

Information for patients having a Vagus Nerve Stimulation (VNS)

Building healthier lives

This leaflet provides information for patients and their families about Vagus Nerve Stimulation (VNS). This leaflet will outline the answers to some frequently asked questions. This information will also supplement consultations with your Epilepsy Nurse Specialist, Neurosurgeon, and Anaesthetist.

What is Vagus Nerve Stimulation (VNS)?

Vagus Nerve Stimulation (VNS) is a treatment used in patients with drug-resistant epilepsy. It involves implanting a lead around the vagus nerve in the neck and a small battery device (similar to a pacemaker) under the skin in the chest. This battery sends regular, mild electrical signals to the brain via the vagus nerve to help with seizures.

What is the vagus nerve?

The vagus nerve is a long nerve that runs from your brain, down through your neck, and into your chest and stomach. It helps control many automatic body functions like breathing, heart rate, voice, and digestion. In VNS therapy, we gently stimulate this nerve to help reduce seizures.

What is drug-resistant epilepsy?

Approximately 1/3 of epileptic patients will suffer from refractory (drug-resistant) seizures. This means that their seizures continue even after two anti-seizure medications have been tried for an appropriate amount of time, as determined by a doctor. This is called refractory, uncontrolled, or drug-resistant epilepsy, and may need consideration of other treatments, like VNS therapy.

Why is VNS treatment done?

VNS is used when antiepileptic medications alone are not enough to control seizures. Results showed that it can lead to:

- Fewer seizures
- Shorter seizures
- Less severe seizures
- Better recovery after seizures
- Improving quality of life

- Improved alertness, mood and memory
- Fewer hospital and A&E visits

What benefits should I expect?

- Around 1 in 3 patients may experience a dramatic reduction in seizure frequency
- Around one-third may have good improvement
- The remaining third may not notice significant changes in seizure frequency
- VNS may also help reduce seizure severity, length, and improve recovery after a seizure

The benefits of VNS are not always immediate; seizure activity may improve slowly over the first two years of treatment. Long-term studies suggest that effects are maintained and can improve over time.

What are the possible risks of VNS therapy?

As with all surgery, there are possible risks, and as part of the consent process, your Neurosurgeon will discuss these with you in more detail. For VNS insertion, these risks can include, but are not limited to:

- Poor wound healing or infection
- Bleeding
- Stroke, due to manipulation of the big vessels around nerve
- Nerve injury may cause:
 - Hoarse voice
 - Swallowing difficulties (both liquids & solids)
 - Breathing issues
- Battery depletion or lead failure (requires replacement via another surgery)
- MRI restrictions (not all scans are safe with the device).
- Cardiac asystole (heart stopping) on first testing

Expected (and often temporary) side effects during stimulation:

- Voice changes
- Tickly cough or throat irritation
- Neck discomfort

- Worsening of asthma, sleep apnoea, or heart rhythm issues
These usually settle over time, and settings can be adjusted if bothersome.

Who will be responsible for my care?

A specialist epilepsy team will coordinate your overall care, surgery, and treatment plan. This team includes a Consultant Neurosurgeon who will perform the operation, Epilepsy Nurse Specialists who will adjust and monitor the VNS settings in the clinic, Neurology consultants who will continue to guide your seizure treatments, and a Consultant Anaesthetist who will be responsible for monitoring you during surgery.

What happens before the operation?

At your consultation with the Epilepsy Nurse Specialist, we will discuss the options for treatment as well as risks and benefits, to enable you to make an informed decision about your surgery. There will also be an opportunity to discuss what will happen during the operation and any process required before and after surgery. In addition, you will attend a pre-admission assessment to review your physical health and fitness for the operation.

What happens during the operation?

The procedure is done under general anaesthetic (you would be asleep for the operation) and is usually a day case (you can go home on the same day). Our technique for VNS insertion is described below.

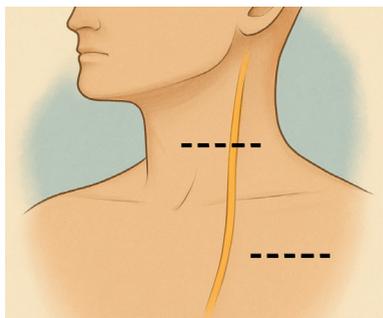
General Anaesthesia:

You should take your antiepileptic medication as usual in the morning of the day of your operation, with a small amount of water. On the ward, you will be seen by the neurosurgeons who will complete a consent form with you and by anaesthetists who will ask questions regarding your health and medical history. Then, you will be taken on a patient trolley to the anaesthetic room. A small needle is used to insert a cannula (a thin plastic tube) into your hand or forearm, and some routine monitoring will be attached. The anaesthetic drugs are given through

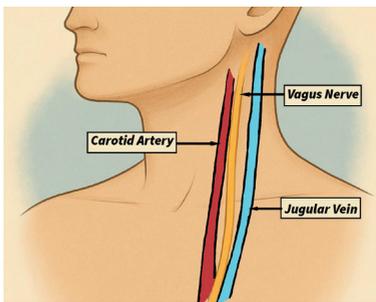
the cannula, and you will then go to sleep. Once you are asleep, you will be moved into the operating theatre, where we will ensure that you are positioned comfortably.

Implantation of VNS:

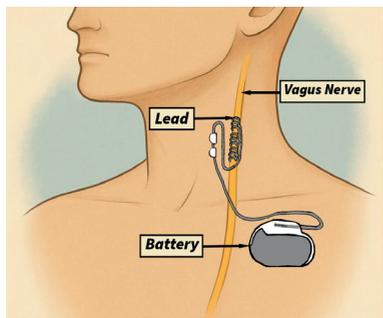
The surgery then begins with two incisions (cuts), one on the upper left chest wall and the other on the left side of the neck. In the chest incision, we create a pocket under the skin to place the battery. From the neck incision, we approach the vagus nerve, which lies between two big vessels, the carotid artery and the jugular vein. Then, we wrap around the nerve a wire (lead). The lead is tunneled under your skin from the neck to the chest incision and connected to the battery. Finally, we perform the first diagnostic check in the VNS system before suturing all the layers. After surgery, the chest and neck may feel sore due to the placement of the device and tunnelling of the lead.



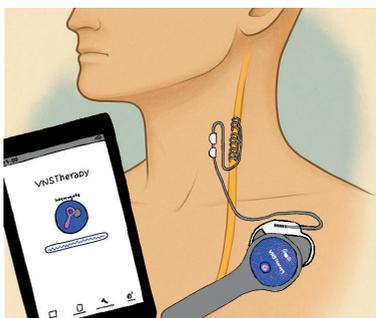
A: This photo shows the neck and chest wall incisions.



B: This image demonstrates the vagus nerve between the carotid artery and the jugular vein.



C: Final placement of lead and battery.



D: First diagnostic check of VNS system.

What happens after the operation?

After the operation, you will stay in the recovery area until you are awake and comfortable. You will then be transferred to the ward. A nurse will take care of you, and when you feel well enough (able to mobilise, eat, and drink), we aim to discharge you. Most patients can go home after a few hours. Occasionally, a longer stay may be required.

What happens after I am discharged?

Your stitches or staples will typically be removed by your GP practice nurse seven days after your operation.

The device is not switched on straight away. We will routinely invite you to attend clinic about two weeks after your operation to see how you are, to check your wounds, and begin the stimulation.

We will see you regularly (from every 2 weeks up to 3 months) to:

- Adjust the settings (if side effects bothersome)
- Monitor any changes
- Assess the device's effectiveness

Keeping a seizure diary before and after implantation helps us objectively measure any impact of VNS therapy.

If VNS is effective, then further surgery to accommodate battery changes would be required every 3–5 years.

How does the device work?

The device has three types of stimulation:

- 1. Normal mode:** To help reduce seizures, stimulation is delivered at regular intervals all day, every day – a typical cycle is on for 30 seconds and then off for five minutes
- 2. Magnet mode:** A magnet (provided) can be swiped over the device, giving an extra boost to help stop or shorten a seizure once it starts
- 3. Auto-Stimulation mode:** An extra dose is automatically delivered when the device detects a sudden increase in heart rate, which can be linked to seizure onset, potentially preventing a seizure

4. Extra modes: If your seizures occur at predictable times, VNS treatment can use the customized “Day and Night Programming” to match your daily routine or manage side effects. After implantation, “Scheduled Programming” allows therapy settings to automatically increase over time based on a schedule agreed upon with your clinical team

What if I have any concerns after going home?

You must tell your GP or Clinical Nurse Specialist if you have any concerns after the operation, in particular if you notice any of the following symptoms:

- Discharge from the wound (fluid or pus)
- Wound swelling
- Temperature/fever
- Difficulty swallowing or breathing
- Any new or worsening

Useful links

- www.epilepsy.org.uk/info/treatment/vagus-nerve-stimulation
- www.epilepsysociety.org.uk/about-epilepsy/treatment/vagus-nerve-stimulation
- www.livanova.com/epilepsy-vnstherapy/en-gb

Epilepsy Clinical Nurse Specialist:

Mrs. Anna Leat

anna.leat@uhb.nhs.uk

Contact information

Your Neurosurgeon is:

How did we do? 😊 😐 😞

If you have recently used our services we'd love to hear about your experience. Please scan the QR code or follow the link to share your feedback to help us improve our services. **Thank you. www.uhb.nhs.uk/fft**



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