Chemical lumbar sympathectomy in the treatment of idiopathic livedo reticularis

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Objective: **Livedo reticularis (LR) is a reticulated discoloration of the skin, particularly on lower extremities. Few treatment options are reported. This study investigated the efficacy and safety of chemical lumbar sympathectomy (CLS) in idiopathic LR. The key technique points of CLS are also illustrated in detail.**

Methods: **Patients with idiopathic LR with a strong desire for treatment were recruited during a 2.5-year period. L3-4 CLSs were performed with 5% phenol (2 mL) in each injection site. The needle tip extends to approximately one-third of the vertical dividing line of the vertebral body. The contrast along the psoas muscle fibers indicates targeting on gray rami communicans instead of the sympathetic trunk. The primary efficacy variable was achieving "clear or almost clear" of LR lesions staying >1 hour in a 24°C air-conditioned room. Safety assessments included monitoring and recording of all adverse events and tolerability to treatment. The follow-up period was 2.5 to 4.7 years.**

Results: **Ten women (median age, 22 years) were enrolled. Seven patients achieved "clear or almost clear" of LR lesions after CLS. The postoperative skin surface temperature increase was 7.4°C ± 2.6°C. Two patients achieved "major partially resolved," and one patient achieved "minor partially resolved." Two of the seven with "clear or almost clear" results reported recurrence ≤1 year during the follow-up, CLS was repeated, and they then achieved "clear or almost clear" again. Two patients reported mild pain localized to the thigh area, which resolved spontaneously by the second day.**

Conclusions: **This study showed CLS provides a valid option for the treatment of idiopathic LR. The efficacy of CLS can be long-lasting, and CLS can be repeated if LR recurs. Targeting at gray rami communicans, rather than the sympathetic trunk, is comparably effective and safer for sympathetic interruption. (J Vasc Surg 2015;62:1018-22.)**

Livedo reticularis (LR) is a reticulated reddish-violet discoloration of the skin, most commonly on the lower extremities. LR can be congenital, physiologic, secondary, or primary/idiopathic.[1,2] Congenital LR can improve during the first few years of life, with 20% of patients showing complete resolution.[1] Physiologic LR usually disappears with warming and reappears with cooling.[1] For secondary LR, treatment of the underlying cause, such as autoimmune diseases, infection, drugs, various forms of arteritis, and tumor, among others, is most important.

Idiopathic LR accounts for most LR cases.[2,3] Although some fluctuation occurs with temperature, LR usually persists to varying degrees with warming. Patients may feel chilling, numbness, and tingling, and more importantly, their mental state may suffer due to altered appearance, especially in young women. Some patients report feelings of inferiority and reduced quality of life due to the inability to wear dresses, swim, and bathe in public areas. These patients may actively seek medical treatment; unfortunately, no treatment is available other than cold avoidance. LR is unresponsive to vascular laser therapy or vasodilatory medications.[1]

The pathophysiologic change in idiopathic LR is slowdown of the blood flow and deoxygenated blood in the dermic venous plexus due to persistent vasospasm of arterioles. Sympathectomy has been a treatment choice to improve peripheral blood flow in ischemic diseases and Raynaud disease[4,5] and might be also useful in idiopathic LR. One study reported a favorable result after open lumbar sympathectomy in patients with LR[3]; however, the follow-up period was not reported, and the trauma from the surgery was significant.

Compared with open surgery, chemical lumbar sympathectomy (CLS) is much less invasive and can be performed repeatedly. CLS has been practiced in our hospital for >20 years and shown to be a safe treatment.[6-8] We performed a prospective study to explore the short-term and long-term efficacy and safety of CLS in patients with idiopathic LR.

METHODS

The Local Ethics Committee approved the study, and all patients signed written informed consent.

Study population. Patients with idiopathic LR fulfilling the following criteria were recruited: (1) involvement of more than two-thirds of the lower extremities, (2) LR

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This work was partly funded partly by grants from Peking University Third Hospital Seed Funding (Grant No.: 77434-01 to L.Z.) and the Beijing Higher Education Young Elite Teacher Project (Grant No.: YETP0072 to W.-H.W.).

Author conflict of interest: none.

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The editors and reviewers of this article have no relevant financial relationships to disclose per the JVS policy that requires reviewers to decline review of any manuscript for which they may have a conflict of interest.

0741-5214

http://dx.doi.org/10.1016/j.jvs.2015.04.419

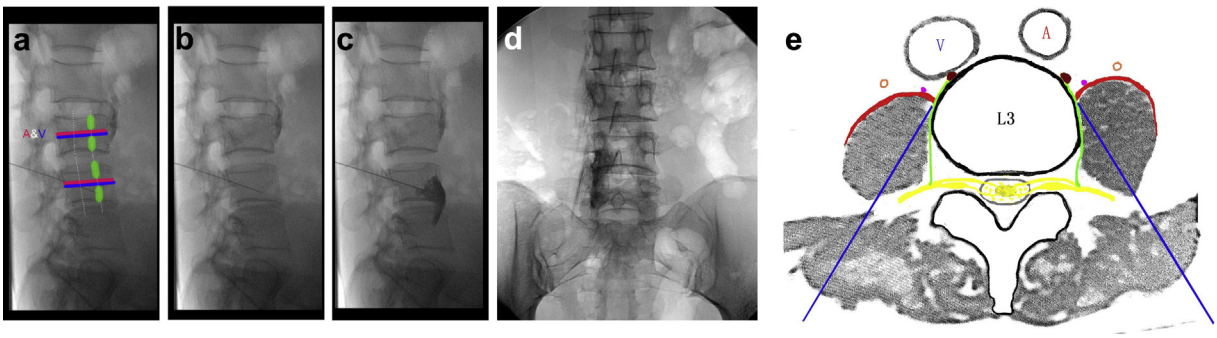

Fig 1. The introduction and positioning of the needles is shown in **(a-c)** lateral radiographs and in **(d)** an anteroposterior radiograph. **a,** The *green areas* show the optimum areas of needle tip injection, the *red and blue bold lines* represent the lumbar artery and vein, and the *white dotted lines* represent the one-third vertical dividing lines of the vertebral body. **b,** Positioning of the needle. **c,** Contrast between the psoas muscle and the vertebral body; note the areas of drug spreading are usually larger than the *green areas.* **d,** Most contrast is confined to the optimum area, and a fraction of contrast is seen spreading along the psoas muscle. The contrast along the psoas muscle fibers is the marker of the injection behind the anterior fascia of the psoas major muscle. The area targets the gray rami communicans area instead of sympathetic trunk. **e,** A diagram shows the cross-section at the level of the needle tip: *blue*, needle; *red*, the anterior fascia of the psoas major muscle; *brown*, sympathetic trunk; *green*, gray rami communicans; *pink*, genitofemoral nerve; *orange*, ureter. *A,* Artery; *V,* vein.

obviously visible in the summer, (3) bothered by social inhibition caused by LR, (4) showing very strong desire for treatment by seeking medical treatment at least twice and waiting for at least 1 week to make a decision, (5) aged ≥18 years, and (6) not pregnant and no plans to become pregnant in the next year. The study excluded patients with other cutaneous signs, such as nodules, purpura, necrosis, or ulceration, and possible association of LR with systemic symptoms, drugs, or laboratory abnormalities for autoimmune causes. All patients were recruited from Dermatology or Interventional Radiology and Vascular Surgery clinics in our hospital between May 2010 and August 2012.

CLS procedure. CLS was performed under fluoroscopic guidance with technical key points shown in Fig 1. Briefly, the patient was in lateral decubitus position with a pad on the flank opposite to the operation side, and the lower limbs were kept flexed. The skin surface and the entire needle tracts were anesthetized with 0.5% lidocaine without vasoconstrictors. The needle was inserted at a distance of ~7 to 8 cm from the dorsomedian line to facilitate outflank introduction according to body shape. The needle was introduced toward one of the optimum injection areas (Fig 1, *a*) and positioned tangential to the vertebral body. Its tip extended to approximately the one-third vertical dividing line of the vertebral body (Fig 1, *a* and *b*), which was behind the anterior fascia of the psoas major muscle. The correct position was confirmed by the injection of iodated contrast (Fig 1, *c* and *d*).

After aspiration of the syringe to ensure that no puncture accidents would occur, a 2 mL 5% aqueous solution of phenol was injected at each site. This technique was performed at L3 and then repeated at L4, without withdrawing the needle from the skin. If interruption was not satisfactory, a supplemental injection to other optimum areas or to L5 might be performed, with the total phenol amount for both sides of <10 mL. Satisfactory sympathetic interruption was defined as a rise in skin temperature of at least 2°C at two or more points on the limb 5 minutes after CLS.[9] Skin temperature was measured using an infrared thermometer with accuracy of 0.1°C, and took the average of temperature increase at the shin and the plantar and dorsum of the foot. The contralateral side was treated in the same manner. The entire procedure took ~15 minutes per side. After the procedure was completed, the patient was encouraged to drink water and ambulate.

Efficacy and safety assessment. The primary efficacy variable was graded as (1) clear or almost clear, (2) major partially resolved, (3) minor partially resolved, (4) no response or almost no response, of the LR lesions while the patient waited for >1 hour in a 24°C air-conditioned room after the CLS procedure. The grading was made by the agreement of the doctors and the patients/relatives by visual inspection of the skin and comparing clinical photos before and after CLS. Secondary efficacy variables were a temperature increase of the leg skin surface and LR relapse during a follow-up period of 2.5 to 4.7 years. Safety assessments included monitoring and recording of all adverse events and tolerability to treatment. Patient satisfaction was graded as very satisfied, satisfied, fair, and unsatisfied.

RESULTS

Among 34 idiopathic LR patients seeking treatment, 10 patients (all female) were enrolled. CLS was not suggested for the other patients because their LR was not severe enough. Patients were a median age of 22 years (range, 18-39 years), and the disease duration ranged from 3 years to >20 years.

The CLS showed a rapid onset of action. Fig 2 shows the self-comparison between two legs immediately after one side was done.