Original Article

Surgical modalities in ulcer management

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Abstract

Chronic leg ulcers (CUL) are the most frequent and economically the most loss-making disorder, the importance and significance of which is not in doubt in the structure of public health and disorder that lasts for a very long period and severely limits the activity of patients. The problems of ulcer represent a wide spectrum of etiology, pathology, severity and morbidity. They can occur in children, adult and elderly. No age spared, no sex is spared. Varying etiological factors and presence of complicated systemic diseases make the treatment of ulcer very difficult. It is necessary to do a careful clinical examination of ulcer to arrive at the diagnosis and plan for appropriate treatment. Surgical treatment of ulcers may be directed toward modifying the cause of the ulcer or treating the ulcer itself by a graft, flaps or primary closure. Various studies have been conducted and a number of procedures and techniques have evolved with varying degree of success. Treatment of these ulcers forms a challenging task as well. So the present study was attempted to analyze a surgical management of the ulcers more over the leg and foot. This study comprises of 86 cases who admitted in the surgical ward between November 2010 to September 2012. It included cases of skin ulcers like stasis ulcers, diabetics with leg ulcers, traumatic ulcers, arterial ulcers and others more over lower limb. It excludes mucous ulcer. All patients were initially examined in the outpatient department and were admitted. A detailed history was collected with particular reference to onset, duration and type of lesion, socioeconomic strata and occupational factors and systemic diseases. Any histories of similar ulcers and past history were also noted. A thorough systemic and local examination was carried out. The morphological features of ulcers i.e. – site, size, shape, floor, edge. Margin, number, distribution, any discharge, surrounding skin, regional lymph nodes and associated diseases like varicose veins, eczema or patches were noted. A provisional diagnosis of ulcer type done on the basis of clinical examination. Plan for appropriate surgical treatment like primary closure, skin grafting and various flaps. The outcomes of surgical management of ulcer like acceptance or rejection were noted at the time of discharge. The data entry and analysis was done. The highest number of cases was found to be ulcer associated with diabetes mellitus (44.2%), traumatic ulcer (41.9%) and less commonly due to vascular (9.3%) and malignant (4.7%) etiology. Incidence of ulcer in the study group were found to be maximum (65.1%) in the age group of 40 years and above followed by 34.9 % in the age group of 20 to 40 years. The incidence of ulcer more common in males (73.3%) than females (26.7%). Diabetic ulcer being relatively common in males, more prevalent in patients above the age of 40 years and above. The commonest organism cultured from the wounds was found to be staphylococcus (24.4%). Though the causative factors are varied, diabetes mellitus and venous insufficiency were by far the more common factors. Underlying vascular disorders are the main etiological factors for ulcers with diabetes forming a major risk factor. Diabetes was the commonest disease associated with chronic ulceration. Majority of ulcers 67 (77.9%) were underwent skin grafting while 11 (12.8%) and 8 (9.3%) were accounted for primary closure and flaps respectively. The ulcers underwent for skin grafting and primary closure have mean timing for heal was 10 days while those underwent for flaps has 13 days. Traumatic ulcers were operated with skin grafting 25 (69.4%), primary closure 6 (16.7%) and flaps 5 (13.9%). More than 2/3rd (31) of diabetic ulcers were treated with skin grafting.

Keywords: Surgical modalities, ulcer management.

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INTRODUCTION

Chronic ulceration is frequent condition and wide in distribution they may be associated with a number of Medical, Surgical and Dermatological conditions the patient suffering is very immense, commonly seen in most of the surgical wards and OPD. The incident of ulceration is more in aging population and increased risk factor for atherosclerotic occlusion such as smoking,

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obesity and Diabetics. Ulceration can be defined "an ulcer is a discontinuity of skin or mucous membrane" in general the slow healing tendency is not simply explained by depth and size. But caused by a underlying pathologic fact that needs to be removed to induce healing. Chronic leg ulcers (CUL) are the most frequent and economically the most loss-making disorder, the importance and significance of which is not in doubt in the structure of public health and disorder that lasts for a very long period and severely limits the activity of patients. The problems of leg ulcer represent a wide spectrum of etiology, pathology, severity and morbidity. The main causes are venous valve insufficient, lower extremity arterial disease and diabetes. Venous ulcers constitute the majority of all leg ulcers, whereas foot ulcers are more likely to be due to arterial insufficiency or neuropathy. Up to 80% of leg ulcers are caused by venous disease, and arterial disease accounts for another 10% to 25%, which may coexist with venous disease. The incidence of arterial insufficiency may likely increase with the aging of our population. Coexisting rheumatologic disease occurs in 10% to 15% of patients, whereas diabetes mellitus is present in 5% to 12% of patients. Less commonly, trauma, pressure, and infectious agents, vasculities, skin malignancies and ulcerating skin diseases such as pyoderma gangrenosum are causes of leg ulcers. But even rare condition exists such as recently discovered combination of vasculities and hypercoagulability. Overlap of various causes as well as coexisting disease occurs because these conditions are not mutually exclusive. Ulcer is an important topics in surgery,. They can occur in children, adult and elderly. No age spared, no sex is spared. Varying etiological factors and presences of complicated systemic diseases make the treatment of ulcer very difficult. It is necessary to do a careful clinical examination of ulcer to arrive at the diagnosis and plan for appropriate treatment. For a proper treatment of patients with ulcers, it is important to be aware of the large differential diagnosis of ulceration. The causes may be various but the anatomical situation of ulcers by itself can give rise to problems that can at times test the ingenuity and patience of the surgeons. Surgical treatment of ulcers may be directed toward modifying the cause of the ulcer or treating the ulcer itself by a graft, flaps or primary closure. There are no specific indications for when skin grafting for ulcers should be used. Larger or refractory ulcers are two instances when grafting should be considered. Even if grafts do not take, they likely stimulate wound healing, and in very painful ulcerations skin grafting may rapidly and markedly relieve pain. Surgical management has more benefits to the patient like cosmetically suitable, durable, reproducible outcome as well as creates a minimal amount of pain, suffering, discomfort or negative impact on patient's quality of life. Also it avoids untoward complications and achieves an acceptable cost of care. Surgical management can provide rapid healing and long-term relief from ulcer that are unable to be treated with conventional therapy. The various surgical modalities can improves and provides an abundant blood supply, and resolves the tissue-related components of chronic ulceration. During the past three decades considerable knowledge has been gained regarding the physiology, anatomy, pathology and management of chronic leg ulcers. Despite all this the management of chronic leg ulcers is a fertile field for experimentation. 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 different types of ulcers due to various etiology and underlying systemic diseases. Moreover, leg and foot ulcers form a good bulk of patients in our hospital. Treatment of these ulcers forms a challenging task as well. I have therefore in my present study attempted to analyze a surgical management of the ulcers more over the leg and foot.

MATERIAL AND METHODS

This study comprises of 86 cases who admitted in the surgical ward between November 2010 to September 2012 after considering inclusion and exclusion criteria. This group was a diversified one and included patients of both sexes and of all ages, all religion and economic strata. This study included cases of skin ulcers like stasis ulcers, diabetics with ulcers, traumatic ulcers, arterial ulcers and others more over lower limb. This study excludes mucous ulcer. All patients were initially examined in the outpatient department and were admitted. A detailed history was collected with particular reference to onset, duration and type of lesion, socioeconomic strata and occupational factors and systemic diseases. Any histories of similar ulcers were also noted. A careful past history regarding ulcer – Diabetes, Hypertension, Tuberculosis, varicose Ulcer and Smoking etc. noted. A thorough systemic and local examination was carried out. The morphological features of ulcers i.e. – site, size, shape, floor, edge. Margin, number, distribution, any discharge, surrounding skin, regional lymph nodes and associated diseases like varicose veins, eczema or patches were noted. A provisional diagnosis of ulcer type done on the basis of clinical examination. But while presenting only relevant positive and some important negative findings were shown to make the study brief and to avoid unnecessary repetitions. The relevant investigation of all patients were done.

a. Routine investigation- hemoglobin (%), ESR,TC and DC, Haemogram

b. Special investigation – fasting and PP blood sugar, lipide profile, LFT, culture and sensitivity of bacteria / fungus, biopsy and histopathological examination, radiological examination like x-ray
c. Investigation of vascular structure of the leg- Doppler ultrasound

A final diagnosis was made correlating the clinical features and investigations. Ulcer was made healthy by giving antibiotics and daily dressing. Pre-requisite – B-haemolytic streptococci load less than 10^5 per gram of tissue. All the cases were operated either local anesthesia, spinal anesthesia and General anesthesia. Ulcer was managed with surgical modalities like Primary closure, Grafting and Flaps according to their site, depth and size of ulcer.

Indication for Grafting

1. Well granulated ulcer
2. Clean wound or defect which cannot be apposed
3. After surgery to cover and close the defect created

Indication for Flaps

1. To cover wider, deeper defects
2. To cover defect over bone, tendon and cartilage
3. If skin graft repeatedly fails

Donor site prepared preoperatively. Post operatively, the patients were managed with intravenous fluids, antibiotics, analgesics and regular dressing. Any post operative complications were recorded and managed accordingly. The outcomes of surgical management of ulcer like acceptance or rejection were noted at the time of discharge. While discharging, the patients were given discharge card and were asked to come for follow up after 1week. The duration of post operative hospital stay recorded in each case.

Table 1: Surgical treatment of the ulcers according their types

Type of ulcer	Type of treatment		
	Primary closure	Skin grafting	Flaps
Traumatic ulcer	6 (16.7%)	25 (69.4%)	5 (13.9%)
Diabetic ulcer	5 (13.2%)	31 (81.6%)	2 (5.3%)
Venous ulcer	-	7 (100%)	-
Arterial ulcer	-	-	1 (100%)
Malignant ulcer	-	4 (100%)	

25 (69.4%) out of 36 patients with traumatic ulcers underwent skin grafting while primary closure and flaps were 6 (16.7%) and 5 (13.9) respectively. More than 2/3rd (31) of diabetic ulcers were treated with skin grafting. Only 5 (13.2%) and 2 (5.3%) of diabetic ulcers were underwent primary closure and flaps surgery respectively. Arterial ulcer undergone flaps surgery. Skin grafting surgeries were done for malignant ulcers.

Table 2: Surgical treatment and Mean Healing time

Type of treatment	Mean Healing time (days)
Traumatic ulcer	9.8 ≈ 10
Diabetic ulcer	10.18 ≈ 10
Arterial ulcer	12
Venous ulcer	13.14 ≈ 13
Malignant ulcer	8.66 ≈ 9
Marjolin ulcer	8

The mean time for Traumatic and diabetic ulcers to heal was 10 days. The mean time for Venous and arterial ulcers to heal was 13 and 12 days respectively. Average healing time of venous ulcers was 13 days while arterial ulcer was 12 days. 8 days is mean healing time of the malignant ulcers.

Table 3: Mean Healing time of ulcers after surgical treatment

Types of Ulcer	Mean Healing time (days)
Primary closure	10
Skin grafting	9.95 ≈ 10
Flaps	12.75 ≈ 13

Ulcers underwent for Skin grafting and primary closure have mean timing to heal was 10 days. Those ulcers underwent for flaps surgery heals averagely on 13 days.

DISCUSSION

In the present study, chronic ulcers associated with diabetes accounted for 44.2% and Traumatic ulcer accounted for 41.9 %. Venous ulcer accounted for 8.1% while malignant ulcer accounted for 3.5%. Arterial ulcer and marjolin's accounted for 1.2% each. As compared with other studies, the prevalence of ulcers is probably between 0.18% and 1% (Phillips, Tania *et al*). 95% of leg ulcers are due to vascular etiology, (Gilliland) and among all chronic wounds lower extremity venous ulcer dominates the differential diagnosis accounting for up to 90% of the cases (Burton S. Claude) (Callum M. J. *et al*). Arterial diseases account for 5 to10 %, most others are due to neuropathy or a combination of both (Yound J. R). Some investigators have classified diabetic ulcers as metabolic. The most important factors responsible for causation of ulcer in diabetes are the neuropathy resulting in decreased sensation and atherosclerosis. However, this is controversial and in diabetes it is a combination of factors that are to be considered in causation of leg ulcers. Also according to Yound J. R.10 and Boyd A. M. *et al*, the distribution of different type of ulcers in different studies varies – 70% to 90% for venous ulcer, 5% to 15% for arterial ulcers and 1% to 5% for other ulcers. As observed above the present study was not comparable with the published studies mentioned probably because of following reasons:

a. The study group of 86 patients was too small a number to draw any comparative conclusions.

b. The other published studies were community based, controlled randomized or a group-based study which included different specialties

As per studies done by Hansson Carita on leg and foot ulcers, ulcers below the line of shoe and feet are considered mostly to be caused by arterial insufficiency and or diabetes. Ulcers on the medial aspect of the ankle in the gaiter zone are mostly caused by venous insufficiency. In the present study, ulcers had the same site of distribution i.e., ulcers in the gaiter zone were mostly caused by venous insufficiency and ulcers in the foot below the line of shoes were mostly caused by diabetes and arterial insufficiency. Cornwall *et al* in his study had 70% of patients over the age of 70 years. The median age of all patients in this study was 47 years. 65.1% of the patients over the age of 40 and above. But according to study done by Callam M. J. the elderly are not the only population at risk: In his study ulceration began before the age of 40 years in 22% of the population studied. In our study, ulceration began before the age of 40 years in 34.9% of the patients. Peripheral vascular diseases increase with age and are 7 times more frequent in 60 years old patients when compared to 20 years old. (Hansson Carita). In this study, arterial and venous diseases were found to be maximum in the age group of 40 to 60 years. In our study, there were more men 73.3% than women 26.7% with ulcers. However, no differences between sexes were found when age specific relative frequencies for all ulcers were compared. Staphylococcus was found to be the most common pathogen accounting for 24.4% of the bacteriological isolates. This was followed by proteus, which accounted for 15.1 %, streptococcus which accounted for 14%, Klebsiella and pseudomonas accounting for 9.3 % and 7% each. No growth of organism occurs on 26 (30.2%) culture. Jankūnas V *et al* shows comparable result that S. aureus in 19 (35.19%) cases, P. aeruginosa in 7 (12.96%) cases, in 3 (5.56%) cases other microorganisms and in 7 cases (12.96%) no pathogens were detected. Rahman GA *et al* also shows comparable result that pseudomonas aeruginosa and Staphylococcus aureus constituted the majority of the isolates recovered accounting for 32.61% and 23.91%, respectively. Treatment modalities readily available were skin grafting, primary closure and flaps in 67 patients (77.9%), 11 patients (12.8%) and 8 patients (9.3%) respectively. The ulcers underwent for skin grafting and primary closure have mean timing to heal was 10 days while those underwent for flaps has 13 days. A complete rejection of the transplant has not occurred in any of the cases.

CONCLUSION

In the present study

The commonest ulcer was found to be diabetic ulcer accounting for 38 cases (44.2%) followed by traumatic ulcer 36 (41.9%). Less commonly were venous ulcer 7 (8.1%), malignant ulcer 3 (3.5%), arterial ulcer 1 (1.2%) and marjolin's ulcer 1 (1.2%). The highest age incidence of ulcers was in the age group of 40 years and above (65.1%). The median age was 47 years and the mean age was 46.52 years. There was a marked male predominance of 73.3%. Diabetes was the commonest disease associated with chronic ulceration. Staphylococcus was found to be the most common pathogen to be isolated from the ulcers i.e.. 24.4%. Majority of ulcers 67 (77.9%) were treated by skin grafting while 11 (12.8%) and 8 (9.3%) were accounted for primary closure and flaps respectively. The ulcers underwent for skin grafting and primary closure have mean timing for heal was 10 days while those underwent for flaps has 13 days. Most patients with diabetic ulcers (31) underwent skin grafting. Only 5 (13.2%) and 2 (5.3%) of diabetic ulcers were undergone primary closure and flaps surgery respectively. The mean time for the ulcer to heal was 10 days.

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