

Summary of Evidence-based Guideline for **PATIENTS** and their **FAMILIES**

VAGUS NERVE STIMULATION FOR TREATING EPILEPSY

This information sheet is provided to help you understand how vagus nerve stimulation (VNS) may help treat epilepsy.

The American Academy of Neurology (AAN) is the world's largest association of neurologists and neuroscience professionals. Neurologists are doctors who identify and treat diseases of the brain and nervous system. The AAN is dedicated to promoting the highest quality patient-centered neurologic care. Experts from the AAN carefully reviewed the available scientific studies on use of VNS for treating epilepsy. The following information* is based on evidence from those studies. This information summarizes the main findings of the 2013 guideline on VNS in epilepsy. It updates a 1999 AAN guideline on this topic.

The 2013 guideline shows that more people than was previously thought may benefit from treatment with VNS.

To read the full 2013 guideline, visit www.aan.com/Guidelines.

WHAT IS VNS?

VNS is a therapy that sends electric signals to the brain. A small device is implanted into the body through the left side of the chest. The device is called a vagus nerve stimulator. It also is known as a pulse generator. It produces repeating, low-level pulses of electrical current. The pulse generator is connected to a wire that attaches to the vagus nerve. Nerves are cordlike bundles of brain cells (neurons). They carry messages to and from the brain and other parts of the body. The vagus nerve has many paths. One path goes from the neck up to the brain. VNS therapy uses this path to send electric signals to the brain. Weak evidence shows that these signals may lower the number of seizures.

There are different types of seizures. They happen because of sudden changes in the brain's electric activity. Brain cells interact by electric signals. During a seizure, a surge of electric energy affects all or part of the brain. The surge interferes with normal brain activity. Some seizures can cause muscle jerking or stiffness that the person cannot control. In some cases, the person may lose consciousness. Sensation, speech, mood, and memory can be affected. Seizures typically last one or two minutes.

Doctors use certain therapies to prevent seizures. These include:

- Anti-seizure drugs known as antiepileptic drugs (AEDs)
- Certain diet changes
- Brain surgery

However, different people have different reactions to treatment. When drugs and other types of treatment are not helpful, VNS therapy may be an option.

BENEFITS OF VNS THERAPY

The US Food and Drug Administration has approved the use of VNS as an adjunctive therapy for:

- People with partial epilepsy aged 12 and older
- People whose seizures are not helped enough by AEDs
- Adults (aged 18 and older) with depression that is not helped by other treatments

Adjunctive therapy is a therapy added to other forms of treatment. VNS is meant for use only when other therapies have not helped.

Some of the studies examined here looked at VNS for treating certain types of epilepsy. These include:

- Partial epilepsy
- Generalized epilepsy
- Lennox-Gastaut syndrome (LGS)

Partial epilepsy involves only part of the brain. Generalized epilepsy involves the entire brain. Both types cause seizures. LGS is a rare and serious form of epilepsy. Weak evidence shows that VNS may help as added therapy for people aged 12 and older with these epilepsy types.

LGS is a rare and serious form of seizure disorder. It usually affects children before age 4. LGS causes many types of seizures in these children. It also affects thinking and learning ability. Weak evidence shows VNS may help as added treatment in people with LGS.

In epilepsy, depression and mood problems are common. There also is weak evidence that VNS may help these problems in people with epilepsy.

CAN VNS BE ADJUSTED TO HELP MY TYPE OF SEIZURES?

Some studies looked at a certain feature of the VNS device. The feature is a magnet that sends stronger current when seizure symptoms are setting in. These are called an aura. Weak evidence shows that the magnet may stop a seizure during an aura.

Other studies tried to determine the best device setting. There is not enough evidence to show which setting is best.

CAN VNS BE USED LONG-TERM?

There is weak evidence that VNS may be more helpful over time. This may help people when drug therapy has stopped working.

DOES VNS CAUSE SIDE EFFECTS?

VNS may cause side effects in some people. These include:

- Changes in voice
- Chest pain
- Coughing
- Difficulty swallowing
- Hoarseness or throat discomfort
- Neck pain
- Pain or infection where the device was implanted through the skin
- Shortness of breath
- Tingling skin
- Worsening of sleep apnea for people with the condition

I HAVE EPILEPSY, AND MY CURRENT THERAPY IS NOT HELPING ME. HOW CAN I KNOW IF VNS IS RIGHT FOR ME?

It is important to talk with your doctor about therapies for treating seizures. Be sure you understand all the options available, including VNS.

This guideline was endorsed by the American Epilepsy Society.

This statement is provided as an educational service of the American Academy of Neurology. It is based on an assessment of current scientific and clinical information. It is not intended to include all possible proper methods of care for a particular neurologic problem or all legitimate criteria for choosing to use a specific procedure. Neither is it intended to exclude any reasonable alternative methodologies. The AAN recognizes that specific patient care decisions are the prerogative of the patient and the physician caring for the patient, based on all of the circumstances involved.

*After the experts review all of the published research studies, they describe the strength of the evidence supporting each recommendation:

Strong evidence = more than one high-quality scientific study

Moderate evidence = at least one high-quality scientific study or two or more studies of a lesser quality

Weak evidence = the studies, while supportive, are weak in design or strength of the findings

Not enough evidence = either different studies have come to conflicting results or there are no studies of reasonable quality