

Medical Policy



Title: Sphenopalatine Ganglion Block for Headache

Professional

Original Effective Date: November 13, 2017
 Revision Date(s): November 13, 2017;
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Institutional

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Populations	Interventions	Comparators	Outcomes
Individuals: • With chronic migraine headache	Interventions of interest are: • Sphenopalatine ganglion block(s)	Comparators of interest are: • Medication • Self-management (eg, relaxation, exercise) • Botulinum toxin injection	Relevant outcomes include: • Symptoms • Functional outcomes • Quality of life • Treatment-related morbidity
Individuals: • With severe acute headache treated in the emergency setting	Interventions of interest are: • Sphenopalatine ganglion block(s)	Comparators of interest are: • Medication	Relevant outcomes include: • Symptoms • Functional outcomes • Quality of life • Treatment-related morbidity
Individuals: • With cluster headache	Interventions of interest are: • Sphenopalatine ganglion block(s)	Comparators of interest are: • Medication • Oxygen therapy	Relevant outcomes include: • Symptoms • Functional outcomes • Quality of life • Treatment-related morbidity

DESCRIPTION

Chronic migraine and severe headaches are common conditions and the available treatments are not universally effective. A proposed treatment option is blocking the sphenopalatine ganglion (SPG) nerve by applying topical anesthetic intranasally. Several catheters approved by the Food and Drug Administration are available for the SPG blocking procedure.

OBJECTIVE

The objective of this policy is to evaluate whether sphenopalatine ganglion blocks improve the net health outcome in patients with chronic or severe acute headaches, compared with other accepted headache treatments.

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BACKGROUND**Headaches AND Headache Treatments**

Headaches are common neurologic disorders and are among the top reasons why patients seek medical care. Headaches affect approximately 50% of the general population in a given year and over 90% of people have a lifetime history of headache.¹ The 2 most common types of headache are migraines and tension-type headaches.

Migraines are the second-most common headache disorder, with a 1-year migraine prevalence of approximately 12% in the United States.² They are characterized by severe pain on one or both sides of the head, nausea, and, at times, disturbed vision. Migraines can be categorized by headache frequency, and by the presence or absence of aura. Chronic migraine is defined as attacks on at least 15 days per month for more than 3 months, with features of migraine on at least 8 days per month.³

Tension headaches have a prevalence of approximately 40%.² Diagnostic criteria include the presence of at least two of the following characteristics: bilateral headache location, nonpulsating pain, mild-to-moderate intensity, and headache not aggravated by physical activity.³

Cluster headaches are less common than tension or migraine headaches, with an estimated prevalence of 0.1% of the population.² They are characterized by severe unilateral orbital, supraorbital, and/or temporal pain that also includes other symptoms in the eye and/or nose on the same side (eg, rhinorrhea, eyelid edema or drooping).

Treatment

A variety of medications are used to treat acute migraine episodes. They include medications taken at the onset of an attack to abort the attack (triptans, ergotamines) and medications to treat the pain and other symptoms of migraines once they are established (nonsteroidal anti-inflammatory drugs, antiemetics). Prophylactic medication therapy may be appropriate for people with migraines that occur more than 2 days per week. In addition to medication, behavioral treatments (eg, relaxation, cognitive therapy) are used to manage migraine headache. Botulinum toxin type A injections are a U.S. Food and Drug Administration-approved treatment for chronic migraine.

Severe acute cluster headaches may be treated with abortive therapy, including breathing 100% oxygen, and triptan medications. Other medications used to treat cluster headaches include steroids, calcium channel blockers, and nerve pain medications. Due to the severity of pain associated with cluster headaches, patients may seek emergency treatment. Tension-type headaches are generally treated with over the counter pain medication.

Sphenopalatine Ganglion Block

Sphenopalatine ganglion (SPG) blocks are a proposed treatment option for chronic migraines and some severe non-migraine headaches. The SPG is a group of nerve cells located behind the bony structures of the nose. The nerve bundle is linked to the trigeminal nerve, the primary nerve involved in headache disorders. The SPG has both autonomic nerves, which in this case are associated with functions such as tearing and nasal congestion, and sensory nerves, associated with pain perception. SPG blocks involve topical application of local anesthetic to mucosa overlying the SPG. The rationale for using SPG blocks to treat headaches is that local anesthetics in low concentrations could block the sensory fibers and thereby reduce pain while maintaining autonomic function.

The proposed procedure for SPG blockade is to insert intranasally a catheter that is attached to a syringe carrying local anesthetic (eg, lidocaine, bupivacaine). Once the catheter is in place, the local anesthetic is applied to the posterior wall of the nasal cavity and reaches the SPG. Originally, SPG blocks were done by inserting a cotton-tipped applicator dabbed with local anesthetic into the nose; this technique may be less accurate and effective than the currently proposed procedure. Neurostimulation of the SPG and SPG blockade with radiofrequency lesioning have been used outside of the United States,⁴ but these treatments are not cleared or approved by the U.S. Food and Drug Administration.

Three catheter devices are commercially available in the United States for performing SPG blocks. The catheters have somewhat different designs but all are attached to syringes to deliver local anesthetic. The catheters are inserted intranasally and, once in place, the local anesthetic is applied through the catheter. With 2 of the 3 commercially available catheters (the SpenoCath®, Allevio™), patients are positioned on their back with their nose pointed vertically and their head turned to the side. With the Tx360® device, patients remain seated.⁵

The company marketing the Tx360® device proposes its use in the context of the MiRx™ protocol.⁶ This 2-part protocol includes a medical component for immediate pain relief and a physical component to reduce headache recurrences. The medical component involves clinical evaluation and, if the patient is considered eligible, an SPG block procedure. The physical component can include any of a number of approaches such as physical therapy, ergonomic modifications, massage, and dietary recommendations.

The optimal number and frequency of SPG treatments is unclear. Information from the American Migraine Foundation suggests that the procedure can be repeated as often as needed to control pain.⁵ A randomized controlled trial has described a course of treatment for migraines consisting of SPG blocks twice a week for 6 weeks (total, 12 treatments).

SGB blocks are proposed for both short- and long-term treatment of headaches and migraines. When used in the emergency setting in patients with severe acute headaches, the goal of treatment is to abort the current headache while the patient is in the emergency department. In the randomized controlled trial that provided a 6-week course of treatment with SPG blocks for chronic migraine (mentioned above), short-term outcomes were assessed up to 24 hours after each treatment, and the duration and frequency of chronic migraines were assessed at 1 and 6 months after the course of treatment.

Regulatory Status

The Tx360® Nasal Applicator (Tian Medical), the Allevio™ SPG Nerve Block Catheter (JET Medical), and the SpenoCath® (Dolor Technologies) are considered class I devices by the Food and Drug Administration and are exempt from 510(k) requirements. This classification does not require submission of clinical data on efficacy but only notification of Food and Drug Administration prior to marketing. All 3 devices are used to apply numbing medication intranasally.

POLICY

Sphenopalatine ganglion blocks are considered **experimental / investigational** for all indications, including, but not limited to, the treatment of migraines and non-migraine headaches.

RATIONALE

This evidence was reviewed and based on a search of the MEDLINE database. The most recent literature update was performed through September 23, 2019..

Evidence reviews assess the clinical evidence to determine whether the use of a technology improves the net health outcome. Broadly defined, health outcomes are length of life, quality of life, and ability to function—including benefits and harms. Every clinical condition has specific outcomes that are important to patients and to managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of a technology, 2 domains are examined: the relevance and the quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. RCTs are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

Because the placebo response rate is typically high in patients with headache, assessment of the evidence for this review focuses on randomized, placebo-controlled trials.

Chronic Migraine

Clinical Context and Therapy Purpose

The purpose of sphenopalatine ganglion (SPG) block(s) in patients who have chronic migraine headache is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does the use of a SPG block improve the net health outcome in patients with chronic migraine headache?

The following PICO was used to select literature to inform this review.

Patients

The relevant population of interest is individuals with chronic migraine headache.

Interventions

The therapy being considered is a SPG block.

Comparators

The following therapies and practices are currently being used to treat chronic migraine headache: medication, self-management (eg, relaxation, exercise), and botulinum toxin injection.

Outcomes

The general outcomes of interest are reductions in migraine frequency, intensity, and medication use. Treatment-related adverse events are minor. A series of injections may be given over several weeks, with follow-up over months to monitor for treatment effect and durability.

Randomized Controlled Trials

The published literature on SPG blocks to treat chronic migraine consists of 1 double-blind, placebo-controlled randomized trial^{7,8}, and a case report with 3 patients.⁹

Findings from the RCT were published in two publications by Cady et al (2015). The first publication⁷, reported on the primary outcome measure and key secondary outcomes, and the subsequent publication⁸, reported on supplemental secondary outcomes and longer term follow-up. The trial included patients who met International Classification of Headache Disorders-II diagnostic criteria for chronic migraine¹⁰, and had had chronic migraine for at least 3 months. Patients could use concomitant headache medication, but had to agree not to change medication use during the study period. Following an initial 28-day baseline period to confirm the diagnosis of chronic migraine, patients were randomized 2:1 to treatment with bupivacaine 0.5% or saline (placebo) applied using the Tx360 device. Patients received a series of 12 treatments—2 treatments a week for 6 weeks. The primary outcome was change in pain severity, measured using a 0-to-10 numeric rating scale. Pain severity was assessed 15 minutes, 30 minutes, and 24 hours after each treatment. Key secondary outcome measures were the Patient's Global Impression of Change, the Headache Impact Test (HIT-6) questionnaire, and patient satisfaction with treatment. In addition, patients kept headache diaries throughout the study.

Forty-one patients met eligibility criteria and had chronic migraine diagnoses confirmed during the baseline period. These patients were randomized to bupivacaine (n=27) or to placebo (n=13). Mean baseline scores on the numeric rating scale were 4.8 in the bupivacaine group and 4.5 in the placebo group. When findings for all treatments were pooled, patients in the bupivacaine group reported a significantly greater reduction in numeric rating scale scores than the placebo group at 15 minutes, 30 minutes, and 24 hours after treatment. Bupivacaine-treated patients also had significantly lower Patient's Global Impression of Change scores than saline-treated patients at 30 minutes and 24 hours posttreatment. No statistically significant between-group differences were reported in HIT-6 scores or in average acute medication use. Only 1 serious adverse event was reported and it was not treatment-related.

The second publication by Cady et al reported on 1- and 6- month follow-up results and on supplemental secondary end points.⁸ To control for multiple comparisons, the cutoff for statistical significance for the supplemental secondary end points was p less than 0.01. There were no statistically significant differences between groups in the reported supplementary secondary outcomes. These outcomes included the number of headache days per month, the mean pain score, and quality of life measures. A post hoc power analysis revealed that the trial was underpowered to detect significant differences in secondary outcomes. Some results were suggestive of a long-term effect. For example, the bupivacaine group had a lower, albeit nonsignificant number of headache days in the month posttreatment (17 days) than the placebo group (23 days). However, a trial with a larger sample size would be needed to confirm whether 1- or 6-month results are significantly better after bupivacaine than after placebo treatment.

Section Summary: Chronic Migraine

One double-blind, placebo-controlled, randomized trial has evaluated transnasal SPG blocks for chronic migraine. The trial found a significantly greater short-term (up to 24 hours) reduction in pain severity after active treatment vs placebo. However, there were no significant longer term effects on other outcomes (ie, 1 and 6 months after 12 treatments over 6 weeks). The trial was underpowered to detect outcomes at 1 and 6 months. It had some risks of bias due to a high rate of dropouts. Additional adequately powered trials are needed to determine the impact of SPG blocks on health outcomes.

Severe acute headache treated in the emergency setting

Clinical Context and Therapy Purpose

The purpose of SPG block(s) in patients who have severe acute headache treated in the emergency setting is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does the use of a SPG block improve the net health outcome in patients with severe acute headache treated in the emergency setting?

The following PICO was used to select literature to inform this review.

Patients

The relevant population of interest is individuals with severe acute headache treated in the emergency setting.

Interventions

The therapy being considered is a SPG block.

Comparators

The following therapy is currently being used to treat severe acute headache treated in the emergency setting: medication.

Outcomes

The general outcomes of interest are reductions in headache intensity and medication use. Treatment-related adverse events are minor. Follow-up over several hours is needed to monitor for treatment effect.

Randomized Controlled Trials

The published literature on SPG blocks to treat severe acute headache consists of 1 double-blind, placebo-controlled, randomized trial, as reported by Schaffer et al (2015).¹¹ The trial included patients between the ages of 18 and 65 who presented to the emergency department with a frontal-based crescendo-onset headache and a negative neurologic examination. The trial focused on frontal-based headaches because this population is considered most likely to respond to SPG blocks. Headaches were not classified into specific types but patients with sudden-onset headache were excluded. Ninety-three patients met eligibility criteria and were randomized 1:1 to treatment with bupivacaine 0.5% (n=45) or to a saline placebo (n=48) applied using the Tx360 device. The intervention consisted of 1 treatment session. The primary outcome was a 50% absolute pain reduction on a 100-mm visual analog scale 15 minutes posttreatment. Four patients, 2 in each group, withdrew before receiving the intervention and 2 were deemed ineligible after randomization. Thus, 41 patients in the bupivacaine group and 46 in the placebo group were included in the primary analysis.

For the primary outcome, 20 (49%) patients in the bupivacaine group and 19 (41%) patients in the placebo group had at least a 50% reduction in the mean visual analog scale score. The difference between groups (7.5%) did not differ statistically (95% confidence interval, -13% to 27%). Secondary outcomes, including at least a 19-mm reduction in visual analog scale score, percentage of patients who were headache-free 15 minutes postintervention, and percentage of patients who were nausea-free 15 minutes postintervention, also did not differ significantly between groups. Seventy-six (88%) patients were available for follow-up after 24 hours. The percentage of patients' headache-free at 24 hours was significantly higher in the bupivacaine group (n=26 [72%]) than in the placebo group (n=19 [48%]; difference, 25%; 95% CI, 2.6% to 44%). No serious adverse events were reported in either group. The trialists stated that, in retrospect, outcome assessment at 1 hour after treatment would have been useful because headache relief at 1 hour, but not at 24 hours, is clinically relevant for emergency department headache patients.

Section Summary: Severe Acute Headache Treated in the Emergency Setting

One double-blind, placebo-controlled, randomized trial has evaluated a single transnasal SPG block for treating patients with acute headache presenting to an emergency department. The trialists did not find a statistically significant benefit for active treatment compared with placebo 15 minutes postintervention. Significantly more patients were headache-free at 24 hours in the active treatment than in the placebo group, but, in the absence of short-term pain relief, SPG blocks would not be a clinically useful treatment in the emergency setting. Future studies conducted in the emergency setting should assess outcomes for an intermediate time period (eg, 1 or 2 hours posttreatment).

Cluster Headache

Clinical Context and Therapy Purpose

The purpose of SPG block(s) in patients who have cluster headaches is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does the use of a SPG block improve the net health outcome in patients with cluster headaches?

The following PICO was used to select literature to inform this review.

Patients

The relevant population of interest is individuals with cluster headache.

Interventions

The therapy being considered is a SPG block.

Comparators

The following therapies are currently being used to treat cluster headaches: medication and oxygen therapy.

Outcomes

The general outcomes of interest are reductions in headache frequency, intensity, and medication use. Treatment-related adverse events are minor. A series of injections may be given over several weeks, with follow-up over months to monitor for treatment effect and durability.

Case Series

No RCTs or nonrandomized controlled studies were identified that evaluated intranasal SPG blocks for treating cluster headache. Two case series in patients with chronic drug-resistant cluster headache were published by a research group in Italy.^{12,13} Both studies used a needle (20-gauge in 1 study, 18-gauge in the other) under endoscopic control to inject a mixture of local anesthetics and steroid as close as possible to the SPG. The mixture consisted of triamcinolone acetonide (40 mg), 1% bupivacaine (4 mL), and 2% mepivacaine with 1/100,000 adrenaline (2 mL).

Pipolo et al (2010) reported on 15 patients who received 3 SPG block treatments a mean of 3 days apart. Eight (53%) of the 15 patients experienced complete remission of cluster headache symptoms.¹² Three (20%) of these continued to be in remission at last follow-up (mean, 18 months). One (7%) patient experienced partial benefit and 6 (40%) reported either no benefit or a benefit for less than 2 weeks. Three (20%) patients experienced complications, including 2 cases of severe epistaxis and 1 of reduced buccal opening that resolved after 5 months.

The earlier study by Felisati et al (2006), included 21 patients who received between 2 and 4 total treatment sessions, provided 1 week apart.¹³ Including 1 patient in whom the treatment could not be applied, 9 (45%) experienced no efficacy, 3 (15%) experienced a partial benefit, and 8 (40%) experienced a complete temporary benefit. In the 8 patients who had complete disappearance of attacks, the benefit lasted 2 to 4 weeks in 3 patients, 3 to 6 months in 3 patients, and 12 to 24 months in 2 patients. Four (19%) patients experienced treatment-related complications, which consisted of 1 case of marked nasal epistaxis 3 days after the procedure and 3 cases of temporary diplopia.

Section Summary: Cluster Headache

The literature includes 2 case series, both of which were published by the same research group in Italy. The approach to treatment was similar in both studies but differed in terms of medication and application technique currently used in the United States. It is unclear how the safety or efficacy of the procedure used in the case series differs from an intranasal SPG block applying local anesthetics and using a Food and Drug Administration-cleared device. In these series, 40% to 50% of patients experienced complete symptom relief for a variable length of

time and about 20% had treatment-related complications. These studies had small sample sizes and lacked a sham treatment or alternative therapy for treating cluster headache.

Summary of Evidence

For individuals who have chronic migraine who receive SPG block(s), the evidence includes an RCT and a case report. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. The randomized trial evaluated a regimen of 12 SPG blocks over 6 weeks and was double-blind and placebo-controlled. The trial found significantly greater short-term (up to 24 hours) benefits from active treatment than from placebo. There were no significant long-term effects (ie, 1 and 6 months after 12 treatments), although the trial was underpowered to detect longer term efficacy. Given that SPG blocks are being proposed as a preventive therapy for chronic migraines, evidence demonstrating reduced migraine frequency, severity, or other objective outcomes from robust trials is still needed. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have severe acute headache treated in the emergency setting who receive SPG block(s), the evidence includes 1 RCT. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. The randomized, double-blind, placebo-controlled trial evaluated a single SPG block for severe acute headache of mixed etiologies. There was no statistically significant difference between active treatment and placebo for the primary outcome (pain reduction 15 minutes postintervention). The trialists did not collect pain data again until 24 hours posttreatment, at which time significantly more patients were headache-free in the active treatment arm than in the placebo arm. Additional studies, preferably RCTs, are needed to determine whether SPG blocks are an effective treatment in the emergency setting. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have cluster headache who receive SPG block(s), the evidence includes case series. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. Two small case series, both of which evaluated an approach for intranasal SPG blocks that differs from the intervention currently available in the United States, were identified. In these series, 40% to 50% of patients experienced complete symptom relief for a variable length of time and about 20% had treatment-related complications. However, it is not clear from these series the degree to which the procedures evaluated differ in safety and efficacy from an intranasal SPG block using a device cleared by the U.S. Food and Drug Administration. Additional studies, preferably RCTs, are needed to evaluate SPG blocks for treating cluster headaches. The evidence is insufficient to determine the effects of the technology on health outcomes.

Supplemental Information

Practice Guidelines and Position Statements

No guidelines or statements were identified.

U.S. Preventive Services Task Force Recommendations

Not applicable.

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Ongoing and Unpublished Clinical Trials

Some currently unpublished trials that might influence this review are listed in Table 1.

Table 1. Summary of Key Trials

NCT No.	Trial Name	Planned Enrollment	Completion Date
<i>Ongoing</i>			
NCT02090998	Sphenopalatine Ganglion Nerve Block vs. Elavil for Treatment of Transformed Migraines	200	Jul 2021
<i>Unpublished</i>			
NCT02365909	Study Evaluating Sphenopalatine Ganglion Block (SPGB) for Treatment of Postdural Puncture Headache (PDPH)	6	Aug 2016 (terminated)

NCT: national clinical trial.

CODING

The following codes for treatment and procedures applicable to this policy are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

CPT/HCPCS

64400 Injection, anesthetic agent; trigeminal nerve, any division or branch
 64505 Injection, anesthetic agent; sphenopalatine ganglion
 64999 Unlisted procedure, nervous system

ICD-10 Diagnoses

Experimental / Investigational for all diagnoses related to this medical policy.

REVISIONS

11-13-2017	Policy added to the bcbsks.com web site on 09-28-2017 with an effective date of 11-13-2017.
01-04-2019	Updated Description section.
	Updated Rationale section.
	Updated References section.
02-26-2021	Updated Description section
	Updated Rationale section
	Updated References section

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