

A Nonhealing or Intransigent Phase of a Septic Wound Ulcer on the Left Lower Limb for Over 30 Years without Clinical Diabetes: A Case Report

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Abstract: Chronic nonhealing wounds are painful with both psychological and financial cost to the affected patient tied to extensive economic repercussion on society. Here, we present a case of a 54-year-old man who has been living with a painful nonhealing septic ulcer wound for more than 30 years. Clinical examination revealed an extensive septic ulcerative wound on the lower left extremity with multiple ulcerative lesions covering the peroneus brevis, digitorum longus and the foot with erythema and oedema. Doppler scan revealed femoral arteries with thick veins that had undergone 25% stenosis. The left popliteal vein had 25% stenosis with distal obstruction to blood flow with elevated peaks of systolic velocity while the posterior tibial artery showed a reduced flow with abnormal waveform and an intraluminal plaque formation of about 50% stenosis. This chronic nonhealing wound requires a more sophisticated wound healing intervention such as arterial revascularisation, debridement, treatment with antimicrobials and organogenesis dressing to permit wound healing.

Keywords: Acute and chronic wounds, Septic ulcer, lower limbs, arterial revascularization, debridement, organogenesis dressing, amputation.

INTRODUCTION

A wound is a sequel of epithelial surface and excessive underlying connective tissue damage associated with poor tissue perfusion and oxygenation [1, 2]. Wounds can be categorised into acute and chronic types. An acute wound undergoes optimal haemostatic and inflammatory cascades within 30 days to repair and regenerate the damaged tissues [3-5]. On the other hand, chronic wounds undergo extensive disruptive phases with persistent underlying pathologies including infection [6, 7]. Wound healing is a complex and dynamic restoration of damaged cellular structures and tissue layers [8, 9]. The repair of wounds can be primary, secondary or tertiary intention [10-12]. Primary healing occurs with epithelialization and connective tissue attachments without any complications; secondary healing involves tissue granulation, contraction of the wound edges, epithelialization and tissue reassemble while in tertiary

healing, wounds are decontaminated before tissue granulation process are allowed to start at a given depth to the edges of the wound [13-15].

A chronic wound remains unresolved for an extended period no matter the underlying cause [16, 17]. Several factors influence the chronicity of wounds such as changes in the molecular environment of the damaged tissue with high levels of inflammatory cytokines, proteases and low levels of growth factors which either slow or terminate the healing processes [18-20]. The termination of wound healing results in increased septic wound infections [21, 22]. Thus, addressing the underlying physiological conditions of chronic wounds is essential to reinitiate the wound healing process.

Most common chronic wounds are found on the lower extremities with venous insufficiency constituting 80-90% and it affects about 1.67 per 1000 population [23-26] and the treatment of chronic wounds may run into millions of dollars per year [27, 28]. In the United States of American, the cost of treating chronic venous insufficiency ulcers alone is estimated to cost 1.5-3 billion dollars per year [29, 30]. Although there are

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several forms of chronic non-healing wounds such as surgical, diabetic, arterial, vasculitis and dermatitis, the increasing new cases of hypertension, neuropathic and diabetic ulcers are of public health importance [31, 32].

Here we report a special case of a chronic septic non-healing wound with unknown aetiology on a 54-year-old man who reported to Assin Nsuta Health Centre for wound dressing. According to him, the wound started as a small bump or boil during his early 20's. However, due to financial difficulties and constraints, he has not been able to obtain consistent treatment or care and wish the affected leg could be amputated to released him from the pain he has endured over the years.

CASE PRESENTATION

A 54-year-old male peasant farmer visited Assin Nsuta health Centre to treat and dress his self-described "nonhealing wound" that he reportedly has had for more than 30 years. He described his wound condition as chronic non-healing, progressive, painful and necrotizing infection of the lower left leg extremity for which he will like to amputate when given the necessary financial support due to the associated unbearable pain. According to him, he had previously sought medical treatment from both formal and informal (traditional medicine) health facilities for over 30 years to no avail. He had been prescribed antibiotics and other traditional herbal medicines, but he did not follow through with them due to financial limitations. His clinical condition was normal on admission to the

health facilities except for the fact that he had an extensive septic ulcerative wound on the lower left extremity with multiple ulcerative lesions covering the peroneus brevis, extensor digitorum longus and the foot with erythema and oedema (Figure 1).

The patient received 12 mega units of Benzylpenicillin IV in divided doses (3 mu qid x 72 hours), 2 g of Flucoxacillin IV in divided doses (500 mg qid x 72 hours), Brufen tablet (500 mg tid x 5 days) and Furosemide tablet (80 mg daily x 5 days). His wound dressing was performed using normal saline, Hydrogen peroxide and Povidone/Iodine solution, covered with surgical gauze and wrapped with a bandage. Again, He was given Flucoxaxillin capsules (500 mg qid x 7 days) and Paracetamol tablet (500 mg tid x 5 days) after the intravenous injections. His arterial doppler scan results showed that his femoral (common and superficial) and popliteal arteries of the right lower limb were of normal calibre and wall thickness with no intraluminal pathology or plaque. No calcification was observed and peak systolic velocities reflected normal flow. The femoral (common and superficial) arteries of the left lower limb were of normal calibre and wall thickness with mild plaque formation of about 25% stenosis. The femoral arteries however showed normal waveform with normal velocities. The left popliteal vein also had mild plaque formation of about 25% stenosis. There was, however, evidence of abnormal waveform (absent reversal flow) signifying a distal obstruction to the flow and elevated peaks of systolic velocity. The left posterior tibial artery showed a reduced flow with an abnormal waveform and an intraluminal plaque



Figure 1: Photo showing the patient's septic ulcer wounds covering the left soleus, tibialis anterior, peroneus brevis, extensor and lower extremity of the left foot.

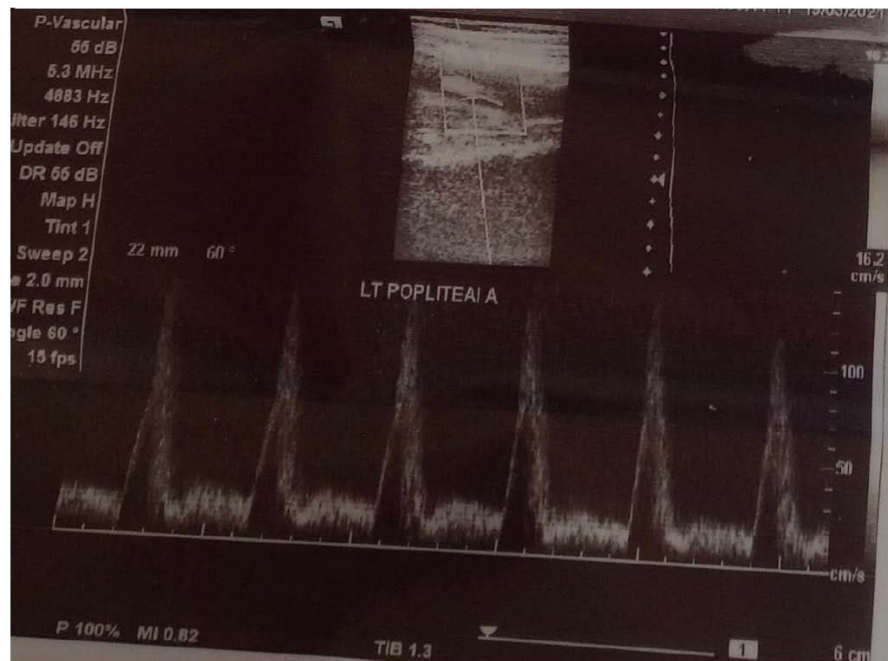


Figure 2: The arterial doppler showing peripheral artery disease with oedema of the lower left limb.

formation of about 50% stenosis. The left dorsalis pedis artery was not assessed due to wound dressing (Figure 2).

The patient was referred to the Cape Coast Teaching Hospital but return to the health Centre with a complaint of lack of attention and financial limitation to seek treatment at the teaching hospital. He was asked to only bear the cost of materials for the wound dressing any time he visits the health Centre without any further cost of service. However, irrespective of the flexible arrangement made by the health centre to assist him, his wound dressing has not been consistent as he only reports to the clinic as and when he has money for transportation and the materials for the wound dressing.

DISCUSSION

The patient's wound has stalled (nonhealing or in the intransigent phase) and its chronicity may have been dictated by the wound milieu or host immune alterations [33]. The factors involved in the wound healing process either collective or individually may have altered the healing process [34, 35]. Thus, the biological events occurring at the wound interface, exudates and underlying disease identification are essential to manage such chronic wounds to reverse the condition [36, 37]. The current status of the patient's wound management seems not to be effective to control the host-related factors due to the patient's financial limitation and inconsistency in seeking

treatment. The primary control of the wound environment and systemic therapies have also failed to achieve the healing milieu.

The patient's wound condition requires more sophisticated, specialized local wound interventions to initiate the healing process [38, 39]. His wound is potentially threatening to his left limb if prompt and appropriate therapeutic measures are not urgently administered. The chronicity of the wound, the psychological stressors and pain may have caused the cells to lose their proliferative abilities thereby impairing the healing process [40-42]. The reduced posterior tibial artery flow, popliteal vein plaque and stenosis, the intraluminal stenosis and abnormal waveforms suggest arterial revascularisation and surgical intervention [43-47]. Arterial revascularization will increase arterial perfusion which is mandatory for successful wound healing [43]. The revascularization together with debridement wound care, treatment with antimicrobials and adequate nutritional intake is important for the management of this patient [48, 49]. These will improve the tibial vessels blood supply to permit wound healing [50, 51].

There are other wound treatment options such as organogenesis (Apligraf), a tissue-engineered biological dressing that is used in the treatment of several chronic nonhealing venous leg ulcers and diabetic foot ulcers, could also be adapted for the treatment of this case [52, 53]. The Apligraf supply the wound areas with sufficient growth factors which are

essential to prevent excessive release of proteases, increase cellular senescence and bacterial bioburden [54, 55]. The Apligraf was approved by the US FDA in 1998 to be used for the treatment of venous ulcers that do not respond to conventional treatment for more than one month and by the year 2000, it had been accepted for the treatment of diabetic foot ulcers [56, 57]. Ever since its approval, it has shown to be effective for the clinical treatment of chronic nonhealing wounds. It has been reported that the use of Apligraf for 6 months is cost-effective for the treatment of venous ulcers per patient with an incremental cost of \$304 compared to the \$28,000 for the treatment of single foot ulcer among diabetes patients or the cost of amputation which ranges from \$20,000 to \$60,000 annually per patient [58-60]. However, this estimated cost excludes the personal, social, and economic aspects of a patient's life.

Although the patient wishes to opt for leg amputation to release him from the pains he has suffered all these years, he does not have the financial capacity to do so. Again, despite the availability of more effective treatment options such as wound revascularisation and organogenesis to achieve complete healing of his wound [48, 58], the low quality of life of the patient makes it economically impossible to afford these cost-effective wound management and treatment options outline in this report.

The economic burden and the public health effect of chronic wounds on the health system, and the general repercussion on the general population requires that government and policymakers critically consider formulating policies that would offer treatment for the underprivileged individuals in the country.

In conclusion, we report a unique case of a nonhealing chronic wound of a 54-year-old man who has harboured a chronic wound for over 30 years. The clinical examination and doppler scan showed a septic wound with reduced posterior tibial artery flow, popliteal vein plaque and stenosis, intraluminal stenosis and abnormal waveforms. The condition necessitates arterial revascularization, Apligraf dressing and surgical intervention to initiate healing of the stalled wound.

CONSENT

Informed consent was obtained from the patients for publication of this case report and any accompanying images.

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