

STELLATE GANGLION BLOCKS FOR POST-COVID-19 HEADACHES: CASE REPORT

Woo Jun Shim¹, Skylar Remick², and Chong Kim, MD³

Background: Long COVID can impact patients with a wide range of new, returning, or ongoing health symptoms, lasting for months to years despite recovery from the acute infection. One of the symptoms is headaches. Post-COVID-19 headaches can affect the quality of life for many patients, and as a result, the management and treatment of the symptoms have become important issues.

Case Report: We present a case series of patients with varying presentations of post-COVID-19 symptoms, including headaches, who responded positively to the use of stellate ganglion blocks (SGBs).

Conclusions: We report the successful use of a right-sided SGB for varying post-COVID-19 symptoms.

Key words: Long COVID, post COVID, post-COVID headache, headaches, stellate ganglion block, case report

BACKGROUND

Postacute sequelae of SARS-CoV-2 infection (PASC), also known as long COVID, refers to persistent or long-term complications of SARS-CoV-2 infection, lasting 4 or more weeks, that include pulmonary, hematologic, and neuropsychiatric, among many others (1). Post-COVID-19 headaches are one of the more prevalent PASC symptoms even at 180 days after the onset of initial symptoms (2). Management of such headaches has been limited mainly to nonsteroidal anti-inflammatory drugs and triptans (3). The stellate ganglion (SG) is formed by the fusion of the inferior cervical and first thoracic sympathetic ganglia and serves as the synapse for sympathetic fibers that supply the head, neck, heart, and superior limbs (4). The etiology of the PASC headache is unclear now but is implicated with dysregulation of the autonomic nervous system (5). The use of the stellate ganglion block (SGB) has shown some promises in the man-

agement of post-COVID-19 headaches by potentially reducing the sympathetic nervous system activity within the cervical sympathetic chain (6). In this case series, we report sustained reductions in headaches and associated symptoms at 6 to 12 months following a right-sided SGB (R SGB).

CASE DESCRIPTIONS

Patient 1

A 38-year-old woman, with no significant past medical history complaining of headaches as a primary symptom, as well as fatigue, brain fog, and hair loss 14 months after COVID-19 diagnosis, underwent an R SGB 2 months following evaluation. Her headaches were mostly frontal in location. Ten months following the SGB, the patient reported a 50% improvement in the headache symptoms, but no changes in other symptoms.

From: ¹Case Western Reserve University School of Medicine, Cleveland, OH; ²Georgia State University, Atlanta, GA; ³Case Western Reserve University School of Medicine, Pain Division, MetroHealth, Cleveland, OH

Corresponding Author: Chong Kim, MD, E-mail: ckim3@metrohealth.org

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Patient 2

A 48-year-old man, with a past medical history of obstructive sleep apnea, chronic obstructive pulmonary disease, gastroesophageal reflux disease, and tobacco use disorder, underwent an R SGB following headaches, which was global, that lasted 6 months since the positive test. He also reported fatigue, tinnitus, and hoarseness as accompanying symptoms. One year following the procedure, the patient reported an 80% reduction in headaches.

Patient 3

A 58-year-old woman, with a history of depression and hypothyroidism, complained of right-sided headaches for 15 months post-COVID-19, as well as right-sided chest pain and hoarseness. Upon an R SGB, the patient reported a complete relief of headaches and a 50% reduction in chest pain 9 months following the procedure.

Patient 4

A 61-year-old woman, with no significant past medical history complaining of global headaches lasting 18 months since onset of COVID-19, underwent an R SGB. She also complained of eye pain, hoarseness, and fatigue. At her 8-month follow-up, the patient reported a 30% reduction in headaches and eye pain, but no changes in hoarseness or fatigue.

Patient 5

A 48-year-old woman, with a past medical history of temporomandibular joint dysfunction, complained of brain fog that lasted > 18 months since the positive COVID-19 test. The patient also complained of joint pain, metallic taste, and fatigue. She underwent an R SGB and then a bilateral SGB (B SGB), 2 months apart. Following the R SGB, the patient reported a 50% reduction in frontal headaches; following the B SGB, the patient reported an 80% reduction in headaches, a 50% reduction in fatigue, and improved taste.

All of the patients underwent a right-sided fluoroscopically guided SGB (7). The R SGBs were performed using a 25G 2-inch needle without sedation at the C6 vertebral level, targeting the Chassaignac's tubercle. Local anesthetic of 1% lidocaine was used subcutaneously. Contrast medium was used before the injectate, which was 5 mL of 0.25% bupivacaine.

Local institutional review board approval was obtained for this case report (STUDY00000328).

DISCUSSION

This case series describes the improvement of various long COVID symptoms with the use of an SGB, particularly headaches. As seen in the series, there is no discernible pattern as to what types of patients experience such symptoms. All patients in the series showed at least a 30% reduction in headaches, an average of 68%, and the effects of the SGB lasted for many months following the procedure. The results suggest consideration and potential applicability of the SGB for post-COVID-19 symptoms (Table 1).

The pathogenesis of post-COVID-19 headaches is thought to be caused by miscommunication in the "inflammatory reflex" where neurotransmitter propagation regulates the host's immune response (8). The R SGB has also been shown to have many other benefits, especially for patients with posttraumatic stress disorder. This suggests a potential mechanistic overlap of the 2 pathogeneses due to prolonged changes to the autonomic nervous system (9). It is possible that headaches are the result of an imbalance of cytokines due to infection causing an imbalance of neuronal communication.

Cerebral blood flow is also an important consideration when it comes to the pathogenesis of headaches. A significant remodeling of the microstructures of the brain can be seen in many patients with severe COVID-19 symptoms. The cerebral blood flow for COVID-19 patients was much lower compared to normal control (10). It has been shown that SGB results in increased extracranial blood flow (11). Our case series provides support for the pathogenesis of the headache itself, as well as the mechanism behind SGB action given that many of our patients were able to achieve long-lasting relief after administration of the SGB.

Limitations

Due to the nature of the case series and small sample size, the study has innate limitations. Additionally, the SGBs were performed on the right side only in 4 of the 5 patients.

CONCLUSIONS

Our case series shows that the R SGB may serve as an important avenue of treatment for many patients. The role of the B SGB vs just the R SGB can be further explored in terms of improved headache with evidence of improved olfactory and gustatory functions (6). Given the intricate communication between the autonomic system and immune system, the use of the SGB may

Table 1. Summary of presented patient cases.

Age/ Gender	PMH	Primary Symptoms	Treatments	Results
1 (38/W)	None	Headache	R SGB, ONB, acupuncture	50% relief
2 (48/M)	OSA, GERD, COPD, tobacco	Headache	R SGB, ketamine infusion	80% relief
3 (58/W)	Depression, hypothyroidism	Headache	R SGB	100% relief
4 (61/W)	None	Headache	R SGB	30% relief
5 (48/W)	TMJ	Brain fog	R SGB, B SGB	80% relief

Abbreviations: PMH, past medical history; R SGB, right-sided stellate ganglion block; B SGB, bilateral stellate ganglion block; ONB, occipital nerve block; OSA, obstructive sleep apnea; GERD, gastroesophageal reflux disease; COPD, chronic obstructive pulmonary disease; TMJ, temporomandibular joint dysfunction.

help alleviate symptoms of long COVID and improve the quality of life for many patients. Despite the increasing support and evidence of the SGB in helping alleviate

post-COVID-19 symptoms, including headaches, further investigation is warranted to explore the mechanism and efficacy.

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