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Debridement In Diabetic Foot Complications – An Analysis Of Debridement Using Amit Jain's Grading System For Debridement

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ABSTRACT

Aim – To analyse surgical debridement done in diabetic foot complications using the new Amit Jain's grading system for debridement in diabetic lower limbs.

Methods and materials – A retrospective analysis was carried in Department of surgery of St Johns medical college, Bangalore, India. The study period was from January 2012 – December 2013.

Results – A total of 55 patients underwent debridement in diabetic foot during this period. Debridement was most commonly done in type 1 diabetic foot complications followed by type 3 diabetic foot complications. In 76.36%, debridement was alone done. Grade 2 was the most common debridement done. 5.45% of patients who underwent debridement ended up in major amputation. The mortality following debridement was 3.64%.

Conclusion – Debridement in diabetic foot is one of the most underestimated and neglected procedure. Grade 2 debridement is the most common debridement done in Inpatients. Majority of the patients underwent debridement only once. This is the first series that studies debridement in diabetic foot through the Amit Jain's grading system for debridement in diabetic lower limb.

Keywords: Diabetic foot, Debridement, Grading, Amit Jain's, Type 1 complications

I.INTRODUCTION

Debridement is considered to be one of the most important procedure in diabetic foot to obtain a successful outcome. Debridement often results in removal of non-viable tissue from the wound to encourage healing [1]. The word debridement comes from French word *debrider*, which means to unbridle [2]. In clinical medicine, this term [3] was first used by Henri Le Dran (1685-1770).

There are various methods of debridement. The surgical/sharp debridement is the rapidest method of debridement and have been used for years [3]. The surgical debridement which is carried out by surgeons involves removal of all non-viable and infected tissue until a healthy wound is achieved using various surgical instruments.

Debridement is considered to be a widely accepted and a definitive treatment for diabetic foot ulcers [4]. Although various methods of

debridement can be considered for ulcers in diabetic foot. The surgical debridement is the only available debridement technique today when treating infections like abscesses and necrotizing fasciitis and one should never consider any other form of debridement for these infections.

In spite of it being such an important procedure, it is astonishing to know that very few studies have been done on surgical debridement exclusively.

This study aims in providing our experience with surgical debridement outcomes using Amit Jain's grading system for debridement [5], which is the first focussed classification for debridement in diabetic lower limbs

II.METHODS AND MATERIALS

A retrospective analysis was carried out in a single surgical unit '3' in Department of Surgery of St John's medical college, Bangalore, India, which is a tertiary referral teaching hospital with high volume. The study period was from January 2012 to December 2013. Diabetic foot are generallymanaged by general surgeons in our institute. All patients with diabetic lower limb complications admitted and operated in our unit during this period were included in this study. Patients treated in other surgical units and at outpatients were excluded in this study.

III.RESULTS

There were 55 patients who underwent debridement during this study period. 43 patients [78.18%] were males and 12 patients [21.82%] were females. The average age for males was 57.31 years and for females was 55.93 years.

35 patients [63.64%] underwent debridement on the right side, 19 patients [34.55%] on the left side and one patient [1.81%] underwent debridement on both side of the limb [Table 1].

Debridement was most commonly done in type 1 diabetic foot complications [65.45%]. 16 patients [29.09%] who underwent debridement had type 3 diabetic foot complications and 3 patients [5.45%] who underwent debridement had type 2 diabetic foot complications [Table 2].

Abscess [Table 3] was the most common type 1 diabetic foot complications requiring debridement [47.22%].

In 42 patients [76.36%], debridement alone was performed. In 7 patients [12.73%], debridement was done along with toe amputations [Figure 1]. In 3 patients [5.45%], debridement was performed with transmetatarsal amputation [Table 4]. In another 3 patients [5.45%] who had undergone debridement ultimately ended up in major amputation.

Grade 2 debridement [56.36%] was the most common debridement done followed by grade 3 debridement [32.73%], 3 patients [5.45%] each underwent grade 1 and grade 4 debridement [Table 5].

40 patients [72.72%] had debridement only at one site without extension. 13 patients [23.64%] had debridement involving 2 sites and 2 patients [3.64%] had debridement over 3 sites [foot, leg and thigh].

37 patients [67.27%] had debridement only one [R0]. 10 patients [18.18%] had debridement repeated once [R1], 5 patients [9.09%] had debridement repeated twice [R2] and 3 patients [5.45%] had debridement repeated thrice [R3].

2 patients [3.64%] had mortality in the same admission in this series.

IV.DISCUSSION

Surgical debridement is a widely practised procedure in diabetic foot care [6]. The debridement could be a minor debridement or an extensive debridement.

There are various definitions for debridement. An expert working group defines debridement as removal of dead non-viable tissue, infected or foreign material from wound bed and surrounding skin [7, 8].

Debridement is described by Hinchcliffe et al as the removal of surface debris, slough and infected matter from the wound bed in an attempt to leave clean viable tissue [8, 9].

The benefits of debridement includes removal of necrotic/sloughy tissue and callus, reduction in pressure, drainage of secretions, inspection of deep tissue, helps in drug delivery and stimulates wound healing [10].

For diabetic foot ulcer management as per se, sharp debridement was viewed for long as the gold standard treatment. However, the evidence for effectiveness of debridement from randomised controlled trial is lacking [3, 11].

However for infections like abscesses and necrotising fasciitis [12, 13, 14, 15], surgical debridement is undisputedly a gold standard debridement technique. In fact, the first choice of treatment for necrotizing fasciitis should be surgical debridement of all the necrotic tissues and drainage via extensive fasciotomy [13].

Many studies mention debridement in diabetic foot loosely without any detailed specification [16, 17, 18].

The prevalence of debridement in diabetic foot complications in Indian patients range from 44%-64% [16, 17, 19, 20, 21]. It was one of the most common procedure performed in type 1 diabetic foot complications [19, 20].

In this series, debridement alone was performed in 76.36% whereas in remaining cases, debridement was associated with some form of amputation. Grade 2 debridement was the most common type of debridement performed.

V.CONCLUSION

Debridement is one of the most common surgical procedure done in diabetic foot in hospitals yet it is neglected and the word debridement is often loosely used. This is the first series in the literature that specifically studies debridement in diabetic foot in detail using Amit Jain's grading. Grade 2 debridement is the most common debridement done in inpatients. The mortality following debridement is 3.64% in this series.

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AUTHOR'S CONTRIBUTION

Dr Amit Kumar C Jain – Concept, Design, Data collection and Manuscript preparation.

Dr Viswanath S – Data collection, Critical revision and Final approval.

TABLES

SL NO	SIDE OF THE LOWER LIMB INVOLVED	NUMBER	PERCENTAGE
1]	RIGHT LIMB	35	63.64%
2]	LEFT LIMB	19	34.55%
3]	BILATERAL	01	1.81%
	TOTAL	55	100%

Table 1 showing the side of the limb most commonly debrided.

SL NO	TYPE OF DIABETIC FOOT COMPLICATION	NUMBER	PERCENTAGE
1]	TYPE 1 DIABETIC FOOT COMPLICATIONS	36	65.45%
2]	TYPE 2 DIABETIC FOOT COMPLICATIONS	03	05.45%
3]	TYPE 3 DIABETIC FOOT COMPLICATIONS	16	29.09%
	TOTAL	55	100%

Table 2 showing distribution of debridement done in diabetic foot according to Amit Jain's diabetic foot complication.

SL NO	TYPE 1 DIABETIC FOOT COMPLICATIONS	NUMBER	PERCENTAGE
1]	ABSCESS	17	47.22%
2]	CELLULITIS	06	16.66%
3]	NECROTIZING FASCIITIS	06	16.66%
4]	WET GANGRENE	07	19.44%
	TOTAL	36	100%

Table 3 showing debridement done in different lesions of type 1 diabetic foot complications.

SL	DEBRIDEMENT AND	NUMBER	PERCENTAGE
NO	AMPUTATION		
1]	DEBRIDEMENT ALONE	42	76.36%
2]	DEBRIDEMENT	07	12.73%

	WITH TOE AMPUTATION		
3]	DEBRIDEMENT WITH TRANSMETATARSAL AMPUTATION	03	5.45%
4]	DEBRIDEMENT THAT ENDED IN MAJOR AMPUTATION	03	5.45%
	TOTAL	55	100%

Table 4 showing cases where debridement was done along with amputation.

GRADING OF DEBRIDEMENT [G]	NUMBER	PERCENTAGE
GRADE 1 DEBRIDEMENT	03	05.45%
GRADE 2 DEBRIDEMENT	31	56.36%
GRADE 3 DEBRIDEMENT	18	32.73%
GRADE 4 DEBRIDEMENT	03	05.45%
TOTAL	55	100%
EXTENT OF DEBRIDEMENT [E]		
ONLY 1 SITE [FOOT/ LEG/ THIGH] [E_0]	40	72.72%
2 SITES [FOOT+ LEG OR LEG+ THIGH] [E_A]	13	23.64%
3 SITES [FOOT+LEG+THIGH] [E_B]	02	03.64%
TOTAL	55	100%
REPEAT DEBRIDEMENTS [R]		
DEBRIDED ONLY ONCE [R_0]	37	67.27%
REPEATED ONCE [R_1]	10	18.18%
REPEATED TWICE [R_2]	05	9.09%
REPEATED THRICE [R_3]	03	5.45%
TOTAL	55	100%

Table 5 showing distribution of debridement using the new Amit Jain's grading system for debridement.

FIGURES

Figure 1 showing debridement along with great toe amputation. This is grade 3-B debridement according to Amit Jain's grading system. Patient had to undergo a repeat debridement subsequently.