11, 12, 13, 14, 15]. According to this new diabetic foot surgery classification, the diabetic foot surgical procedures can also be divided into 3 general categories namely simple, complex and complicated procedures (Figure 1).

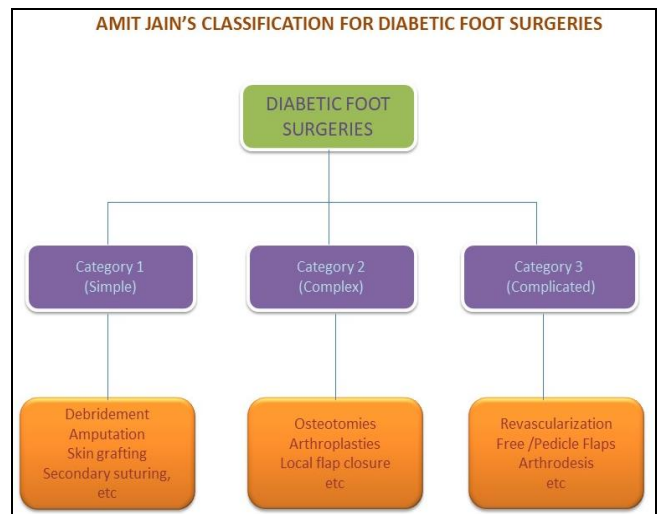


Fig 1: The New SCC classification for diabetic foot surgery

Category 1 Diabetic foot surgery (Simple procedures) includes procedures like debridement, amputation, incision and drainage, skin grafting, secondary suturing, etc (Figure 2). The above procedures are taught frequently during medical training as part of their regular curriculum and many of them are commonly performed by general surgeons or orthopedic surgeons in the teaching hospitals in countries like India [3, 16, 17]. Even procedures that are commonly done by podiatric surgeons/diabetic foot surgeons like tenotomies or gastrocnemius recession surgery can be included in category 1 diabetic foot surgeries.

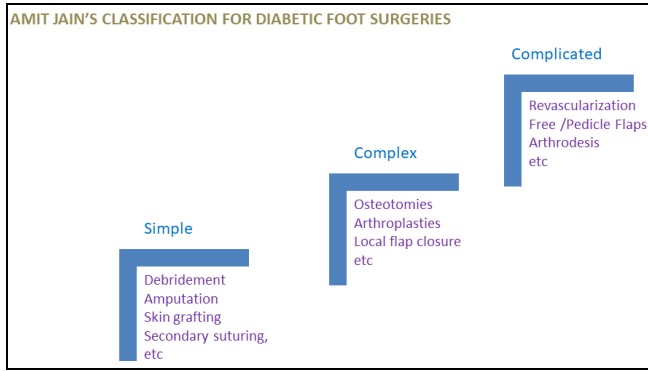


Fig 2: Showing the different diabetic foot surgeries categorized as per the new SCC classification.

Category 2 Diabetic foot surgery (Complex procedures) consists of arthroplasties, osteotomies, local flaps, etc. These procedures, though commonly done by podiatric surgeons, requires further training/exposure for non-specialist, expertise and ability to decide (decision making) when to do them. These procedures are commonly taught when one does podiatry/diabetic foot surgery training.

Category 3 Diabetic foot surgery (Complicated procedures) includes arthrodesis, free/pedicule flaps, vascular bypass, etc. These procedures often require multidisciplinary team approach like bypass surgery is done by vascular surgeons, free/pedicule flaps will require plastic surgeon support, etc. The author, as a diabetic foot surgeon, in the early career phase did make attempts to learn such procedures by observing and working in specialty divisions but later observed that they require expensive equipment's and set ups like Cath-lab or hybrid OT's which are expensive. Further, they are time consuming procedures requiring long duration of training if combined together and also the willingness of the respective expert to teach them which the author found to be difficult. Even to the patients, the category 3 procedures are expensive. Many of the respective specialist may not have access or exposure to many of these procedures. For example, the new orthopedic surgeon who has freshly graduated, wouldn't have seen arthrodesis in Charcot foot, forget about performing them in good numbers. A vascular surgeon may not have easy access to do endovascular procedures as it involves huge investments that many hospitals may not do so. Further, it is observed that there is an overall decreasing trend in category 3 diabetic foot surgeries. One can see that procedures like arthrodesis, vascular bypass in diabetic foot are decreasing year by year in most regions.

In a recent series by the Jain *et al.* [18], it is noticed that Charcot foot patients very rarely required or underwent arthrodesis. In one of the earlier studies by Jain *et al.* [19], it was observed that only 2.097% of patients underwent bypass procedure for diabetic foot and no free flaps were done even in premier teaching hospital. Although these complicated procedures are still been performed by respective experts, there is a gradual decline in category 3 procedures in many regions. There are multiple reasons for it and they include improvement in healthcare and screening, early identification of diabetic foot problems, presence of diabetic foot surgeons/podiatrist in many regions, availability of better options (endovascular procedures compared to vascular bypass), etc. In case of low socioeconomic patients, they may not afford these

expensive procedures and may choose affordable alternative options.

This new classification for diabetic foot surgery, which is an easy to remember descriptive classification, includes vascular procedures also. It is an open classification in which almost all the procedures in diabetic foot can be included in one of the 3 categories. Sometimes a patient may have to undergo both a simple as well as a complicated procedure with an example being debridement followed by revascularization to improve blood supply in an ischemic limb.

Just like some of the entities that has this Amit Jain's 'SCC' classification and few having subsequent triangles^[20, 21] to them to serve as a good teaching tool as the 3 components can be easily placed at 3 ends of the triangle thereby providing available options to a clinician, this Amit Jain's classification for diabetic foot surgery can also have a triangle in view of its 3 categories and also providing the available options of procedures (Figure 3).

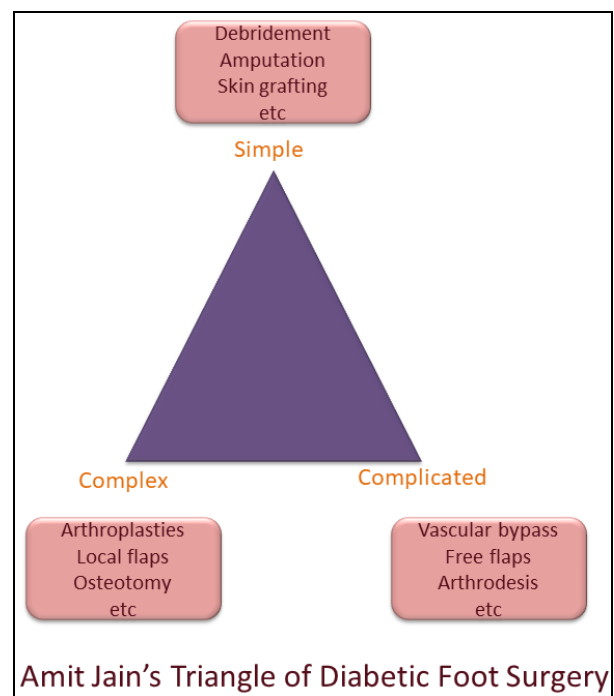


Fig 3: showing triangle of diabetic foot surgeries

Conclusion

Diabetic foot has numerous surgical procedures. Many of these are frequently done like category 1 procedures whereas some of the procedures require multidisciplinary team approach like category 3 diabetic foot surgeries. The Amit Jain's 'SCC' classification for diabetic foot surgery is easy to remember and also it includes all the procedure done in diabetic foot. It can also serve as a good teaching tool especially its triangle.

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