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Clinical assessment of the ulcers of lower limb in patients from Bihar region

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Abstract
An ulcer is defined as a full thickness loss of epidermis and some dermis, which heals with scarring. Chronic leg ulcer, also known as chronic lower limb ulcer, is defined as an open lesion between the knee and ankle joint that shows no tendency to heal after three months of appropriate treatment. Such ulcers are associated with significant morbidity and decrease in the quality of life of the patient. Based on above reported findings the present study was planned for Clinical Assessment of the Ulcers of Lower Limb in Patients from Bihar Region.
The present study was planned in Department Of General Surgery, Nalanda Medical College and Hospital, Patna, Bihar. Total 50 cases of the patients suffered from Ulcers of Lower Limb were included in the present study. These cases were examined in detail and investigated thoroughly. This study included patients with venous ulcers, arterial ulcers, diabetic ulcers, non-healing ulcers and other rare types.
The data generated from present study concludes that Diabetes was the commonest disease associated with chronic leg ulceration. Thus, the study of various cases of leg ulcers arouses lot of interest and is mind bogging as far as the treatment of these cases are concerned. What with the availability of arsenal of investigation wide range of antibiotics and with ever improving dressing material, there is certainly a great improvement in treatment of chronic leg ulcers. Management should include patient education about the importance of regular care of the lower limb, and early medical treatment when necessary.

Keywords: leg, ulcers, diabetes, obesity, smoking, etc

Introduction
Ulcers are defined as abnormal breaks in the skin or mucous membranes. They can be caused by a wide number of pathologies and have a prevalence of approximately 1%.
The majority of lower limb ulcers have a venous origin (80%), with other common causes including arterial insufficiency and diabetic-related neuropathy. Rarely, they can also be caused by infection, trauma, vasculitis or malignancy (typically squamous cell carcinoma).
It should be remembered that in patients who are less mobile, ulcers may also be caused by prolonged or excessive pressure over a bony prominence (pressure ulcers), leading to skin breakdown and eventual necrosis. In the hospital setting, these pressure ulcers should be managed by adequate mattresses to aid repositioning and good wound management.
A venous ulcer is caused by venous insufficiency. They often appear shallow with irregular borders and a granulating base, characteristically located over the medial malleolus. Venous leg ulcers are the most common type of leg ulcer; they are prone to infection and can present with associated cellulitis,
Their pathophysiology is poorly understood. It is thought that valvular incompetence or venous outflow obstruction leads to impaired venous return, with the resultant venous hypertension causing the "trapping" of white blood cells in capillaries and the formation of a fibrin cuff around the vessel hindering oxygen transportation into the tissue. The white blood cells subsequently become activated, with the release of inflammatory mediators leading to resultant tissue injury, poor healing, and necrosis.
Venous ulcers can be painful (particularly worse at the end of the day) and are often found in the gaiter region of the legs. Associated symptoms of chronic venous disease, such as aching, itching, or a bursting sensation, will be present often before venous leg ulcers appear.
On examination, there may be varicose veins with ankle or leg oedema, as well as features associated with venous insufficiency, including varicose eczema or thrombophlebitis, haemosiderin skin staining, lipodermatosclerosis, or atrophie blanche. The diagnosis of venous ulcers is clinical, with the underlying venous insufficiency confirmed by Duplex Ultrasound. Most commonly venous incompetence occurs at the sapheno-femoral or sapheno-popliteal junctions, although it may occur in any perforator.
An Ankle Brachial Pressure Index (ABPI) is required to assess for any arterial component to the ulcers and to determine whether compression therapy will be suitable. If infection is suspected (i.e. erythematous or with purulent exudate) then consider microbiology swabs and antibiotics. Take swab cultures if suspecting an associated infection. Consider a thrombophilia and vasculitic screening in young patients, especially if there is a suspicion or family history of prothrombotic and autoimmune diseases. Conservative management for venous ulcers warrants leg elevation and increased exercise (promoting the calf muscle pump action which aids venous return). Encourage lifestyle changes, including weight reduction and improved nutrition, as appropriate.
Antibiotics should only be prescribed with clinical evidence of a wound infection (most wounds are colonized, therefore swab results should only be acted upon if evidence of infection).

The mainstay of management is via multicomponent compression bandaging, changed once or twice every week; 30-75% of venous leg ulcers will heal after six months of compression therapy. Eight randomised clinical trials demonstrated improved time to healing with compression versus no compression treatment. Importantly, the ABPI must be measured as at least greater than 0.6 before any bandaging is applied. Appropriate dressings and emollients are crucial in maintaining surrounding skin health. If there is concurrent varicose veins, these should be treated with endovenous techniques or open surgery, as improving venous return will allow for the healing of the venous ulcers.

An arterial ulcer refers to an ulcer caused by a reduction in arterial blood flow, leading to decreased perfusion of the tissues and subsequent poor healing. They often form as small deep lesions with well-defined borders and a necrotic base. They most commonly occur distally at sites of trauma and in pressure areas (e.g the heel). The main risk factors are those of peripheral arterial disease, including smoking, diabetes mellitus, hypertension, hyperlipidaemia, increasing age, positive family history, and obesity and physical inactivity.

A patient with a suspected arterial ulcer is likely to give a preceding history of intermittent claudication (pain when they walk) or critical limb ischaemia (pain at night). The ulcer may be painful and often develops over a long period of time, with little to no healing (therefore no or little granulation tissue). Other associated signs include cold limbs, thickened nails, necrotic toes and hair loss. On examination, the limbs will be cold and have reduced or absent pulses. In pure arterial ulcers, sensation is maintained (unlike neuropathic ulcers). Assess for signs of venous insufficiency, as some patients have mixed pathology.

A neuropathic ulcer is one that occurs as a result of peripheral neuropathy. In peripheral neuropathy, there is a loss of protective sensation. Which leads to repetitive stress and unnoticed injuries forming, resulting in painless ulcers forming on the pressure points on the limb. Concurrent vascular disease will often contribute to their formation and reducing healing potential.

Neuropathic ulcers can develop with any condition with peripheral neuropathy, the most common being diabetes mellitus and B12 deficiency. Ulcer risk is further compounded by any foot deformity or concurrent peripheral vascular disease.

Patients with neuropathic ulcers typically have a history of peripheral neuropathy (although sometimes they may be unaware) or symptoms of peripheral vascular disease. Other clinical manifestations of the neuropathy may include burning/tingling in legs (painful neuropathy), single nerve involvement (mononeuritis multiplex, such as CN III or median nerve), or amotrophic neuropathy (painful wasting of proximal quadriceps).

On examination, neuropathic ulcers are variable in size and depth, with a “punched out appearance”. They occur most commonly on sites of pressure on feet (e.g. metatarsal heads or heels). Additionally, there may be a peripheral neuropathy (classically in a ‘glove and stocking’ distribution) with warm feet and good pulses (unless element of concurrent arterial disease).

Blood glucose levels should be checked (either random glucose or HbA1c %), in addition to serum B12 levels.

Concurrent arterial disease should be assessed with an ABPI +/- duplex. Signs of infection require a microbiology swab and any evidence of deep infection (e.g. visible bone or ulcers extending into joints), may warrant an X-ray to assess for osteomyelitis. It is important to assess the extent of peripheral neuropathy which can be done using the 10g monofilament or Ipswich touch test, along with testing vibration sensation with a 128Hz tuning fork.

Many centres will have specialised diabetic foot clinics for patients with neuropathic ulcers, where they are managed via a full multidisciplinary (MDT) team. Diabetic control should be optimised, targeting HbA1c <7%. Improved diet and increased exercise (within limits) should be encouraged, and any cardiovascular risk factors present managed accordingly. Ensure regular chiropody to maintain good foot hygiene and appropriate footwear provided (e.g. non-weight bearing shoes). Any signs of infection will warrant swabs taken and antibiotics (e.g. flucloxacillin) started. Ischaemic or necrotic tissue may require surgical debridement. In severe cases, necrotic or infected digits may need amputation [1].

Ulceration of the lower leg and foot may be associated with a number of medical, surgical and dermatological conditions. Etiology of Leg Ulcers being venous disease which leads to local venous Hypertension (e. g. varicose veins), Arterial disease either large vessel (atherosclerosis), or small vessel (diabetes), Arteries associated with Autoimmune disease (Rheumatoid arthritis, lupus, etc.,), Trauma (could be self-inflicted), Chronic infection (Tuberculosis/Syphilis), Neoplastic (squamous/ basal cell carcinoma/ sarcoma) [2].

They are distinct with regards to their location, appearance, bleeding, associated pain and findings. Ulcer healing is delayed by a variety of mechanisms like site, structures involved, mechanism of wounding, contamination, loss of tissue, local factors like infections, mechanical irritation, associated diseases and ischemia, systemic factors like malnutrition, diseases like diabetes, medications like steroids, immunodeficiency like HIV, and smoking [3].

Management of patients with leg ulcers has improved due to research based approaches, compression therapy for venous, revascularization for arterial and a multidisciplinary approach for diabetic and decubitus ulcers being the important aspect. With more elderly in population this problem is likely to increase unless effective measures are taken to treat the various diseases that cause the leg ulceration. Due to recent advances in diagnostic studies such as Doppler, Plethysmography there has been considerable gain in the knowledge about anatomy, pathophysiology of chronic leg ulcers. Even though there are various techniques and procedures in the management of chronic leg ulcers since the recent past, but the management of leg ulcers still remains a study [4].

An ulcer is defined as a full thickness loss of epidermis and some dermis, which heals with scarring. Chronic leg ulcer, also known as chronic lower limb ulcer, is defined as an open lesion between the knee and ankle joint that shows no tendency to heal after three months of appropriate treatment. Such ulcers are associated with significant morbidity and decrease in the quality of life of the patient. Based on above reported findings the present study was planned for Clinical Assessment of the Ulcers of Lower Limb in Patients from Bihar Region.

Methodology

The present study was planned in Department Of General Surgery, Nalanda Medical College and Hospital, Patna, Bihar. Total 50 cases of the patients suffered from Ulcers of Lower Limb were included in the present study. These cases were examined in detail and investigated thoroughly. This study included patients with venous ulcers, arterial ulcers, diabetic ulcers, non-healing ulcers and other rare types.

All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

Following was the inclusion and exclusion criteria for the present study.

Inclusion Criteria: Patients with chronic leg ulcers.

Exclusion Criteria: Patients with traumatic ulcers, or neuropathic ulcers including leprosy, or those not consenting to participate in the study, were excluded.

Results & Discussion

Clinical assessment includes full clinical history and physical examination of the patient of leg ulcer presenting either first time or with recurrent leg ulcer. In history, the duration/recurrence of an ulcer, pain, trauma, comorbid factors, and associated medical causes should be considered. The comorbid factors such as old age, malnutrition, poor hygiene, intravenous drug abuse, obesity, varicose veins, deep vein thrombosis, and coexisting medical causes such as diabetes mellitus, peripheral arterial diseases, rheumatoid arthritis, systemic vasculitis adversely affect both prognosis, and outcome of the treatment.

The incidence of chronic leg ulcers is increasing as a result of the increase in the aging population, occupations involving prolonged standing, and increased risk factors and comorbidities such as smoking, obesity and diabetes leading to atherosclerosis. Recurrence rates are also high.

Table 1: Basic Details

College	Number of patients
Age group (years)	
< 20	2
20-35	6
36-50	13
51-65	20
> 65	8
Sex	
Male	31
Female	19
Education	
Illiterate	7
Primary school	11
Secondary school	18
Higher secondary school	10
Degree and above	4
Socioeconomic status	
Below poverty line	39
Above poverty line	11
Family history of leg ulcer	
Present	5
Absent	45
Smoking	22
Co-morbidities	
Hypertension	15
Diabetes mellitus	10
Dyslipidemia	23
Anaemia (haemoglobin < 10 gm %)	15

Table 2: Type of ulcer

Type of ulcer	Gaiter Zone	Foot	Leg	Total
Diabetic	0	24	4	28
Venous	6	1	1	8
Arterial	0	6	0	6
Malignant	0	8	2	10
Others	1	6	1	8

Table 3: Distribution of diabetic ulcers in the limbs

Side	No. of cases
Right limb	14
Left limb	12
Bilateral	2
Total	28

Table 4: Distribution in venous leg ulcers

System	No. of cases
Long saphenous	5
Short saphenous	1
Both	2
Deep veins	0
Total	8

Table 5: Distribution of various types of arterial ulcers

Pathology	No of cases
TAO	2
Atherosclerosis	4
Total	6

Deficient protective sensation leads to ulceration on high pressure areas, motor neuropathy results in biomechanical abnormalities an autonomic neuropathy causes decreased sweating and dry skin which is more prone to hyperkeratosis an ulceration. Ischeamia is caused by peripheral arterial disease resulting in decreased blood supply and tissue perfusion which significantly compromise ulcer healing. Peripheral arterial disease in patients with Diabetes tends to be multifocal and commonly affects the infra poplitea l vessels. Furthermore disease progression is usually accelerated [5] and together with microvascular disease results in poor outcomes. Endothelial dysfunction appears to be the main cause of both the macrovascular and microvascular disease and the mechanisms which contributes to this include persistant hyperglycemia, increased advanced glycation end products, oxidative stress, endothelial inflammation and reduced nitric oxide activity.

According to GATS-1 (2009-2010) India; prevalence of smoking and any form of tobacco use is more in male (47.9%) compared to female (20.3%) with overall 34.6% tobacco users. Higher rate of smoking and use of tobacco products, especially use of bidi smoking in Indian male could be the cause of more number of male patients compared to female and higher number of arterial ulcers in our study. Also incidence of Burger's disease (TAO) among peripheral arterial disease is more in India [6, 9]. Bidi smoking is prevalent in lower socioeconomic class people who also walk bare foot, so more vulnerable to trauma to foot.

Clinical assessment of ulcer includes the assessment of site, size, depth, edge, margins, floor, base, and condition of the surrounding skin. The site of the ulcer medial, lateral, anterior, posterior, or combination should be noticed, this give clue to the underlying etiology of the ulcer. The size

and surface area of the ulcer is determined by measuring the two maximum perpendicular axis, tracing the margins, and clinical photography. The surface area of the ulcer should be serially measured over time (evidence Level C) [10 11]. A study compared the accuracy of ulcer measurement from digital images with contact tracing, and it was found that the two methods were equally accurate and reproducible, but that the digital image measurement was significantly quicker and offered a number advantages (evidence Level C) [12].

Patients need to be educated on foot care. During every visit to the Diabetologist, physician, examination of the distal pulses, changes in skin colour over the feet, examination for neurological changes and presents of tropic ulcers is mandatory. This approach can definitely reduce the instances of diabetic foot ulcer and the probability of amputations.

Conclusion

The data generated from present study concludes that Diabetes was the commonest disease associated with chronic leg ulceration. Thus, the study of various cases of leg ulcers arouses lot of interest and is mind bogging as far as the treatment of these cases are concerned. What with the availability of arsenal of investigation wide range of antibiotics and with ever improving dressing material, there is certainly a great improvement in treatment of chronic leg ulcers. Management should include patient education about the importance of regular care of the lower limb, and early medical treatment when necessary.

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