

# EPILEPSY TREATMENT: VAGUS NERVE STIMULATION

Sakoun Phommavongsa

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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

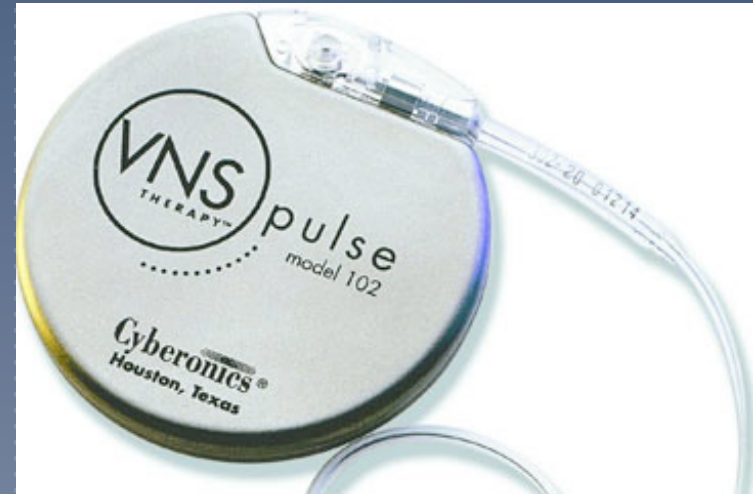
- ▶ 10<sup>th</sup> cranial nerve: connects brain stem to abdomen
- ▶ Responsible for bodily functions: motor functions, sensory functions

## ▶ 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 1 ½ inch in diameter and 10-13 mm thick
- ▶ Small, pacemaker-like generator
- ▶ Battery usually lasts approximately 5-10 years



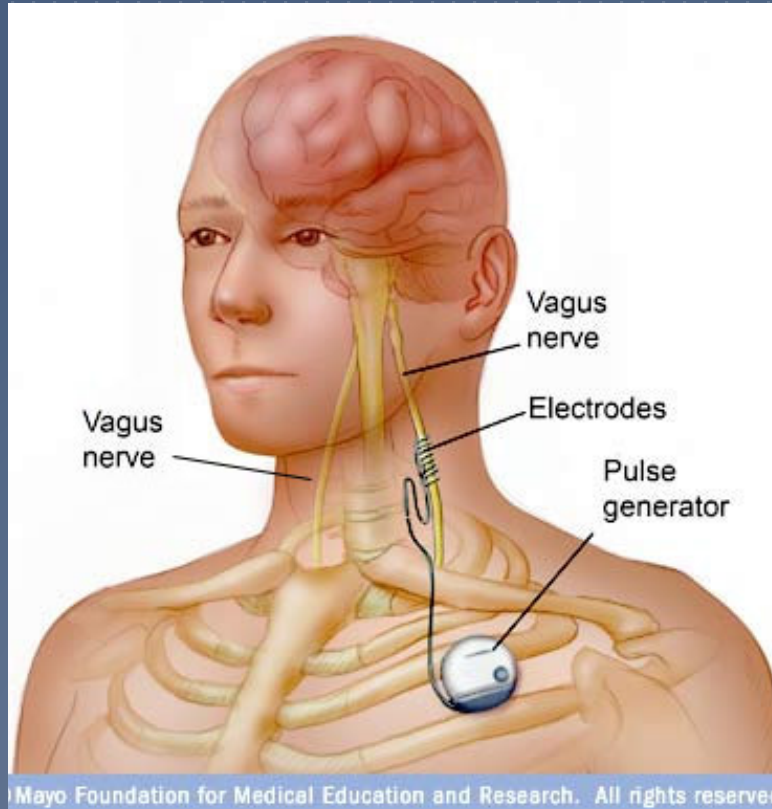


# METHOD OF VNS THERAPY

- ▶ 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



# METHODS OF VNS THERAPY (CONT'D)



- ▶ 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

## ADVANTAGES

- Decrease in seizure severity
- Many people who undergo VNS therapy experience a significant reduction in the frequency of their seizures (by more than 50%)

## DISADVANTAGES

- Risks to vagus nerve/nearby vessels
- Risk of infection/bleeding
- Coughing, tingling in neck, throat pain, shortness of breath
- Total elimination of seizures is rare
- Does not work for everyone!
- Is NOT a cure for epilepsy

# 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

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