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MARTORELL'S ULCERS MANAGED BY WOUNDECTOMY, FAT LIPOASPIRATE AND SKIN GRAFT: A NEW APPROACH TO TREATMENT

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ABSTRACT

Background: **Martorell's ulcers are common in hypertensive patients. They are characterized by painful ulceration on the distal aspect of the leg. Management of these wounds have been by surgical debridement with eventual wound closure. We share our experience in patients treated by woundectomy followed by fat lipoaspirate and skin graft.**

Objective: **To audit management of Martorell's ulcer with woundectomy followed by fat injection and skin grafts.**

Methodology: **Patients with histologically confirmed Martorell's ulcer were followed up between January 2017 and December 2022. Woundectomy was done followed by infiltration with fat lipoaspirate. Wounds were then dressed with conventional dressings materials for at least two weeks after which skin graft was done. Post operatively, patients were seen at a regular interval of one year to determine recurrence.**

Results: **A total of 28 patients were seen with histologically confirmed Martorell's ulcers, of whom 18 were female. Two patients had ulcers on both legs. There was considerable reduction in pain score from an average of 8 /10 to 2 /10 after fat grafting of the wounds. All patients had good skin grafts take. Recurrence of the ulcer was noted in one patient during the one year of follow up.**

Conclusion: **Woundectomy followed by lipoaspirate infiltration and skin graft is a reliable method of treating Martorell's ulcers and should be considered as one of the armamentarium in the management of Martorell's ulcers.**

INTRODUCTION

Martorell's ulcers were first reported by a cardiologist Otze Fernando (1). They were described as ulcers on the distal aspect of the leg either in the anterior, lateral and or posterior aspects of the leg. These ulcers are characteristically painful, could be unilateral or bilateral in a symmetrical pattern (1,2). Diagnosis of the ulcer is based on clinical presentation and confirmed by biopsy that demonstrates enda arteritis obliterans of the small blood vessels (2-4). Treatment of Martorell's ulcers has traditionally been by control of hypertension followed by surgical debridement wound dressings and eventual wound closure either by secondary intention or skin graft (2-5). Other adjunct therapies have been by the use of hyperbaric oxygen and lumbar sympatheticotomy (5,6). This treatment path has however been long, tedious and painful (3-5). Adipose lipoaspirate has been described in the management of many chronic wounds such as diabetic ulcers and ischemic wounds with good outcomes (7). The use of adipose lipoaspirate has not been reported for Martorell's ulcers to the best of our knowledge .We share our experience in the management of these ulcers with woundectomy followed by fat lipoaspirates.

MATERIALS AND METHODS

Study Design: This was a prospective audit of patient who presented with histologically confirmed Martorell's ulcer between January 2017 and December 2022. The objective of the study was to determine clinical outcome of patients managed by woundectomy, lipoaspirate and partial thickness skin graft. Specific Objectives were to assess pain reduction and skin graft take rates. For all patients woundectomy was done with at least 5 mm margin plus excision of the ulcer base. After attaining hemostasis fat lipoaspirate was harvested using a 2 mm cannula in a 20 cc syringe.

Figure 1: *Patient with Martorells Ulcer involving posterior lateral aspect of the left leg*

From the lower abdomen, the fat was let to decant for at least 10 minutes. The lipoaspirate was then injected into the wound using a 1 mm cannula at a ratio of 1 ml per 1cm^2 of the wound (Figure 2).

Figure 2: *Lipoaspirate being infiltrated into the wound of the right leg on the lateral aspect*

The injection was done both in the base and the edges of the ulcer. The ulcer was then dressed with petroleum gauze, gauze and crepe bandages. After discharge dressing changes were done every after three days. Wound pain scores were taken at the time of admission before commencing on analgesics and repeated at one week after surgery. Once the wound had granulated well patients were readmitted and skin grafting done. Skin graft take was assessed at one week after surgery during dressing changes (Figure3).

Figure 3: *Martorells' ulcer of the right leg with skin graft after 10 days of follow up. Note good graft take with no evidence of recurrence*

Figure 4: *Martorells ulcer of the right leg fully healed at one year of follow up. Note similarity with the surrounding skin.*

Post skin graft patients were put on compression stockings for at least two months. They were then followed up for one year to determine recurrence.

RESULTS

A total of 28 patients with histologically confirmed Martorell's ulcers were followed up during the study period. All patients had hypertension with two patients suffering bilateral disease at the point of admission. Twenty six patients were reviewed for at least one year. The male female ratio was 1 to 1.5. The average size of the ulcers were 32 .6 cm2 with a range from 16cm2 to 67 cm2. The mean duration of the ulcers were 5.6 months .All wounds were of gradual onset with no history of trauma nor predisposing factors. The mean age for the patients was 59.3 year with an age range of 47 to 75 years .Forty six percent of the ulcers were on the anterior medial aspect of the leg.

Table 1: *The anatomical location of the ulcers*

Anatomical location (Distal Leg)	Frequency	Percentage
Anterior medial	12	46
Posterior medial	4	15.4
Postero lateral	4	15.4
Lateral	3	11-5
Posterior	3	11-5

The average duration after woundectomy/lipoaspirate to skin grafting was 16 .9 days with a range of 12 to 26 days. Pain reduction was noted in all patients after the first procedure with an average reduction on visual analogue scale from 8 to 2 after seven days. Skin graft was approximately 95 percent at one week of follow up. Recurrence of the ulcer was noted in one patient at four

months of follow up. Complications noted were wound sepsis and graft failure in a patient.

DISCUSSION

Martorell's ulcers also referred to as hypertensive leg ulcers which are probably more missed than diagnosed. As a result of this the prevalence and incidence of this ulcers are not known especially in Africa. The ulcers can closely resemble pyoderma gangrenosum and calciphyloxis ulcers that are common in patients with connective disease and renal transplant patients respectively (2,8). However a high index of suspicion compounded by a good history, physical examination and histology is confirmatory for this disease. The management for the ulcers has largely been by surgical debridement followed by wound dressings and eventually wound closure by either secondary intention or skin grafts (2,4,5, 9). The duration over which this happens has largely varied from patient to patient with some taking as long as six months to heal necessitating for better and faster ways of treatment (9). Other adjuncts of treatment has been hyperbaric oxygen, spinal cord stimulation and prostaglandin E1 injection (10-12). Prostaglandin E1 injection in a small series of four patients showed a reduction in the overall treatment duration by about half . It seems to work by causing vasodilatation of the blood vessels leading to increased tissue perfusion. The treatment however requires daily injection of PGE1 which is costly.

Adipose lipoaspirate has been documented in a number of studies as a viable option in the management of chronic wounds such as diabetic wounds, venous ulcers and sickle cell ulcers (7,13). Its use in Martorell's ulcer has however not been described to the best of our knowledge. The lipoaspirate in majority of this studies have shown acceleration of wound healing and reduction in pain (7). Lipoaspirate contains adipose derived stem cells that can differentiate into fibroblasts and keratinocytes in the wounds that would accelerate proliferative phase of wound healing. Other benefits include growth factors such as platelet derived growth factors, vascular endothelial growth factors and fibroblast growth factors that do promote angiogenesis and granulation formation.

In our study all patients managed for Martorell's ulcer had woundectomy followed by fat lipoaspirate injection of the wounds and later on skin grafting once the wound had attained good granulation. The mean duration of treatment between surgical debridement and skin grafting was 16.9 days with a range of 14 to 31 days which was much faster compared to the conventional method of Martorell's ulcer treatment. There was only one ulcer recurrence at one year of follow up. Further the grafted wound had better aesthetic outcome with close resemblance to the neighboring skin (Figure 4). Other benefits included reduction in wound pain. Though skin grafts as a modality of management of Martorell's ulcers has been reported in literature by Dagregorio *et al*, the long term outcome has not been reported (5). Further their study reported skin graft success rate of about 70 percent suggesting that infiltration with lipoaspirate improves on the quality of granulation tissue ensuring on higher graft take rate as reported in our study.

In conclusion woundectomy with fat lipoaspirate provides an alternative approach in the management of Martorell's ulcer. With the lipoaspirate the wounds are able to granulate faster leading to early skin grafting and stable wound coverage compared to the conventional way of management.

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