

# Varicose vein on right tibia, post-traumatic varicose ulcer, and bone exposure: A case report

SAGE Open Medical Case Reports  
Volume 8: 1–4  
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DOI: 10.1177/2050313X20936078  
journals.sagepub.com/home/sco



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## Abstract

Varicose ulcer, a severe symptom of chronic venous insufficiency, may be refractory to treatment when accompanied by bone exposure. The lack of a blood supply and fresh granulation tissue on the exposed bone can result in a protracted healing time. A 59-year-old man suffered from varicose veins for 10 years, a varicose ulcer for 1 year, and an exposed right tibia for 40 days after using traditional Chinese medicinal plasters. The patient was treated with conventional high ligation and stripping of the great saphenous vein, segmental endovenous laser ablation, bone drilling, and a free skin graft. Patient outcome is satisfactory 2 years after discharge. We present a rare case of varicose ulcer in association with bone exposure. Tibia drilling with Kirschner wire was used to allow blood flow and provide nutrients for the formation of granulation tissue over the exposed bone and wound healing. Subsequently, free skin grafting was used during reconstructive surgery to replace skin loss on the right calf. Physicians encountering this rare condition in clinical practice should consider our treatment approach as a successful limb-preserving option for these patients.

## Keywords

Varicose ulcer, bone exposure, bone drilling, granulation tissue

Date received: 6 February 2020; accepted: 20 May 2020

## Introduction

Varicose ulcers occur due to dysfunctional venous valves and venous hypertension, often in association with lower extremity varicosities. Varicose ulcers are usually located above the medial malleolus and have a characteristic indolent appearance and an ulcer bed covered with a distinct layer of viable granulation tissue. Clinically, venous disease is assessed using the Venous Clinical Severity Score (VCSS),<sup>1</sup> which includes 10 clinical descriptors, including induration, number of active ulcers, duration of active ulcer, and size of ulcer.<sup>2</sup> However, the VSCC does not consider the degree of tissue loss and bone exposure caused by the ulcer. Treatment of varicose ulcers with bone exposure is challenging as the wound bed is ischemic without granulation tissue. Here, we present our clinical experience of a 59-year-old man suffering from a varicose vein on right tibia with a varicose ulcer and bone exposure.

## Case report

A 59-year-old man presented to our hospital with a varicose vein on right tibia, a varicose ulcer, and bone exposure. The

patient underwent bone drilling to allow granulation followed by a successful free skin graft.

The patient noticed a varicose vein had developed in his right leg 10 years before presentation to our hospital. However, 5 years before this, the patient reported occasional right leg pain, which worsened when he stood for prolonged

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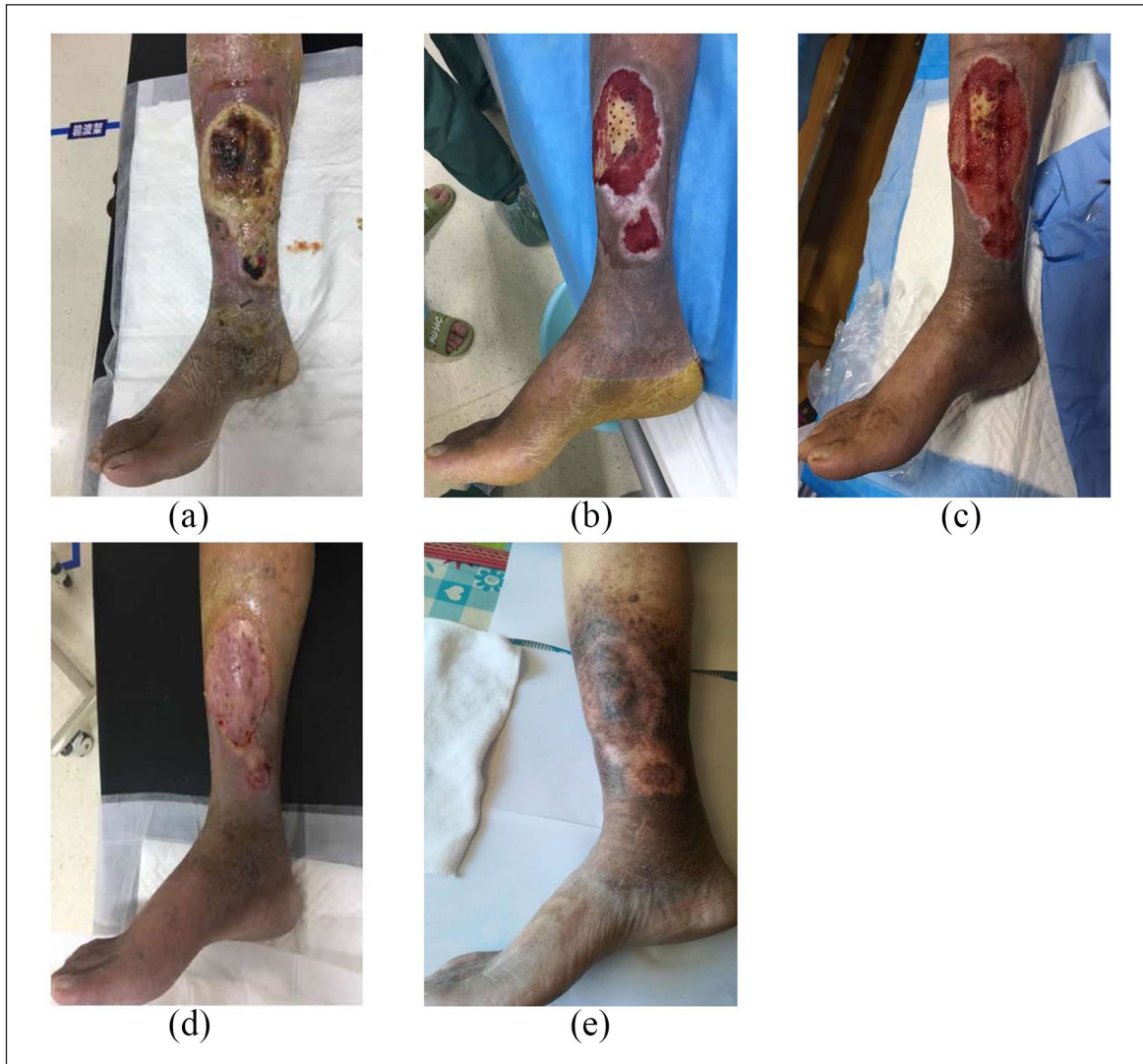
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**Figure 1.** (a) Varicose ulcer was exuding pus on admission. (b) Multiple pores in the exposed tibia. (c) Fresh granulation tissue covered the exposed tibia. (d) The successful free skin graft. (e) The right tibia of the patient 2 years after discharge.

periods and was relieved when he elevated the leg. At this time, the patient refused analgesia. The patient noticed swelling in the lower two-thirds of the right leg in the mornings 4 years before presentation. He experienced stasis dermatitis, with symptoms, including hyperpigmentation and lipodermatosclerosis 2 years before presentation. The patient also complained of itching and nocturnal leg cramps but experienced no palpitations, dyspnea, fatigue, or dizziness. The patient was accidentally knocked by a sharp object 1 year before presentation. He developed a varicose ulcer 1 cm in diameter above the medial malleolus. The patient visited a traditional Chinese medicine clinic and was treated with unidentified plasters, which exacerbated the condition leading to involvement of the tibia 40 days before presentation (Figure 1(a)).

The patient had a 40-year history of hypertension without any intervention. He had suffered a cerebral infarction 6 years ago with no lasting symptoms. The patient had not

been diagnosed with diabetes mellitus or a rheumatic disease. Physical examination revealed a temperature of 36.5°C, blood pressure of 118/83 mmHg, a pulse of 70 beats per minute, and a respiratory rate of 18 breaths per minute. Pedal pulses were easily palpable, and there were no crackles in the lungs. The patient had right lower extremity superficial varicose veins, especially on the inner side of the calf. A section of a superficial vein of the lower two-thirds of calf was hard, there was an ulcer exuding pus on the anterior surface of the tibia, the middle third of the tibia was exposed, and the right lower leg was swollen and tender to palpitation above the ankle. Clinical examination showed Trendelenburg test (+), Perthes test (-), Pratt test (-), and a VCSS of 21.<sup>1</sup> Routine blood, urine, liver function, and renal function tests, and coagulation were normal. Culture on pus from the ulcer demonstrated *Klebsiella pneumoniae* that was sensitive to piperacillin, cefepime, and meropenem. Duplex ultrasonography

indicated a varicose vein in the right calf. Deep vein thrombosis was not observed.

The patient was diagnosed with a varicose vein on right tibia, a varicose ulcer, and bone exposure. He was administered an anti-infective agent (flucloxacillin sodium 2 g tid sc), therapy for reducing edema (torasemide 20 mg qd iv, mucopolysaccharide polysulfate cream 3 cm bid topical), vasodilators (alprostadil 10 µg qd iv, troxerutin 10 ml qd iv), an antihypertensive agent (nifedipine controlled-release tablets 30 mg qd po), and an analgesic (propapam 2 g qd iv). On the 14th day (11 November 2016) of hospitalization, the patient was treated by high ligation and stripping of the great saphenous vein and segmental endovenous laser ablation. After surgery, he was administered an anticoagulant (rivaroxaban 10 mg qd po).

As a granulation tissue bed had not developed over the exposed bone, on 26 December 2016, the patient underwent a second surgery that involved drilling the tibia. Under general anesthetic, the patient was placed in the supine position, and the right lower limb was routinely disinfected. The wound was debrided and washed repeatedly, and a 1.5 mm Kirschner wire was used to drill multiple pores in the exposed tibia until blood was seen (Figure 1(b)). Hemostasis was established, and the wound was flushed and covered with a vacuum sealing drainage (VSD) dressing. On 23 January 2017, a healthy, uniform granulation tissue bed had developed over the exposed bone (Figure 1(c)). To prevent osteomyelitis, we gave the patient antibiotics both locally and systemically.

On 20 February 2017, the patient underwent reconstructive surgery with a free full thickness skin graft to replace skin loss on the right calf. A 9 × 8 cm graft obtained from the right groin was fixed with suturing (Figure 1(d)). The wound was dried and covered with VSD dressings. After surgery, the patient was administered rivaroxaban and mucopolysaccharide polysulfate cream. Compression stockings were used to prevent the recurrence of varicose veins when the wound had been fully healed. The model of the compression stockings is AD, 5 (Cizeta Surgical, Bologna, Italy), and the pressure was 30 mmHg. However, 2 years after discharge, outcomes remain satisfactory (Figure 1(e)).

## Discussion

Varicose ulcer is a costly, refractory, and sometimes life-threatening condition.<sup>3</sup> Initial treatment usually involves compression stockings, although their use is limited by frailty, obesity, and skin fragility or contact dermatitis.<sup>4,5</sup> If the condition worsens, minimally invasive procedures, such as subfascial endoscopic perforator surgery<sup>6</sup> or endovenous laser ablation<sup>7</sup> are used. If these procedures are ineffective, drug therapy, such as pentoxifylline,<sup>8</sup> and surgeries, including high ligation and stripping of the great saphenous vein, are performed.

Currently, there are no guidelines for the treatment of a varicose ulcer with bone exposure. The present report describes our clinical experience of a patient that presented with a varicose vein on right tibia, a varicose ulcer, and bone exposure and should raise awareness among physicians of one possible treatment strategy for this rare condition. Our patient underwent conventional high ligation and stripping of the great saphenous vein and segmental endovenous laser ablation. Simple endovenous laser ablation of the great saphenous vein was not considered as the varicose ulcer had been refractory to previous treatment with compression stockings and pharmacotherapy. There was no granulation tissue over the areas of bare bone, and the wound could not heal. Given the lack of blood supply, tibia drilling with Kirschner wire was used to allow blood flow and provide nutrients for the formation of granulation tissue and wound healing. Although this technique has been used in other fields, it is a novel approach to the treatment of varicose ulcer. Antibiotics were used to control infection. Subsequently, free skin grafting was used during reconstructive surgery to replace skin loss on the right calf. Compression stockings were used to prevent the recurrence of varicose veins. This approach avoided lower limb amputation. Patient outcome is satisfactory 2 years after discharge.

## Conclusion

In summary, we report a rare case of varicose ulcer in association with bone exposure. The diagnosis was based on medical history, clinical features, and duplex ultrasonography. The patient was treated with conventional high ligation and stripping of the great saphenous vein, segmental endovenous laser ablation, bone drilling, a free skin graft, and compression stockings. Based on our clinical experience, physicians encountering this rare condition in clinical practice could consider our treatment approach as a successful limb-preserving option for these patients.

## Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## Informed consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

### Patient consent statement

The patient information was anonymized. Written informed consent was obtained from the patient for publication of the case.

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