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Original Research Article

A hospital based cross sectional study on surgical profile of patients with chronic leg ulcers

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ABSTRACT

Background: Treatment of chronic leg ulcer is not easy. Appropriate diagnosis and proper treatment are the cornerstone for successful outcome. To study the profile of patients with chronic leg ulcers.
Methods: Hospital based observational study was carried out in 108 cases. All patients coming to surgery OPD in our set up with chronic leg ulcers of duration of more than 6 weeks were advised admission if they were willing for the same. Then detailed history was recorded. Detailed examination of venous system was done for varicosities, incompetent perforators, sapheno-femoral or poplitio-femoral junction incompetence. In case of patient's peripheral vascular diseases, detailed examination of arterial system was done. Descriptive statistics like frequencies and percentage for categorical data, mean and SD for numerical data has been depicted.
Results: Majority of study subjects were in age range of 60 to 70 years. percentage of male patient (76.9%) was higher than that of the female (23.1%). 43.5% of participants with ulcer on left side and 56.5% participants had ulcer on right side. 47% of participants had complaints between 7 to 8 weeks. main etiological factor was infective etiology in 38.9% patients. 54.1% ulcers were found in lower 1/3rd of the leg. About 88.9% cases had positive culture. The most common organism grown was of pseudomonas in 45.8% cases.
Conclusions: The most common etiology of chronic leg ulcer in this study is infective followed by traumatic ulcer. The most common associated condition found in chronic leg ulcer is diabetes mellitus.

Keywords: Ulcer, Etiology, Profile, Culture, Organism, *Pseudomonas*

INTRODUCTION

Any breach in the skin or in the mucous membrane which results in the molecular death is defined as an ulcer.[1] Chronic leg ulcers are those ulcers on the leg which do not heal even after giving proper treatment for more than six weeks or those ulcers on the leg which do not heal even after one year. Thus, this tendency of healing slowly is one of the criteria of chronic leg ulcers.[2]

Many studies have reported that chronic leg ulcers not only have physical impact on the patient but also social, financial and psychological impact due to chronicity of the leg ulcers.[3] Treatment of chronic leg ulcer is not easy. Appropriate diagnosis and proper treatment are the cornerstone for successful outcome. Various risk factors for chronic leg ulcers are diabetes, increasing age, smoking, obesity. The prevalence of chronic leg ulcers in the age group of 60 years and above is around 0.6-3%. It increases with age. Among the developed countries it is estimated that about 1 to 2 % of the people will experience a chronic leg ulcer during their lifetime. Very few Indian studies have been done on the epidemiology of ulcers.[4] Neuropathy, diseases of the venous and arterial system are some important causes of chronic leg ulcers. Other causes are infections, disorders of metabolism and

hematological disorders. Hence understanding of causes by the physician is important for appropriate management.[2] Since there is paucity of research on chronic leg ulcers, this study was conducted to study various etiology of chronic leg ulcer in and to study demographic characteristics of chronic leg ulcer.

METHODS

The present study was carried out in government medical college, Latur from December 2017 to November 2019 department of general surgery. The present study was a hospital based observational descriptive study. The study population was all patients with leg ulcers with complaint duration of more than 6 weeks. Patients were recruited as cases using the below mentioned inclusion and exclusion criteria.

Inclusion criteria

All patients age more than 12 years with chronic leg or foot ulcers for more than 6 weeks and are willing to participate in the study.

Exclusion criteria

Burns, immunocompromised patients, patients less than 12 years of age, malignant ulcers.

Sample size

No formal sample size calculation was done and an approximate of 100 patients were expected to be enrolled in the study based on medical record statistics of last 3 years before starting the study.

Ethical clearance

The study was granted by the institutional ethical committee of the tertiary care institute and the concerned university authorities.

Methodology

All patients coming to the surgery OPD in our set up with chronic leg ulcers of duration of more than 6 weeks were advised admission if they were willing for the same. Then detailed history was recorded as follows.

Demographic factors

Age (in years at the time of presentation of disease was recorded as a continuous variable) and gender.

Chief complaints

Duration of ulcer, mode of onset of ulcer: traumatic, infective, vascular insufficiency, associated conditions: diabetes or varicose veins, other complaints, after detailed history recording patients were examined in detail, as follows.

General examination

Pulse rate per minute, blood pressure in millimetre of mercury (right brachial artery), body temperature in fahrenheit (F0) at the time of presentation.

Local examination

The patient was examined in an examination room in day light, after completely exposing both lower legs.

Following points were noted in proforma: exact site of ulcer, size of ulcer, slough of ulcer, surrounding skin.

Detailed examination of venous system was done for varicosities, incompetent perforators, sapheno-femoral or poplitio-femoral junction incompetence. In case of patient's peripheral vascular diseases, detailed examination of arterial system was done.

Statistical analysis

Data obtained was compiled on a MS Office Excel Sheet (v 2010, Microsoft Redmond Campus, Redmond, Washington, United States). Data was subjected to statistical analysis using Statistical package for social sciences (SPSS v 21.0, IBM). Descriptive statistics like frequencies and percentage for categorical data, Mean and SD for numerical data has been depicted. Inter group comparison (>2 groups) was done using one-way ANOVA followed by pair wise comparison using post hoc test. Comparison of frequencies of categories of variables with groups was done using chi square test. For all the statistical tests, $p<0.05$ was considered to be statistically significant, keeping α error at 5% and β error at 20%, thus giving a power to the study as 80%.

RESULTS

In Table 1, shows sex distribution in different age groups. Males were more than females. Among male's majority were seen in the age group of more than 69 years followed by the age group of 59-68 years. Among females majority of the study subjects were seen in the age group of 59-68 years of age followed by the age group of 29-38 years of age. Overall majority of the study subjects were seen in the age group of 59-68 years of age followed by the age group of more than 69 years of age.

In Table 2, shows distribution of the study subjects as per side of the leg ulcer. Majority of the cases were found to have the presence of the chronic leg ulcer on the right side i.e. in 61 cases it has been found to have the presence of the chronic leg ulcer on the right side which constituted about 56.5% of the total study subjects. Remaining cases were found to have the presence of the chronic leg ulcer on the right side i.e. in 47 cases it has

been found to have the presence of the chronic leg ulcer on the right side which constituted about 43.5% of the total study subjects.

In Table 3, shows distribution of the study subjects as per location of the leg ulcer. Majority of the study subjects presented with chronic leg ulcer on dorsal aspect of foot in 39.8% of the cases. Twenty-eight study subjects which constituted 25.9% of the study subjects had chronic leg ulcer on lateral aspect of leg. Thirty-two study subjects which constituted 29.6% of the study subjects had chronic leg ulcer on medial aspect of leg. One person had chronic leg ulcer on heel. Four individuals in the study had chronic leg ulcer on plantar aspect of foot.

Table 1: Sex distribution in different age groups.

Age (years)	Male		Female		Total	
	Number	N (%)	Number	N (%)	Number	N (%)
18-28	8	9.6	0	0	8	7.4
29-38	10	12	5	20	15	13.9
39-48	13	15.7	2	8	15	13.9
49-58	12	14.5	2	8	14	13
59-68	19	22.9	12	48	31	28.7
>69	21	25.3	4	16	25	23.1
Total	83	100	25	100	108	100

Table 2: Distribution of the study subjects as per side of the leg ulcer.

Side	Number	N (%)
Left	47	43.5
Right	61	56.5
Total	108	100

Table 3: Distribution of the study subjects as per location of the leg ulcer.

Location	Number	N (%)
Dorsal foot	43	39.8
Lateral aspect of leg	28	25.9
Medial aspect of leg	32	29.6
Heel	1	0.9
Plantar foot	4	3.7
Total	108	100

Table 4: Distribution of ulcer according to the size.

Size of ulcer	Number	N (%)
More than 7 cm^2	46	42.6
Less than 7 cm^2	62	57.4
Total	108	100

In Table 4, shows distribution of ulcer according to the size. Majority of the study subjects had size of the ulcer less than 7 cm^2. Forty-six study subjects presented with size of the ulcer of more than Less than 7 cm^2 which constituted 42.6% of the total study subjects. Sixty-two study subjects presented with size of the ulcer of more than less than 7 cm^2 which constituted about 57.4% of the total study subjects.

In Table 5, shows distribution as per duration of ulcer. Majority of the study subjects had duration of the chronic leg ulcer as between seven and eight weeks i.e. 47.8%. forty-eight study subjects had duration of the chronic leg ulcer between six and seven weeks which constituted 44.4% of the total study subjects. Fifty-one study subjects had duration of the chronic leg ulcer between seven and eight weeks which constituted 47.8% of the total study subjects. Nine study subjects had duration of the chronic leg ulcer more than eight weeks which constituted 8.3% of the total study subjects.

Table 5: Distribution as per duration of ulcer.

Duration of ulcer in weeks	Number	N (%)
6-7	48	44.4
7-8	51	47.8
>8	9	8.3
Total	108	100

Table 6: Distribution of the study subjects as per the grading of slough.

Slough grade		Number	N (%)
0	Less than 10% surface area has slough	3	2.8
1	10-30% surface area of the wound has slough	72	66.7
2	30-60% surface area of the wound has slough	28	25.9
3	More than 60% of the surface area of the wound has slough	5	4.6

In Table 6, shows distribution of the study subjects as per the grading of slough. Majority i.e. 66.7% had grade 1 slough. Three study subjects had grade 0 i.e. Less than 10% surface area has slough. Seventy-two study subjects had grade 1 i.e. 10-30% surface area of the wound has

slough. Twenty-eight study subjects had grade 2 i.e. 30-60% surface area of the wound has slough. Five study subjects had grade 3 i.e. More than 60% of the surface area of the wound has slough.

Table 7: Distribution as per etiology.

Etiology	Number	N (%)
Diabetes	25	23.1
Infections	42	38.9
Peripheral vascular disease	7	6.5
Trauma	27	25
Varicose	7	6.4
Total	108	100

Table 8: Distribution as per organism found on pus culture.

Organism on pus culture	Number	N (%)
Acinetobacter	5	4.6
Bacteroides	3	25.8
Coagulase negative *Staphylococcus aureus*	2	1.9
Escherichia coli	20	18.5
Klebsiella	13	12
Methicillin resistant *Staphylococcus aureus*	7	6.5
Pseudomonas aeruginosa	44	40.7
No growth	12	11.1
Propionibacterium	1	0.9
Staphylococcus aureus	1	0.9
Total	108	100

In Table, 7 shows distribution as per etiology. The most common cause of chronic leg ulcer in the present study was infections in 38.9% of the cases. Forty-two cases had Infective etiology which constituted 38.9% of the cases. Twenty-five cases had Diabetic etiology which constituted 23.1% of the cases. Twenty-seven cases had Traumatic etiology which constituted 25% of the cases. Seven cases had varicose veins etiology which constituted 6.4% of the cases. Seven cases had peripheral vascular disease etiology which constituted 6.5% of the cases.

Most commonly seen organism is pseudomonas aeruginosa, followed by *Escherichia coli*, *Klebsiella spp.*, MRSA, *Acinetobacter spp.*, bacteroid, coagulase negative *Staphylococcus aureus*, *Propionibacterium* and *staphylococcus aureus* in decreasing order of appearance. *Acinetobacter* was found in five cases. Bacteroides was found in three cases. Coagulase negative staphylococcus aureus was found in two cases. *Escherichia coli* was found in twenty cases. *Klebsiella* was found in thirteen cases. Methicillin resistant *staphylococcus aureus* was found in seven cases. *Pseudomonas aeruginosa* was found in 44 cases.

DISCUSSION

Majority of the study subjects were in the age range of 60 to 70 years followed by 70 to 80 years and 40 to 50 years. The mean age of the study subjects was 54.67±16.76 years. A study done by Kumar et al reported the most common age group to be more than 65 years followed by 51 to 65 years and 36 to 50 years.[5] A study done by Rahman et al reported that the peaks of presentations in their study were at 30 to 39 years and 50 to 69 years.[6]

In present study percentage of male patient (76.9%) was higher than that of the female (23.1%) patients in each age group with sex ratio of 1:4. Kumar et al had included about 58% males and 42% females in their study. Rahman et al included equal distribution of males and females in their study.[5,6] Ogunkeyede et al reported that females were in higher proportion than males in their study.[7]

Present study comprises 43.5% of participants with ulcer on left side and 56.5% participants had ulcer on right side. The ulcer on leg were 56.5% while those on foot were 43.5%. A study done by Rahman et al reported that the ulcers were more common in left side when compared to right side.[6]

About 45% of the participants had the duration 6 to 7 weeks, 47% of participants had complaints between 7 to 8 weeks and 8.3% participants had complaints for more than 8 weeks. The average duration reported by Gokhale et al was 4.6 months in their study.[8]

In present study the main etiological factor was infective etiology in 38.9% patients, followed by trauma in 25% subjects and vascular in 12.9% subjects. A study conducted by Kumar et al reported that 72% of their cases had venous aetiology.[5] Further they sent 4 specimens for biopsy and none were positive for malignant. A large cross-sectional study conducted by Korber et al in Germany revealed that the most common aetiology of chronic ulcer was venous ulcers in 47.6% of the patients.[9] Further, they reported 1.2% subjects had malignancy in their study.

Present study comprised about 6.4% had varicose veins and 23.1% had diabetes. Kumar et al reported that 38% had smoking history 32% had hyperlipidaemia, 22% had diabetes mellitus, 32% were hypertensive and 22% were anaemic in their study.[5] A study done by Rahman et al 6 reported that 16.7% had diabetes, 13.3% had hypertension, 1.7% had sickle cell disease and 3.3% had varicose veins in their study subjects. Gajjan et al reported that 22% of the cases were diabetics in their study.[10]

In present study, 56.5% ulcer were on leg. Out of these, 54.1% ulcers were found in lower 1/3rd of the leg, 21% in middle 1/3rd of the leg and 25% participants had ulcer in upper 1/3rd of the leg. About 43.5 % ulcers were on

foot. Out of these, 89% were on fore foot and 11% were on hind foot. About 9 out of 40 cases studied by Gokhale et al were present on medial malleolus.[8] Edwards et al also reported that the most common site of venous ulcer was medial malleolus.[11] Fadeyi et al reported the ulcers in their study were more common in lower 1/3 followed by middle 1/3 of the leg.[12]

About 88.9% cases had positive culture and 11.1% had negative culture. Rahman et al reported a positivity rate of 82.9% in their study.[6] Another study reported a positivity rate of 82%. About 29.5% positivity rate was reported by Wu et al in their study.[13] Reason behind negative culture in patient with chronic leg ulcer could be that they were referred to tertiary care due to treatment failure or flaring of the condition or many of them have already received course of antibiotics.

The most common organism grown was of pseudomonas in 45.8% cases followed by *E. coli* in 20.8% cases and *Klebsiella* species in 13.5% cases. The most common organism reported by Rahman et al was *Pseudomonas* followed by *Staphylococcus* in their study constituting 32.61% and 23.91% of the sample which were positive for culture.[6] The most common organism reported by Fadeyi et al was *pseudomonas* followed by *Staphylococcus* species.[12] Moore et al reported the most common organism to be *Staphylococcus* species in the culture positive cases.[14]

CONCLUSION

In this study majority of patients lied in the age group of 59 to 68 years. In this hospital setup, chronic leg ulcer is more common in males than in females. The most common etiology of chronic leg ulcer in this study is infective followed by traumatic ulcer. The most common associated condition found in chronic leg ulcer is diabetes mellitus followed by varicose veins, followed by peripheral vascular diseases.

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REFERENCES

1. Jarbrink K, Ni G, Sonnergren H, Schmidtchen A, Pang C, Bajpai R, et al. The humanistic and economic burden of chronic wounds: a protocol for a systematic review. Syst Rev. 2017;6(1):15.
2. Herber OR, Schnepp W, Rieger MA. A systematic review on the impact of leg ulceration on patients quality of life. Health Qual Life Outcomes. 2007;5:44.
3. Vishwanath V. Quality of life: Venous leg ulcers. Indian Dermatol Online J. 2014;5(3):397-9.
4. Shukla VK, Ansari MA, Gupta SK. Wound healing research: a perspective from India. Int J Low Extrem Wound. 2005;4(1):7-8.
5. Kumar SA, Binitha MP, Sarita S. A Clinical and Aetiological Study of Chronic Leg Ulcers. Int J Contemporary Med Res. 2016;3(12):3438-40.
6. Rahman GA, Fadeyi A. Epidemiology, aetiology and treatment of chronic leg ulcer: Experience with sixty patients. Ann Afr Med. 2014;9(1):1-4.
7. Fadeyi A, Adigun I, Rahman G. Bacteriological Pattern of Wound Swab Isolates in Patients with Chronic Leg Ulcer. Int J Heal Res. 2008;1(4):183-8.
8. Gokhale Y, Raut A, Lala DK, Kothari R, Kalekar L. Etiology and Outcomes of Lower Limb Ulcers in Non-Diabetic Patients, An Experience from Government Hospital in Western India. J Assoc Physicians India. 2017;65:47-50.
9. Korber A, Klode J, Al-benna S, Wax C, Schadendorf D, Steinstraesser L et al. Etiology of chronic leg ulcers in 31, 619 patients in Germany analysed by an expert survey. J Dtsch Dermatol Ges. 2010;9(2):1-6.
10. Gajjam SA, Amol W, Shrinivas G, Res IJ, Sci M. Study of the pathogenesis and diagnosis of ulcer of lower extremity under various conditions. Int J Res Med Sci. 2016;4(2):621-7.
11. Edwards H, Finlayson K, Miaskowski C, Aouizerat B, Gibb M, Care MW. Identification of Symptom Clusters in Patients with Chronic Venous Leg Ulcers. J Pain Symptom Manage. 2014;47(5):867-75.
12. Fadeyi A, Adigun I, Rahman G. Bacteriological Pattern of Wound Swab Isolates in Patients with Chronic Leg Ulcer. Int J Heal Res. 2008;1(4):183-8.
13. Wu M, Ruan H, Huang Y, Liu C, Ni P, Ye J et al. Bacteriological Investigation of Chronic Wounds in a Specialized Wound Healing Department: A Retrospective Analysis of 107 Cases. Int J Low Extrem Wounds. 2015;14(2):178-82.
14. Moore K, Hall V, Paull A, Morris T, Brown S, Mcculloch D et al. Surface bacteriology of venous leg ulcers and healing outcome. Br Med J. 2010;63(9):830-5.

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