

# Ultrasound-Guided Hydrodissection of an Entrapped Saphenous Nerve After Lower Extremity Varicose Vein Stripping: A Case Report

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A 78-year-old woman complained of numbness, tingling, and pain in the left leg 6 months after greater saphenous vein stripping. Ultrasonography identified a mass adjacent to the saphenous nerve at the scar. Ultrasound-guided hydrodissection separated the mass from the nerve. The pain disappeared after hydrodissection, and the patient remained pain free for 3 days. The visual analog pain scale decreased from 80 (before treatment) to 60 three days later. The hydrodissection was repeated weekly for a total of 8 times, and the pain completely resolved 4 months later. Ultrasound-guided hydrodissection is effective to treat nerve entrapment after lower extremity varicose vein stripping. (A&A Practice. 2020;14:28–30.)

Vein stripping is the traditional treatment for primary varicose veins of the lower extremity.<sup>1</sup> However, this procedure is associated with a risk of nerve damage.<sup>1</sup> Postoperative sensory deficit has been reported in 7%–11% of patients after greater saphenous vein stripping.<sup>2,3</sup> It was reported that postoperative pain usually spontaneously resolves within 3 months,<sup>4</sup> but some patients have persistent pain, paresthesia, and discomfort.<sup>5</sup> The pathophysiology of these refractory symptoms has not been determined.

We report a patient who had persistent pain after varicose vein stripping. Nerve entrapment with a mass adjacent to the saphenous nerve was found and effectively treated with ultrasound-guided hydrodissection. The patient has provided written consent to publish this case report.

## CASE DESCRIPTION

A 78-year-old woman with lower extremity varicose underwent bilateral greater saphenous vein stripping under general anesthesia. She had no remarkable medical history. Postoperatively she complained of numbness, tingling, and pain in the left leg. This was initially diagnosed as neuropathy and treated with pregabalin 300 mg/d. The symptoms continued 6 months postoperatively. The patient was referred to the pain clinic for evaluation and treatment of intractable neuropathy. Physical examination

showed that the numbness and spontaneous pain were in the saphenous nerve distribution, starting in the vicinity of the operative scar on the medial side of the left leg. Ultrasound examination showed a 0.5-cm mass adjacent to the saphenous nerve (Figure 1). Tinel sign was elicited by applying pressure over the mass with the ultrasound probe. The symptoms were suspected to be due to saphenous nerve entrapment by the mass. Magnetic resonance imaging suggested that the mass was related to the varicose vein stripping (Figure 2). The mass was in the path of the vein stripping wire. The mass was adjacent to the saphenous nerve beneath the surgical scar.

Ultrasound-guided nerve hydrodissection with 10 mL of saline and 4 mg of betamethasone was performed using a 25-gauge needle (1.5-inch, Terumo Hypodermic Needle, Terumo Medical Co, Tokyo, Japan) (Figure 3). The pain immediately resolved, which lasted for 3 days. The visual analog pain scale decreased from 80 (before treatment) to 60 three days after hydrodissection. Repeat ultrasound-guided hydrodissection was planned weekly.

After each session of hydrodissection, the pain resolved for 3 days, and the overall severity and distribution of the pain decreased gradually. The visual analog pain scale decreased to 30 three weeks later. Pregabalin was continued, and the herbal Kampo medicine Keishikajutsu-buto was prescribed by the clinician to alleviate the discomfort associated with numbness. Hydrodissection was performed with saline only, and pregabalin was decreased to 150 mg/d from the third week onward. Hydrodissection stopped after 8 weeks, at which time the patient had no further pain, but mild numbness remained. There were 8 hydrodissection sessions in total. Four months after starting treatment, numbness was limited to the medial ankle, and pregabalin was reduced to 75 mg/d. Ten months after starting treatment, the numbness resolved completely.

## DISCUSSION

Saphenous vein stripping for varicose veins of the lower extremity is associated with a risk of saphenous nerve injury. Therapeutic strategies other than surgical stripping have been considered and are generally less invasive, such

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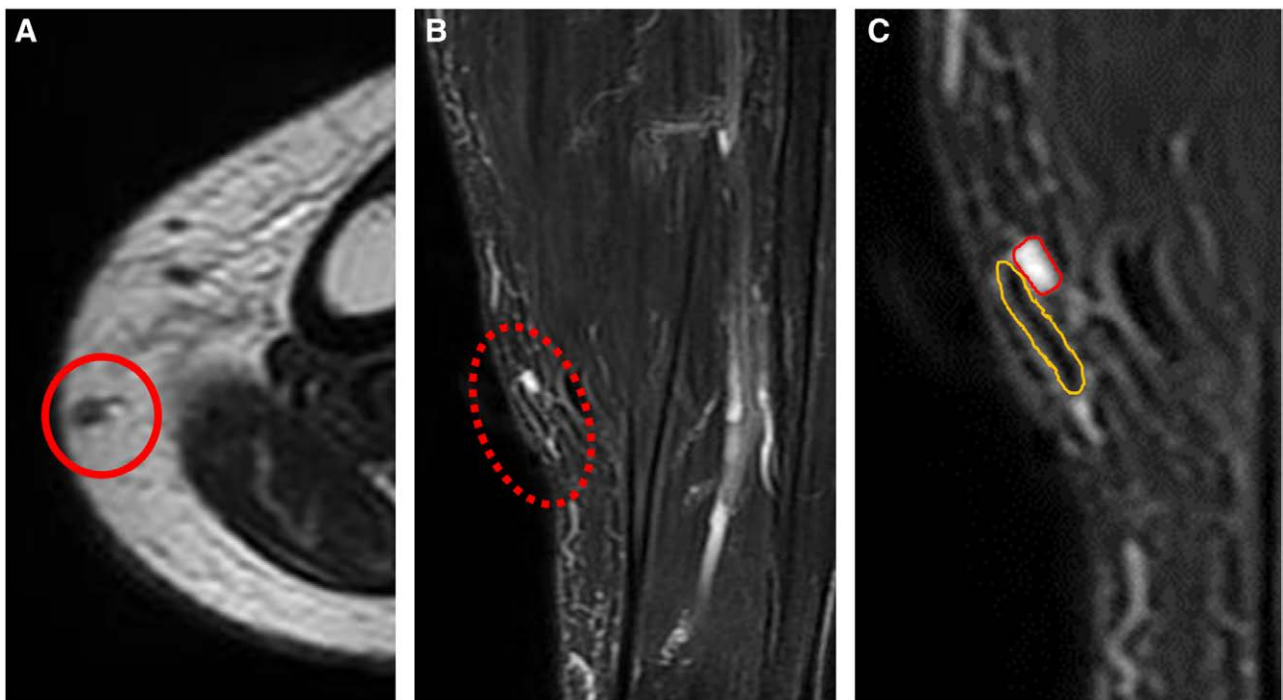
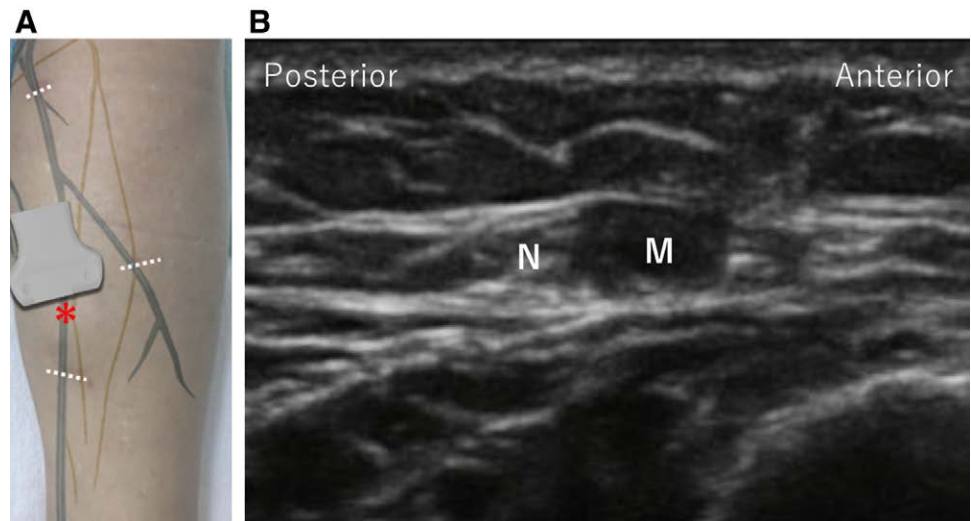
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**Figure 1.** Photograph of the patient's left leg and ultrasound view at the operative site. A, Position of the probe. Applying pressure at the site (\*) with the ultrasound probe elicits a positive Tinel sign. White dashed line indicates the incisional scar. B, A mass is adjacent to the saphenous nerve. M indicates mass; N, saphenous nerve.

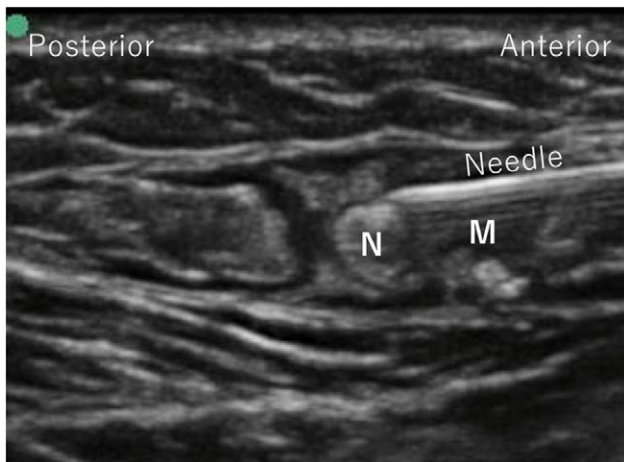


**Figure 2.** Magnetic resonance imaging of the left lower extremity. Magnetic resonance imaging (diffusion-weighted images) shows a round mass in the transverse plane view (A), which looked like an empty shell of the vein in the coronal plane view (B and C). Magnetic resonance imaging was taken 1 week after the start of hydrodissection therapy. A, Transverse plane view of the middle of the left leg. The red circle shows the location of the mass. B, Coronal plane view of the middle of the left leg. The dashed red circle shows the location of the mass. C, Magnified coronal plane view (B). The yellow circle shows an empty shell, likely caused by the vein stripping procedure. The red ring shows a high-density area, which is the saphenous nerve.

as radiofrequency or laser ablation, cryosurgery, bipolar coagulation, and foam sclerotherapy.<sup>1</sup> However, the efficacy of these less invasive procedures has not been conclusively shown.

Below the knee, especially in the lower third of the leg, there is an increased risk of saphenous nerve injury with saphenous vein procedures, because the vein and nerve are adjacent to each other. Branches of the nerve lie along the vein.<sup>6</sup> Saphenous nerve injury may be caused by ablation of these complexes of neighboring vein and nerve

tissue with the stripping wire. Lower extremity varicose vein stripping frequently results in saphenous neuropathy, but it is usually self-limited.<sup>4</sup> However, long-term unrelenting pain has been reported. In the present patient, we found a small mass adjacent to the saphenous nerve. Ultrasound-guided hydrodissection relieved the pain immediately. The pain was believed to be due to saphenous nerve entrapment by the mass. Magnetic resonance imaging showed that the mass may have been related to the stripping wire. This is the first report of refractory pain



**Figure 3.** Ultrasound-guided hydrodissection. Hydrodissection was performed to separate the saphenous nerve from the adjacent mass. M indicates mass; N, saphenous nerve.

after lower extremity varicose vein stripping diagnosed as saphenous nerve entrapment. This suggests that other patients with continued pain after vein stripping may also have saphenous nerve entrapment. We recommend ultrasound examination for patients with refractory pain after varicose vein stripping.

Ultrasound-guided nerve hydrodissection is a minimally invasive treatment for various neuropathies, including carpal tunnel syndrome, scleroderma hand, meralgia paresthetica, mastitis, and sural neuroma.<sup>7-11</sup> The mechanism of hydrodissection therapy has not been elucidated but may lyse the adhesion between the mass and the nerve. Supporting this idea, Fader et al<sup>7</sup> reported that symptoms disappeared with 1 hydrodissection therapy performed for neuroma. Depending on the density of the adhesions, there may be situations where it can be cured with 1 hydrodissection session, and others may not resolve no matter how many times hydrodissection is performed. The present patient had resolution of pain with 8 hydrodissection sessions. The density of the adhesion may not have been so severe in this patient. Further studies are needed to elucidate the efficacy of ultrasound-guided hydrodissection for nerve entrapment syndrome.<sup>12</sup>

Keishikajutsu has been used to treat neuropathic pain.<sup>13</sup> We felt that Keishikajutsu may relieve the numbness in this patient and has been reported to have an anti-inflammatory effect.<sup>14</sup> Physical peeling from hydrodissection may induce inflammation at the procedure site, which can lead to scar formation at the site. Hence, an anti-inflammatory drug may prevent future scar formation.

Ultrasound diagnosis and ultrasound-guided hydrodissection may be effective for the diagnosis and treatment of

saphenous nerve entrapment after lower extremity varicose vein stripping. ■■

#### DISCLOSURES

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**Contribution:** This author helped write the draft.

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