

Ultrasound-Guided Dual-Level Cervical Sympathetic / Stellate Ganglion Block

C3 and C7 - Patient Information

What is a cervical sympathetic / stellate ganglion block?

The sympathetic nervous system is part of the autonomic nervous system and helps regulate functions such as heart rate, blood pressure, blood vessel tone, sweating, temperature regulation, and the body's response to stress.

Sympathetic nerves travel through a chain of nerve structures along each side of the neck. The **stellate ganglion** is located near the base of the neck, around the C7-T1 region.

Our technique uses a **dual-level cervical sympathetic block**, treating the sympathetic chain at approximately the **C3 and C7 levels**.

The C3 injection targets the upper portion of the cervical sympathetic chain, while the C7 injection targets the lower cervical sympathetic chain near the stellate ganglion.

The procedure is performed using **real-time ultrasound guidance** and only **one side is treated at a time**.

Why are two levels treated?

The cervical sympathetic chain extends through the neck rather than existing as a single isolated nerve. Treating both an upper cervical level at **C3** and a lower level near **C7** is intended to produce a broader cervical sympathetic block than targeting a single location.

Only **one side is treated during a treatment session**. If treatment of the opposite side is appropriate, it is performed separately.

How is the procedure performed?

You will usually lie on your back with your neck positioned to allow access to the side being treated. The skin is cleaned with an antiseptic solution.

An ultrasound probe is placed on the neck. Ultrasound allows the physician to identify important structures in real time, including:

- Blood vessels
- Thyroid tissue
- Muscles and connective tissue
- Cervical vertebral structures
- The tissue planes surrounding the sympathetic chain

After the anatomy is identified, a small needle is advanced under continuous ultrasound visualization toward the appropriate tissue plane. Local anesthetic is injected at the **C3 level**.

The lower cervical region is then examined with ultrasound, and a second injection is performed at approximately the **C7 level**, near the stellate ganglion. The spread of the local anesthetic can be seen with ultrasound during the injection.

Only one side of the neck is blocked during a treatment session.

What does the block do?

The medication temporarily reduces sympathetic nerve activity on the treated side. Depending on the reason for treatment, this may affect:

- Sympathetic nervous system activity

- Blood vessel tone and regional blood flow
- Temperature and sweating
- Pain signaling
- Autonomic symptoms

The duration and degree of benefit vary between patients. Some patients notice a rapid change, others improve more gradually, and some patients receive little or no benefit.

Expected temporary signs of a sympathetic block

Because sympathetic nerves to the eye and face are temporarily affected, you may develop signs known as **Horner syndrome** on the treated side. These effects are expected and temporary.

- Drooping of the upper eyelid
- Smaller pupil
- Red or watery eye
- Facial warmth or flushing
- Nasal stuffiness
- Reduced sweating on the treated side of the face

These effects generally resolve as the local anesthetic wears off.

Other common temporary side effects

- Hoarseness or a change in your voice
- Feeling of a lump or fullness in the throat
- Mild difficulty swallowing
- Cough
- Neck soreness
- Bruising or tenderness at the injection sites
- Lightheadedness or dizziness
- Temporary arm warmth, heaviness, tingling, numbness, or weakness if anesthetic spreads toward nearby nerves
- Temporary changes in heart rate or blood pressure

Most of these effects resolve as the local anesthetic wears off.

Temporary emotional crying or emotional release

Some patients may experience **sudden or unexpected crying after SGB**. This may occur even when the patient is not feeling sad and may be described as an emotional release or an abrupt change in emotional state.

The exact mechanism is not established. One proposed explanation is that a rapid change in sympathetic and autonomic signaling can temporarily alter the way emotional responses are expressed or regulated.

When it occurs, the crying is generally temporary and does not necessarily mean that something has gone wrong with the procedure. Please contact the clinic if emotional changes are severe, persistent, distressing, or accompanied by other concerning symptoms.

Paradoxical autonomic reaction

Although many patients experience a reduction in sympathetic symptoms after SGB, a small number of patients may have the opposite response and temporarily feel **more activated or more sympathetic** after the block.

Symptoms may include:

- **Increased anxiety or agitation**
- **Difficulty sleeping or insomnia**
- **Increased heart rate, racing heart, or tachycardia**
- Palpitations
- A feeling of being overstimulated, restless, or unable to relax

This is sometimes referred to as a **paradoxical reaction**. It may reflect a temporary imbalance or shift in autonomic regulation after blocking one side of the cervical sympathetic system.

In many cases, the symptoms can be observed and allowed time to settle. A reasonable approach may be to **wait approximately 1-2 weeks** for the autonomic system to readjust if the symptoms are tolerable.

If symptoms are significant or do not settle, the physician may consider a **sympathetic block on the opposite side** at a separate treatment session when clinically appropriate.

The opposite side is not blocked simultaneously. It is performed separately to reduce the risk of affecting the nerves controlling the voice, swallowing, and breathing on both sides at the same time.

Contact the clinic if you develop marked anxiety, persistent insomnia, sustained or symptomatic tachycardia, severe palpitations, or another significant change after SGB.

What if the benefit does not last or symptoms return?

The local anesthetic used for SGB wears off within hours, but the **clinical effect may last much longer**. The goal is not simply to keep the nerve numb. The block may temporarily interrupt an abnormal sympathetic pattern and give the autonomic nervous system an opportunity to settle into a more stable state.

The duration of benefit varies. Some patients have prolonged improvement after one treatment, while others notice that symptoms gradually return.

If symptoms return after several days or about one week: this does not necessarily mean the block failed. It may indicate that the autonomic system responded to the block but has not yet maintained the change. The response can help guide whether additional treatment, treatment of the opposite side, or other autonomic therapies should be considered.

If symptoms return after several weeks or a month: a period of meaningful improvement followed by recurrence may still be considered a positive clinical response. It suggests that the symptoms were modifiable by sympathetic blockade, even if the effect was not permanent. The physician may discuss whether repeating SGB is appropriate based on how much improvement occurred, how long it lasted, and the patient's overall condition.

If there is little or no meaningful improvement: repeating the procedure may not always be appropriate. The physician may reassess whether sympathetic overactivity is a major contributor to the symptoms and whether other causes or treatments should be considered.

SGB is therefore not necessarily a one-time treatment for every patient. The decision to repeat a block or treat the opposite side is individualized and based on the magnitude, duration, and pattern of the clinical response.

Daily vagus nerve stimulation (VNS) after SGB

SGB may create an opportunity for the autonomic nervous system to shift away from an excessive sympathetic state. After the block, **daily vagus nerve stimulation (VNS)** may be used as an adjunct to help reinforce parasympathetic activity and support more stable autonomic regulation.

When recommended by your clinician, use VNS **every day for at least 30 minutes**. Longer sessions may be used if they are comfortable and consistent with the instructions for the specific device being used.

The goal of daily VNS is to provide repeated autonomic input during the period after SGB and potentially help reduce the tendency for the nervous system to return to the previous symptom pattern.

VNS does not guarantee that symptoms will remain controlled, and the optimal duration and schedule after SGB have not been established in large clinical trials. It should be used according to your clinician's recommendations.

and the safety instructions for the device.

Risks and complications

Although ultrasound allows the physician to see important structures and guide the needle in real time, complications can still occur.

Bleeding

A blood vessel can be punctured, resulting in bruising or a hematoma. Very rarely, significant bleeding in the neck can cause pressure on the airway and require emergency treatment.

Infection

Infection at the injection site or in deeper tissues is uncommon but possible.

Blood-vessel injection

Local anesthetic can unintentionally enter an artery or vein. If enough local anesthetic enters the bloodstream, **local anesthetic systemic toxicity** can occur.

Symptoms of local anesthetic systemic toxicity may include:

- Metallic taste
- Ringing in the ears
- Numbness around the mouth
- Confusion or agitation
- Seizure
- Abnormal heart rhythm
- Loss of consciousness
- Cardiac arrest

This is a rare but potentially serious complication.

Nerve effects

Local anesthetic may spread to nearby nerves and cause temporary hoarseness, difficulty swallowing, cough, arm weakness or numbness, or changes in breathing. Persistent nerve injury is rare.

Epidural or spinal spread

Rarely, medication can spread into the epidural or spinal space and produce extensive numbness, weakness, low blood pressure, or difficulty breathing. Emergency support may be required.

Pneumothorax

Because the lung is located near the lower portion of the neck, particularly near the C7 region, there is a small risk of puncturing the lung and causing a **collapsed lung (pneumothorax)**. Ultrasound guidance is used to help minimize this risk.

Injury to nearby structures

Rarely, the needle may injure structures such as a blood vessel, thyroid, esophagus, trachea, or other nearby tissues.

Medication reaction

An allergic or other adverse reaction to the local anesthetic, antiseptic, adhesive, or another medication used during the procedure is possible.

Vasovagal reaction

Pain, anxiety, or the procedure itself may cause temporary slowing of the heart rate, lowering of blood pressure, nausea, sweating, or fainting.

Why is only one side treated at a time?

The sympathetic chains are present on both sides of the neck, but other important nerves controlling the voice, swallowing, and breathing are also located nearby.

Treating **one side at a time** allows the effects of the procedure to be assessed before considering treatment of the opposite side and reduces the risk of simultaneous effects on nearby nerves on both sides of the neck.

After the procedure

You will be observed after the block until the physician determines that you are ready to leave.

Temporary drooping of the eyelid, redness of the eye, facial warmth, nasal congestion, hoarseness, or throat fullness may occur.

Follow the specific activity, eating, drinking, medication, and driving instructions provided by the clinic.

Seek urgent medical attention for:

- Difficulty breathing
- Rapidly increasing neck swelling
- Significant or persistent difficulty swallowing
- Severe chest pain or shortness of breath
- New severe weakness
- Loss of consciousness
- Seizure
- Persistent or severe neurologic symptoms
- Sustained severe tachycardia associated with chest pain, fainting, or shortness of breath
- Any rapidly worsening or concerning reaction after leaving the clinic

Treatment expectations

A cervical sympathetic / stellate ganglion block does not guarantee improvement. The degree and duration of benefit vary among patients. A temporary sympathetic block may also provide useful information about whether abnormal sympathetic activity is contributing to a patient's symptoms.

When this procedure is used for conditions such as **Long COVID or dysautonomia**, clinical research is still evolving and the procedure should not be viewed as a guaranteed or curative treatment.

Questions

Please ask any questions you have about the procedure, expected benefits, alternatives, or potential risks before treatment.

This document provides general information about the procedure and does not replace the individualized discussion and procedural consent obtained by your physician.