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Research Article

Early debridement and skin grafting in diabetic ulcer to reduce morbidity

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Abstract

Aim: To study the role of early debridement and skin grafting in patients having diabetic ulcer to reduce morbidity.
Method: Total 24 patients of diabetic ulcer foot and leg were studied prospectively. Patients with leg and foot ulcer more than 6 cm and less than 10 cm were taken in thae study. Study was prospective. All patients were subjected to test random blood sugar level for conforming diabetes and were subjected to early surgical debridement and skin grafting. Patients were followed after one month for results.
Results: All patients (100%) with diabetic ulcer had under gone early surgical debridement and 17 (70%) patients were under gone partial thickness skin graft and three (12.5%) required amputation. Rest 4 didn't any definitive surgical procedure.
Conclusion: Management of diabetic ulcer is multi-disciplinary and necessitates close communication with surgeons or physicians, diabetologist, dieticians, podiatrist and community health care workers and increase in awareness of risk factors. Early surgical debridement reduces the risk of amputation and healing by secondary intention. Also facilitates the early granulation tissue formation and ultimately skin grafting.
Key words: Surgical debridement, skin grafting

1. Introduction

Diabetic Foot and Leg ulcer is very common condition in surgical practice and wide in distribution. The patients suffering are very immense, commonly seen in most of the surgical wards and OPD. The incident of diabetic ulceration is more in ageing population and also with risk factor for atherosclerotic occlusion such as in smoking, obesity. The problems of diabetic ulcer represent a wide spectrum of severity and morbidity. For a proper treatment of patients with leg ulcers, it is important to have knowledge of the diabetic ulcer pathogenesis. The anatomical situation of ulcer in the leg by itself can give rise to problems that can at times test the ingenuity and patience of the surgeon. During the past three decades considerable knowledge has been gained regarding the physiology, anatomy, pathology and management of diabetic leg ulcers. Despite all this the management of diabetic ulcers is a very competing field for experimentation and different local therapies. Various studies have been conducted and a number of procedures and techniques have evolved with varying degree of success. It is common to see patients with diabetic ulcers. Moreover, leg ulcers form a good bulk of patients in our hospital, routine work. Treatment of these ulcers forms a challenging task as well.

We have therefore attempted to study and analyze the role of early surgical debridement and skin grafting in diabetic ulcers of the leg and foot.

2. Material Methods

2.1 Inclusion criteria

All patients with diabetic foot ulcers over 6cm but less than 10cm over leg and foot visiting to hospital

2.2 Exclusion criteria

Patients of leg ulcers other than diabetic.

Total 24 patients of diabetic ulcer foot and leg were studied prospectively. Patients with leg and foot ulcer more than 6 cm and less than 10 cm were taken in the study. Study was prospective. All patients were subjected to test random blood sugar level for conforming diabetes and were subjected to early surgical debridement and skin grafting. Patients were followed after one month for results.

In the proforma, name and age of the patient, sex, occupation, complaints and history in detail were recorded. Complaints were elaborated as onset and duration of ulcer, pain at ulcer site, and discharge from ulcer and associated complaints like fever, claudication, tingling, numbness, night cramps, itching were enquired in detail. Patients were examined in detail about the general condition like anemia, jaundice, fever, blood pressure and peripheral pulses. The leg ulcer was examined in detail like site, size, number, shape, stage of progression; floor, edge, margin, base, depth, discharge and regional lymphadenopathy were recorded.

The various treatment modalities given - Surgical and chemical debridement.
Specific surgical treatment including- Split skin grafting; Amputation; Treatment of underlying diabetics

Patients who were treated were assessed for healing of ulcer and reduction in size of ulcer and were advised to come for follow up for one month after discharge. The final outcome was recorded of surgical treatment of diabetic ulcer on follow up.

The data was statically analyzed & results tabulated. Statistical analysis was done by using descriptive and inferential statistics using Chi Square test. The software used in the analysis was SPSS17.0 version and Graph pack prism 5.0 version and results were tested at 5 percent level of significance.

3. Results

Table 1: Distribution of Micro-Organism In diabetic ulcer

Number of Patients	Percentage	Organism Found In Culture
8	32%	*Staphylococcus Aureus*
4	16%	*Pseudomonas*
2	8%	*Anaerobes*
2	8%	*E. Coli*

Table 2: Distribution of patient's diabetic Leg ulcer according to complaints of patients

Diabetic Ulcer	Discharge	Pain	Fever	H/o trauma	H/o varicose vein	H/o claudication	H/o burn
	Present	Present	Present	Present	Present	Present	Present
No	24	17	6	24	-	2	0
%	100.00	70.83	25.00	100.00	0.00	8.33	0

Table 3: Distribution of patient's diabetic Leg ulcer according to nature of discharge

Diabetic Ulcer	Nature				Total
	No	Purulent	Serosan guinous	Serous	
No	0	16	0	8	24
%	0.00	67.5	0.00	32.5	100.0

Table 4: Distribution of Site of diabetic ulcer on leg

Diabetic Ulcer	Site of Leg Ulcer							Total
	Dorsum foot	Planter foot	Upper 1/3rd Leg	Middle 1/3rd Leg	Lower 1/3rd Leg	Medial Malleolus Area	Lateral Malleolus Area	
No.	7	10	0	2	5	0	0	24
%	29.17	41.67	0.00	8.33	20.83	0.00	0.00	100.0

Table 5: Distribution patients according to Local application

Diabetic ulcer	Surgical	Partial thickness	Amputation	Total
No.	24	17	3	24
%	100	70.00	12.50	100

All patients with diabetic ulcer (24), were surgically debrided. In 70 %(17) diabetic foot patients skin grafting was done while in 12.5 %(3) foot was amputed. Statistical analysis has shown excellent results in 94.2% of them. However graft rejection noted in 5.7% cases

4. Discussion

Faglia *et al* had studied the role of early surgical debridement and revascularization in patients with diabetes and deep space foot abscess on 106 patients with diabetes data show that a delay in the surgical debridement of a deep space abscess increases the amputation level.[1]

In our study, all diabetic ulcer patients had under gone early surgical debridement.

George *et al* stated that debridement is an important aspect of the treatment of diabetic wounds. The modern meaning of debridement, removal of devitalized tissue, is quite different from its early definition which was the opening of a wound as for drainage.[2]

EranTamir *et al* stated that off-loading was also important for infected diabetic ulcers but controlling the infection is essential. The infection is controlled by antibiotics, pus drainage, debridement of necrotic tissues including surgical debridement, and partial foot amputations[3].

Benjamin *et al* said that sharp debridement with scalpel, scissors, or tissue nippers is generally preferable to hydrotherapy or topical debriding agents, which are less definitive and controllable and may require prolonged and repeated applications.[4]

In our present study also, we had done surgical debridement for all diabetic patients. It showed good healing as in reduction on size of ulcer and after this initial therapy and adequate healing, 70.00% had undergone split skin grafting.

Mahmoud *et al* and Wood *et al* had studied role of Split-skin graft in the management of foot ulcers and had showed Split-skin grafting was an effective method of managing diabetic foot ulcers as, compared with the conservative dressings, it reduced healing times and the length of hospital stay, while donor-site morbidity was minimal. Conventional split-skin grafting is a useful and effective technique for diabetic healing ulcers in certain patients.[5,6]

We did split skin grafting in 17 patient of diabetic leg ulcer. Statistical analysis has shown excellent results in 94.2% of them. However graft rejection noted in 5.7% cases. Skin grafting is an effective procedure in diabetic foot ulcer.

Frykberg *et al* had done a study in 115 patients with diabetic foot ulcers and concluded that culture should be taken when signs of infection such as purulence were present.[7]

Bjarnsholt T and *et al* said that pseudomonas plays the important role in diabetic foot infection.[8]

George *et al* stated that diabetes accounts for up to 50 per cent of non-traumatic leg amputations. Foot ulceration unattended is the most common single precursor to amputation. All newly diagnosed diabetics must be evaluated for Diabetic foot.[9]

Van *et al* studied 1232 patient with new diabetic foot ulcer and concluded that amputation was performed frequently in diabetic foot.[10]

Among 24 patients of diabetic ulcer only three patients had undergone amputations as a life saving measure. This confirms that prevention was the most effective way of dealing with the diabetic ulcer and that early recognition and liberal debridement with proper antibiotic cover and excellent diabetic control would reduce the incidence of amputations.

Huijberts *et al* said that hyperglycaemia can also add to the oxidative stress when the production of ROS (reactive oxygen species) exceeds the anti-oxidant capacity. The formation of advanced glycation end-products (AGEs) under hyperglycaemia and the interaction with their receptors (RAGE) are associated with impaired wound healing in diabetic mice as well.[11]

In our study, three patient of diabetes had un-controlled hyperglycaemia and impaired wound healing and got infected with pseudomonas with ulcer over dorsal and planter aspect of foot with purulent discharge and in these patients amputations were done.

Due to the short period of study and noncompliance of patients for regular follow up the success (or) otherwise of the management and recurrence of the problems in the long term could not be completed.

In summary, it is likely that the key to a future reduction in the incidence of diabetic foot lesions lies in an increase in clinical interest and awareness of the risk factors. If education can be implemented with enthusiasm and efficiency, it has the promise of a rich reward.

As Benjamin Franklin stated rightly- "A little neglect may breed mischief".

5. Conclusion

Diabetic ulcer is a common disease in Indian population particularly in low socio economic status Patients having leg ulcers of small size were managed as outdoor patients. These were excluded from the study. Patients with bigger size ulcers were admitted and managed. Management of diabetic ulcer is multi-disciplinary and necessitates close communication with surgeons or physicians, diabetologist, dieticians, podiatrist and community health care workers and increase in awareness of risk factors. Early surgical debridement reduces the risk of amputation and healing by secondary intention. Also facilitates the early granulation tissue formation and ultimately skin grafting. Early surgical debridement was an effective procedure followed by SSG which was the major surgical therapy for healing diabetic ulcer and reduced the morbidity. Uncontrolled hyperglycemia with pseudomonas infection and severe tissue destruction were the main factors responsible for amputation in the three cases.

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