Patient Preference and Adherence Dovepress

Open Access Full Text Article

CASE SERIES

Ultrasound-Guided Stellate Ganglion Block Combined with Pharmacological Treatment for Rosacea: A Report of Two Cases

Changjian Gao, Fang Wang, Lulu Zhou, Weiwei Zhan, Rui Min

Department of Anesthesiology, the Third Clinical Medical College of China Three Gorges University, Gezhouba Central Hospital of Sinopharm, Yichang, Hubei, 443002, People's Republic of China

Correspondence: Rui Min, Email 504461407@qq.com, Weiwei Zhan, Email 504461407@qq.com

Abstract: Rosacea is a chronic inflammatory disease primarily affecting the central facial region, significantly involving the facial blood vessels and the sebaceous gland units associated with hair follicles. The stellate ganglion block (SGB) technique can restore balance to autonomic nervous function by interrupting the impulse conduction of preganglionic and postganglionic sympathetic nerve fibers, thereby alleviating excessive peripheral blood vessel contraction, enhancing tissue blood supply, balancing hormone secretion, and modulating immune responses. SGB has demonstrated remarkable efficacy in treating various skin conditions affecting the head, face, and neck. In our case study, two patients with a disease duration exceeding six months underwent treatment involving oral medications, topical applications, and local cold spray, which yielded unsatisfactory results. Subsequently, our department employed the SGB method guided by multiple ultrasound assessments, resulting in nearly complete resolution of the intractable rosacea lesions in both patients.

Keywords: ganglion block, rosacea, stellate ganglion

Rosacea, a chronic inflammatory skin disease, primarily affects the face and is characterized by erythema and telangiectasia, often accompanied by inflammatory papules, pustules, and nasal sebaceous gland hyperplasia. It predominantly occurs in adults aged between 20 and 50 years.[1] This condition may arise from a combination of factors, characterized by chronic inflammation, and is influenced by natural immunity and vasomotor dysfunction within a specific genetic context.[2] The disease can be classified into four clinical types: erythematotelangiectatic type, papulopustular type, hypertrophic type, and ocular type. Treating rosacea poses challenges and can have significant psychological and social implications for patients. This report discusses two cases of refractory rosacea that were treated using various sympathetic ganglion block (SGB) methods, resulting in satisfactory outcomes. One patient consented to the publication of both case data and accompanying images, while the other agreed only to the publication of case data, as detailed below:

Medical Records

General Information

Patient 1: A 47-year-old female presented to our hospital for treatment of facial erythema, papules, and pustules accompanied by pruritus for the past six months, with exacerbation over the last week. She had previously been in good health, denied any family history of skin conditions and any special food, medication, or other allergies. She was initially diagnosed with rosacea (papular pustular stage). Treatment included oral doxycycline at a dosage of 0.1 g/day and topical metronidazole gel applied twice daily for four weeks; however, the therapeutic response was suboptimal.

Patient 2: A 45-year-old female sought treatment at our hospital for facial erythema and papules persisting for two years, with an increase in pruritus and burning sensation over the past three months. She also reported being in good health prior to this condition and denied any genetic predisposition and any special food, medication, or other allergies.

Received: 9 September 2024
Accepted: 17 December 2024
Published: 24 December 2024

The initial diagnosis was rosacea (erythema capillary expansion stage). Treatment consisted of oral doxycycline at a dosage of 0.1 g/day, metronidazole gel applied twice daily, and local cold spray administered every other day for three weeks. Although the burning sensation was alleviated, there was minimal improvement in erythema and inflammatory papules, indicating a lack of satisfactory treatment response.

Treatment Background

Clinical studies have demonstrated the efficacy of SGB in treating acne vulgaris. Goel et al[3] noted in their systematic retrospective study that SGB is effective not only for herpes zoster and intractable pruritus but also for various skin conditions, including seborrheic dermatitis, acne, cholinergic urticaria, specific dermatitis, chilblains, and sclerosis. Additionally, Park et al[4] successfully employed the SGB method to treat an acne patient, while Gun et al[5] effectively treated a patient with seborrheic dermatitis using the same approach. Given the frequent overlap of rosacea with acne and the similar pathogenesis shared by rosacea, acne, and seborrheic dermatitis, we opted to administer multiple SGB treatments for this patient, drawing on insights from the aforementioned studies.

Treatment Process

Both patients were treated with multiple ultrasound-guided SGB as follows: The patient was supine, the head turned to the opposite side, and the high-frequency probe was placed above the patient's clavicle and moved in the cephalic direction. The ultrasound image showed a prominent posterior tubercle and an incomplete anterior tubercle as the C7 transversal process (ramp-like). Then, the probe is shifted slightly to the side of the head to see the high-echo Bihummedan camel sign, which is the C6 transverse process, which is located at the level of the cricoid cartilage notch. In this image, the jugular arteriovenous, sternocleidomastoid muscle, and cervical longus muscle can be clearly identified, and the cervical middle ganglion is located on the surface of the cervical longus muscle. A high-frequency linear probe can be used to monitor the injection path in real time under ultrasonic guidance. After the tip reaches the surface of the longus muscle of the neck, blood is withdrawn and 10 mL 1% lidocaine is injected slowly to observe the drug diffusion range. The hallmark of SGB success is the presence of Horner syndrome. Each patient received SGB alternately on the left and right side, once a day, and remained in the treatment room for 30 minutes after each treatment, and could leave on their own without any adverse reactions, for a course of 7 days. Keep patients away from direct sunlight, protect skin with sunscreen and moisturizing lotion, and avoid spicy food.

Therapeutic Effect Evaluation

The severity of Rosacea was assessed based on different skin lesion manifestations, Various relevant scales and evaluation methods have been used for the overall assessment of the disease, This includes the [flushing assessment tool (FAST[6]) and global flushing severity scale (GFSS[7])], persistent erythema [clinician's erythema assessment (CEA[8]) and patient's The self-assessment (PSA[9])] and Evaluation Scale [Inflammatory Focus Count and Investigator Global Evaluation (investigator's global assessment, IGA)].[10] In order to timely evaluate the treatment effect, we adopted the monitoring tool (rosacea tracker[11]) proposed by the International Rose Acne Collaborative Group in 2019 to comprehensively evaluate and monitor the severity of rose acne based on the performance of skin lesions. Photos were taken after each treatment and usedThe monitoring tool (rosacea tracker[11]) for rose acne evaluation was performed separately Physician assessment and patient assessment.

Two patients using ultrasound-guided SGB combined rosacea treatment for a week, according to the evaluation results of the doctor and patients (see Tables 1–4), the severity of the skin features has been significantly improved, the influence on the daily life has decreased significantly, the treatment has achieved obvious effect, follow-up march no relapse, and no adverse reactions during treatment.

Discussion

Currently, there is no cure for rosacea; treatment focuses on managing the signs and symptoms of the condition. Conventional therapeutic approaches encompass general treatment, topical therapies, systemic medications, and physical therapy.[12] The stellate ganglion block (SGB) is a minimally invasive procedure that targets sympathetic nerves in specific

Table 1 Patient 1's Physician Sheet

Rosacea Features	Visit Date			
	Day1	Day3	Day5	Day7
Diagnostic features: Please indicate severity using a score of 0–4, where 0= Clear/none | 1 = Almost clear/minimal | 2 = Mild | 3 = Moderate | 4 = Severe				
Persistent centrofacial erythema	4	3	2	1
Phyma – clinically inflamed	3	2	1	0
Phyma – clinically non-inflamed	2	1	1	0
Major features: Please indicate severity using a score of 0–4, where 0= Clear/none | 1 = Almost clear/minimal | 2 = Mild | 3 = Moderate | 4 = Severe				
Transient centrofacial erythema	4	2	1	1
Papules/pustules	3	2	1	0
Telangiectases	1	1	1	0
Ocular manifestations (additional sheet available to detail)	1	1	0	0
Minor features: Please indicate severity using a score of 0–4, where 0= Clear/none | 1 = Almost clear/minimal | 2 = Mild | 3 = Moderate | 4 = Severe				
Burning/stinging sensation	3	1	0	0
Oedema	2	0	0	0
Dry sensation/appearance	2	1	0	0
Other (please describe)	3	1	0	0

Table 2 Patient 1's Patient Sheet

Rosacea Features	Visit Date:			
	Day1	Day3	Day5	Day7
Diagnostic features: Please indicate for each feature you have, using a score of 0–4, where 0= Not at all | 1 = A little | 2 = Somewhat | 3 = A lot | 4 = Very much				
Persistent centrofacial erythema (Ongoing redness in the central part of the face. May not be visible in darker skin)	4	3	2	1
Phyma – inflammatory (Persistently thickened skin that is red)	3	2	1	0
Phyma – non-inflammatory (Persistently thickened skin that is not red)	2	2	1	1
Major features: Please indicate for each feature you have, using a score of 0–4, where 0= Not at all | 1 = A little | 2 = Somewhat | 3 = A lot | 4 = Very much				
Transient centrofacial erythema (Temporary redness or feeling of warmth; flushing)	3	2	1	1
Papules/pustules (Red bumps which may be pus-filled or deep under the skin)	3	2	1	0

(*Continued*)

Table 2 (Continued).

Rosacea Features	Visit Date:			
	Day1	Day3	Day5	Day7
Telangiectases (Visible blood vessels)	2	2	2	1
Ocular manifestations (additional sheet available to detail) (Eye problems related to rosacea)	1	0	0	0
Minor features: Please indicate for each feature you have, using a score of 0–4, where 0= Not at all | 1 = A little | 2 = Somewhat | 3 = A lot | 4 = Very much				
Burning/stinging sensation	3	1	0	0
Oedema (swelling)	2	1	0	0
Dry sensation	2	1	0	0
Other (eg itch; please describe)	3	1	0	0
Impact on overall quality of life: Please indicate using a score of 0–4, where 0= Not at all | 1 = A little | 2 = Somewhat | 3 = A lot | 4 = Very much				
Over the past month, how much have your rosacea signs and symptoms affected your quality of life?	4	3	2	1
Over the past month, how much has the time lost to your rosacea affected your quality of life?	3	3	1	1
Over the past month, how much has your rosacea affected your productivity in the workplace or education?	3	2	2	1
Over the past month, how well controlled do you feel your rosacea has been?	0	1	3	4

Table 3 Patient 2's Physician Sheet

Rosacea Features	Visit Date			
	Day1	Day3	Day5	Day7
Diagnostic features: Please indicate severity using a score of 0–4, where 0= Clear/none | 1 = Almost clear/minimal | 2 = Mild | 3 = Moderate | 4 = Severe				
Persistent centrofacial erythema	3	3	2	1
Phyma – clinically inflamed	2	2	1	0
Phyma – clinically non-inflamed	2	1	1	0
Major features: Please indicate severity using a score of 0–4, where 0= Clear/none | 1 = Almost clear/minimal | 2 = Mild | 3 = Moderate | 4 = Severe				
Transient centrofacial erythema	3	2	1	0
Papules/pustules	3	2	1	0
Telangiectases	1	1	1	0
Ocular manifestations (additional sheet available to detail)	0	0	0	0
Minor features: Please indicate severity using a score of 0–4, where 0= Clear/none | 1 = Almost clear/minimal | 2 = Mild | 3 = Moderate | 4 = Severe				
Burning/stinging sensation	3	1	0	0

(*Continued*)

Table 3 (Continued).

Rosacea Features	Visit Date			
	Day1	Day3	Day5	Day7
Oedema	2	0	0	0
Dry sensation/appearance	2	1	0	0
Other (please describe)	2	1	0	0

Table 4 Patient 2's Patient Sheet

Rosacea Features	Visit Date:			
	Day1	Day3	Day5	Day7
Diagnostic features: Please indicate for each feature you have, using a score of 0–4, where 0= Not at all | 1 = A little | 2 = Somewhat | 3 = A lot | 4 = Very much				
Persistent centrofacial erythema (Ongoing redness in the central part of the face. May not be visible in darker skin)	3	3	1	1
Phyma – inflammatory (Persistently thickened skin that is red)	3	1	1	0
Phyma – non-inflammatory (Persistently thickened skin that is not red)	2	2	1	1
Major features: Please indicate for each feature you have, using a score of 0–4, where 0= Not at all | 1 = A little | 2 = Somewhat | 3 = A lot | 4 = Very much				
Transient centrofacial erythema (Temporary redness or feeling of warmth; flushing)	3	3	2	1
Papules/pustules (Red bumps which may be pus-filled or deep under the skin)	3	2	1	0
Telangiectases (Visible blood vessels)	2	2	1	1
Ocular manifestations (additional sheet available to detail) (Eye problems related to rosacea)	0	0	0	0
Minor features: Please indicate for each feature you have, using a score of 0–4, where 0= Not at all | 1 = A little | 2 = Somewhat | 3 = A lot | 4 = Very much				
Burning/stinging sensation	3	1	0	0
Oedema (swelling)	2	0	0	0
Dry sensation	2	1	0	0
Other (eg itch; please describe)	2	1	0	0
Impact on overall quality of life: Please indicate using a score of 0–4, where 0= Not at all | 1 = A little | 2 = Somewhat | 3 = A lot | 4 = Very much				
Over the past month, how much have your rosacea signs and symptoms affected your quality of life?	4	3	2	1
Over the past month, how much has the time lost to your rosacea affected your quality of life?	3	3	1	1
Over the past month, how much has your rosacea affected your productivity in the workplace or education?	3	2	2	1
Over the past month, how well controlled do you feel your rosacea has been?	1	2	3	4

Figure 1 Patient 1's Phenotypes Day1.

Figure 2 Patient 1's Phenotypes Day3.

organs by administering local anesthetics into the neck's stellate ganglion (SG) and surrounding loose connective tissue.[13] As above, SGB has been applied in the treatment of two cases of rosacea, both of which demonstrated satisfactory efficacy.

1. We observed decreasing trends in the scores for Diagnostic features, Major features and Minor features in both Physician sheets and Patient sheets (see Tables 1–4).
2. Patients perceived that the impact of rosacea on their overall quality of life was reduced and felt that rosacea was well controlled (see Tables 2 and 4).

The pathogenesis of rosacea is complex and involves multiple factors. The primary etiology includes genetic predispositions, neurovascular dysfunction, immune-inflammatory responses, and environmental influences. These factors can be triggered by various stimuli such as temperature fluctuations, emotional state, sleep patterns, sun exposure, physical activity, dietary choices, and inappropriate skin care practices.[14] We believe SGB's satisfactory efficacy in the treatment for rosacea may be associated with the following mechanism of action.

After SGB treatment, the score for centrofacial erythema and phyma in sheet started to decrease in day3. The decline continued on day5(see Tables 1–4). On day7, all the major features, including papules/pustules, telangiectases, and ocular manifestations were clear or almost clear in patient 1(Figures 1–4). Patient 2 was unable to obtain before-and-after photos due to privacy protection.

SGB can inhibit both central and peripheral sympathetic nerve activity and reduce Norepinephrine (NE) levels. The release of various neurotransmitters, including Adenosine triphosphate (ATP) and Neuropeptide Y (NPY), regulates sympathetic activity, restoring it from a pathologically hyperactive state to normal levels and maintaining homeostasis.[15] This process contributes to a reduction in inflammation. SGB plays a crucial role in regulating immune function.[16,17] Guo

Figure 3 Patient 1's Phenotypes Day5.

Figure 4 Patient 1's Phenotypes Day7.

Zongrong et al[18] demonstrated that SGB treatment can reduce the production of inflammatory mediators triggered by the body's stress response and alleviate the suppression of immune function resulting from trauma. Thus, it is evident that SGB can regulate the overall immune system, enhance defense mechanisms, and exert anti-inflammatory effects.

The burning/stinging sensation and itching almost disappeared in both patients on the day3 after treatment (see Tables 1–4). SGB can interrupt the detrimental cycle of sympathetic nervous tension and induce anesthetic effects in the affected area, thereby effectively reducing the itching and burning sensations associated with rosacea. This was also confirmed in the two patients.

After treatment, the patients felt their rosacea were gradually controlled, and the overall quality of their lives improved. The negative effects of rosacea signs and symptoms were reduced, as was the time lost. The productivity in the workplace or education also improved.(see Tables 2 and 4). SGB can enhance blood circulation and increase blood flow in specific innervation areas. Notably, it can elevate blood flow in the carotid artery by 75%, thereby improving cerebral blood supply and increasing perfusion volume in the head.[19] This improvement helps maintain the balance of various hormones secreted by the hypothalamic-pituitary system,[15] reducing both the proliferation of blood vessels and the aggregation of inflammatory cells. Furthermore, it has been reported that SGB can regulate melatonin secretion by the pineal gland.[20] Wang et al[21] found that SGB alleviates depression induced by chronic stress in rats by increasing levels of plasma adrenocorticotrophin releasing factor (CRF), adrenocorticosterone (ACTH), corticosterone (CORT), norepinephrine, and epinephrine. Thus, a substantial body of literature supports the notion that SGB regulates various hormone levels secreted by the hypothalamic-pituitary system, leading to improved sleep and reduced anxiety.

The stellate ganglion block (SGB) can effectively inhibit the transmission of sympathetic nerves, leading to the dilation of blood vessels in target organs and enhancing blood supply. Furthermore, the vasomotor factors associated with SGB can be modulated to improve blood circulation and facilitate self-healing capabilities.[22] However, the small size of the stellate ganglion, along with its complex anatomical positioning adjacent to several vital organs, larger blood vessels,

and nerves, presents challenges. Variations in anatomical positioning among individuals further complicate the application of blind techniques for SGB, increasing the risk of inadvertent injury. The most common complications arise from needle misplacement into a blood vessel, resulting in the injection of anesthetic into unintended areas or the formation of hematomas, which may include accidental injury to epidural or subarachnoid vessels.[23] Utilizing ultrasound guidance allows for clear visualization of blood vessels, target nerve roots, needle placements, and the diffusion process of the injection around the nerves,[24] significantly enhancing the success rate of SGB and reducing the incidence of complications.

Conclusion

For patients with rosacea, stellate ganglion block (SGB) performed under ultrasound guidance may be a safe and effective alternative when traditional medicine and physical therapy prove insufficient. This approach warrants promotion. However, it is important to note that despite the significant enhancement in treatment safety afforded by ultrasound monitoring and guidance, vigilance regarding potential complications during the procedure is essential. Therefore, emergency rescue medications and first-aid equipment should be readily available at all times.

Ethics Statement

The study was approved by the Health Science Research Ethics Committee of Gezhouba Central Hospital of the Chinese Academy of Sciences, based on the Policy Statement of the Chinese Health Commission on the Ethical Review of Life Science and Medical Research Involving Humans: Ethical Conduct in Research Involving Humans, Chapter 2, Article 7. No institutional approval from Health Science Research Ethics Committee of Gezhouba Central Hospital of the Chinese Academy of Sciences was required to publish case details. All patients participating in the study provided written informed consent for the release of case details and accompanying images.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Feifei S, Yan L, Huaxu L. Progress in the treatment of refractory erythema of rosacea [J. *Chinese J Leprosy Dermatol*. 2019;36(9):571–575. in Chinese.
2. Goel V, Patwardhan AM, Ibrahim M, Howe CL, Schultz DM, Shankar H. Complications associated with stellate ganglion nerve block: a systematic review. *Reg Anesth Pain Med*. 2019;44(6):669–678. doi:10.1136/rapm-2018-100127
3. Park JG, Cha DC, Lee SK, et al. Effect of a stellate ganglion block on acne vulgaris: a case report. *Korean J An-Esthesiol*. 2001;41(4):500–502. doi:10.4097/kjae.2001.41.4.500
4. Gun WK, Ki HM, Jeong YS, et al. Seborrheic dermatitis treatment with stellate ganglion block. *Korean J Anesthesiol*. 2016;69(2):171–174. doi:10.4097/kjae.2016.69.2.171
5. Kawata AK, Revicki DA, Thakkar R, et al. Flushing Assessment Tool (FAST): psychometric properties of a new measure assessing flushing symptoms and clinical impact of niacin therapy[J]. *Clin Drug Investig*. 2009;29(4):215–229. doi:10.2165/00044011-200929040-00001
6. Norquist JM, Watson DJ, Yu Q, et al. Validation of a questionnaire to assess niacin-induced cutaneous flushing[J]. *Curr Med Res Opin*. 2007;23(7):1549–1560. doi:10.1185/030079907x199637
7. Tan J, Liu H, Leyden JJ, et al. Reliability of clinician erythema assessment grading scale[J]. *J Am Acad Dermatol*. 2014;71(4):760–763. doi:10.1016/j.jaad.2014.05.044
8. Tan J, Leoni M. Erythema of rosacea: validation of patient′s self-assessment grading scale[J]. *J Drugs Dermatol*. 2015;14(8):841–844.
9. Kim J, Ahn JW, Ha S, et al. Clinical assessment of rosacea severity: oriental score vs. quantitative assessment method with imaging and biomedical tools[J]. *Skin Res Technol*. 2017;23(2):186–193. doi:10.1111/srt.12318
10. Schaller M, Almeida L, Bewley A, et al. Recommendations for rosacea diagnosis, classification and management: update from the global Rosacea Consensus 2019 panel[J]. *Br J Dermatol*. 2020;182(5):1269–1276. doi:10.1111/bjd.18420
11. Weinkle AP, Doktor V, Emer J. Update on the management of rosacea[J]. *Clin Cosmet Invest Dermatol*. 2015;8(4):159–177. doi:10.2147/CCID.S58940
12. Elias M. Cervical sympathetic and stellate ganglion blocks. *Pain Physician*. 2000;3(3):294–304. doi:10.36076/ppj.2000/3/294
13. Asai Y, Tan J, Baibergenova A. Canadian clinical practice guidelines for rosacea. *J Cutan Med Surg*. 2016;20(5):432–445. doi:10.1177/1203475416650427
14. Amhaz HH, Manders L, Chidiac EJ, et al. Unusual case of contralateral Horner's syndrome following stellate-ganglion block: a case report and review of the literature. *Local Reg Anesth*. 2013;6:31–33. doi:10.2147/LRA.S49580
15. Kim J, Park HS, Cho SY, et al. The effect of stellate ganglion block on intractable lymphedema after breast cancer surgery. *Korean J Pain*. 2015;28(1):61–63. doi:10.3344/kjp.2015.28.1.61

16. Uchida T, Nakao S, Morimoto M, et al. Serious cervical hematoma after stellate ganglion block. *J Anesth*. 2015;29(2):321. doi:10.1007/s00540-014-1914-7
17. Zongrong G, Zean L, Shiping G, et al. Effect of stellate ganglion block on perioperative cellular immunity in gynecological laparoscopic surgery [J]. *HEILONGJIANG MEDL J*. 2018;42(2):113–115. in Chinese.
18. Jun Z, Lisheng Z. *Pain Therapeutics [M]*. Beijing: Huaxia Publishing House. Vol. 94 1994 ; 452.
19. Uchida K, Tateda T, Hino H. Novel mechanism of action hypothesized for stellate ganglion block related to melatonin[J]. *Med Hypotheses*. 2002;59 (4):446–449. doi:10.1016/S0306-9877(02)00158-5
20. Wang W, Shi W, Qian H, et al. Stellate ganglion block attenuates chronic stress induced depression in rats[J]. *PLoS One*. 2017;12(8):e0183995. doi:10.1371/journal.pone.0183995
21. Guo W, Jin XJ, Yu J, et al. Effects of stellate ganglion block on the peri-operative vasomotor cytokine content and intrapulmonary shunt in patients with esophagus cancer. *Asian Pac J Cancer Prev*. 2014;15(21):9505–9509. doi:10.7314/APJCP.2014.15.21.9505
22. Xiukun L, Lei L, Mingwei S. Research progress of ultrasound-guided stele ganglion block [J]. *Chinese J Experim Diagnost*. 2024;24 (11):1913–1915.
23. Narouze S, Peng PW. Ultrasound-guided interventional procedures in pain medicine: a review of anatomy, sonoanatomy, and procedures. Part II: axial structures[J]. *Reg Anesth Pain Med*. 2010;35(4):386–396. doi:10.1097/AAP.0b013e3181e82f42
24. Subspecialty Committee of Cosmetic Dermatology, Chinese Medical Doctor Association Dermatologist Branch. Expert consensus on diagnosis and treatment of rosette acne in China (2016)[J]. *Chin Jl Dermatol*. 2017;50(3):156–161. in Chinese.