EPILEPSY TREATMENT: VAGUS NERVE STIMULATION

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WHAT IS EPILEPSY?

- A chronic neurological disorder characterized by having two or more unprovoked seizures
- Affects nearly 3 million Americans and 50 million people worldwide
CAUSES & SYMPTOMS

**Causes of seizures**
- Can develop at any age
- Person becomes stiff, or maybe suddenly falls

**Symptoms of Epilepsy**
- Repeated seizures
  - Often happen without warning!
- Partial seizures
- Generalized seizures
METHODS OF TREATMENT

- Drug Therapy
- Surgery
- Ketogenic Diet
- Vagus Nerve Stimulation
VAGUS NERVE STIMULATION

The Vagus Nerve
- 10th cranial nerve: connects brain stem to abdomen
- Responsible for bodily functions: motor functions, sensory functions

VNS Treatment:
- Utilizes the vagus nerve to send signals to the brain
- FDA approved in 1997 for epilepsy!
COMPOSITION OF VNS DEVICE

- Flat, round battery about the size of a silver dollar
- About 1½ inch in diameter and 10-13 mm thick
- Small, pacemaker-like generator
- Battery usually lasts approximately 5-10 years
METHOD OF VNS THERAPY

- The VNS device is implanted under the skin on the chest wall.

- A wire runs from the device to the vagus nerve on the neck.

- A stimulator sends mild pulses of electrical energy to the brain.
A computer is used to generate the pulses of electricity at regular intervals.

Intervals are usually about 30 seconds for every 5 minutes, then is adjusted based on the patient’s tolerance.
RESULTS

- Results are comparable to trying different antiepileptic drugs

- Studies have shown that:
  - About 1/3 of patients have had the number of their seizures reduced by 50% or more
  - About 1/3 of patients have shown little benefit, with their seizures reduced by less than 50%
  - About 1/3 of patients have shown no worthwhile benefit at all

- Still, less than 5% of these patients actually become seizure free
DISCUSSION

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<tr>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
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<tr>
<td>• Decrease in seizure severity</td>
<td>• Risks to vagus nerve/nearby vessels</td>
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<td>• Many people who undergo VNS therapy experience a significant reduction in the frequency of their seizures (by more than 50%)</td>
<td>• Risk of infection/bleeding</td>
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<td>• Coughing, tingling in neck, throat pain, shortness of breath</td>
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<td>• Total elimination of seizures is rare</td>
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<td>• Does not work for everyone!</td>
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<td>• Is NOT a cure for epilepsy</td>
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FUTURE

- Up to 25% of the 50 million people worldwide suffering with epilepsy are still unable to control their seizures with the currently available medications.

- In the future, epilepsy may be treated by new forms of electronic stimulation of the brain.

- The ultimate goal is to find a cure!
REFERENCES