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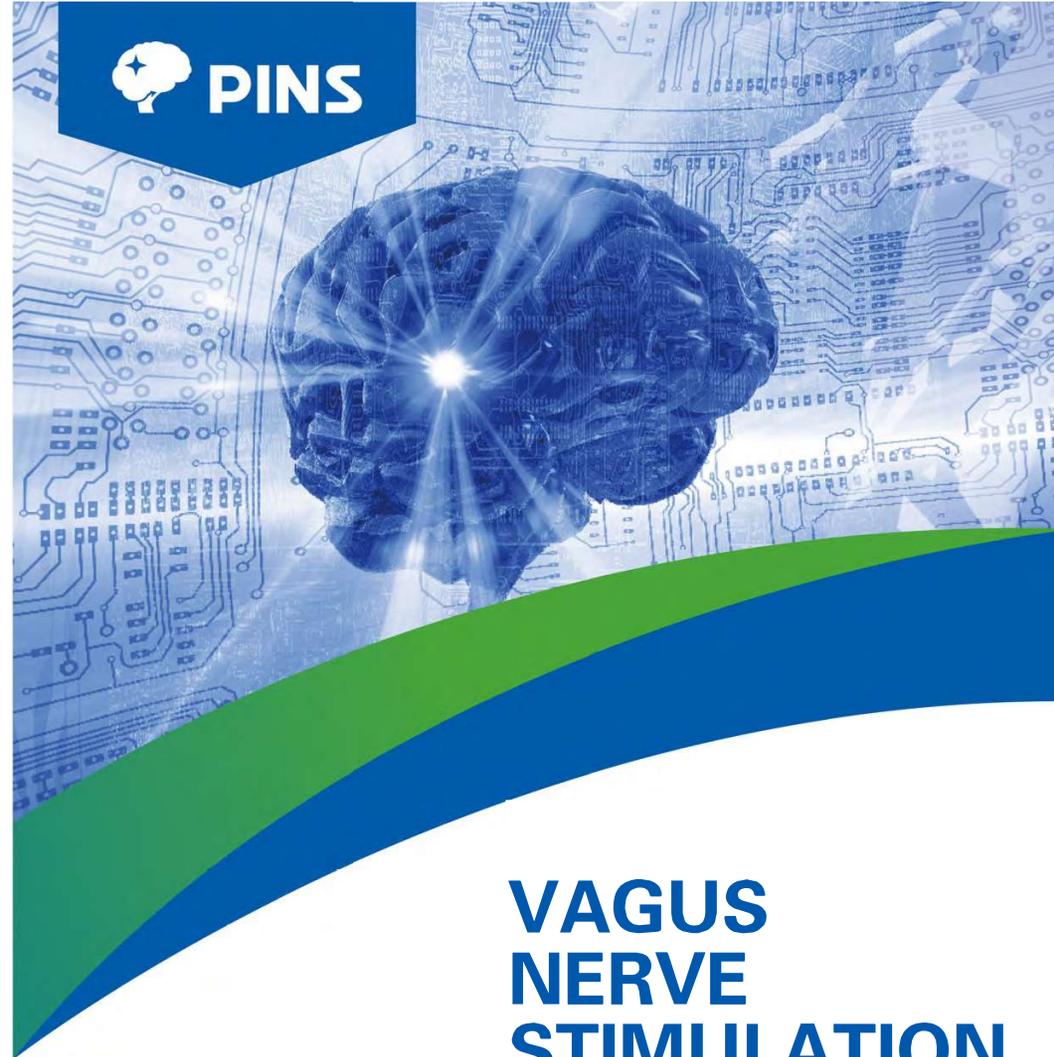
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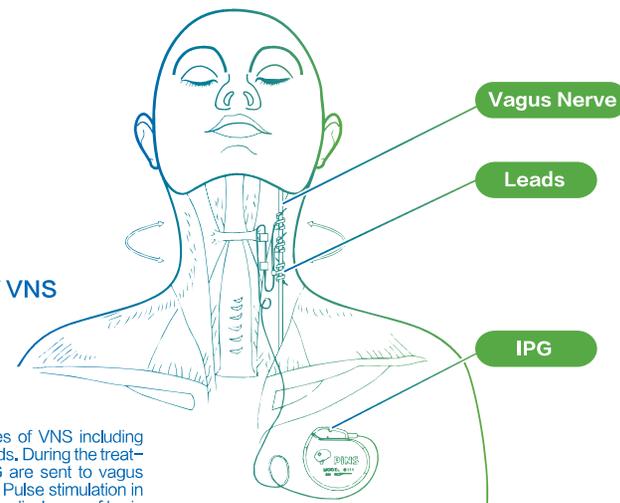
VAGUS NERVE STIMULATION

Treatment for patients
with refractory epilepsy

Restoring Hope
World's leading neuromodulation expert

VNS (Vagus Nerve Stimulation)

Evangel for patients with refractory epilepsy



World's 2nd
China's 1st supplier of VNS

1 Mechanism of VNS treatment

As shown in the picture, devices of VNS including IPG (Impulse generator) and leads. During the treatment, pulses generated by IPG are sent to vagus nerve in left neck through leads. Pulse stimulation in vagus nerve can reduce irregular discharge of brain tissue related to epilepsies, thus controlling the symptoms and seizure frequency of epilepsies.

2 Definition and treatment status of refractory epilepsy

- China Epilepsy Guidelines 2015 Revision noted that Refractory epilepsy refers to symptoms of seizures which cannot be effectively controlled even with two kinds of properly elected tolerant anti-epileptic drugs(single or combined).
- Under current anti-epileptic medication, 30% of epilepsy patients will become refractory epilepsy.
- It is reported that anti-epileptic medication is harmful to cognitive function of patients.^{[1][2]}

3 VNS—Newly developed “electronic medication”

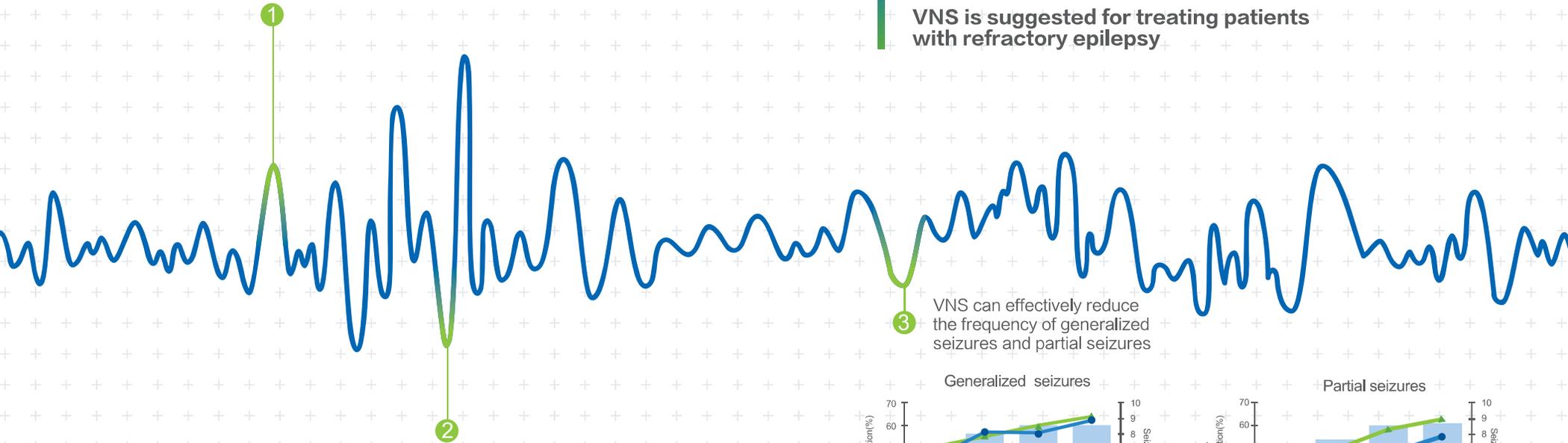
- Effectively reducing seizure frequency
- Effectively improving patients' life quality and cognitive function
- Without influence upon mental and physical development of children
- Without toxic and side effects of chemical drugs
- Preventing missing or refusing dose
- Adjustable and reversible stimulation, safe to use



[1] Quan Qingyun, Zhao Jingxia. Journal of International Neurology and Neurosurgery, 2009, 36(1): 69-72
[2] Fastenau PS, et al. Neurology. 2009, 73(7): 526-534.



Efficacy of VNS increases with extension of time and will be stable after 2 years.

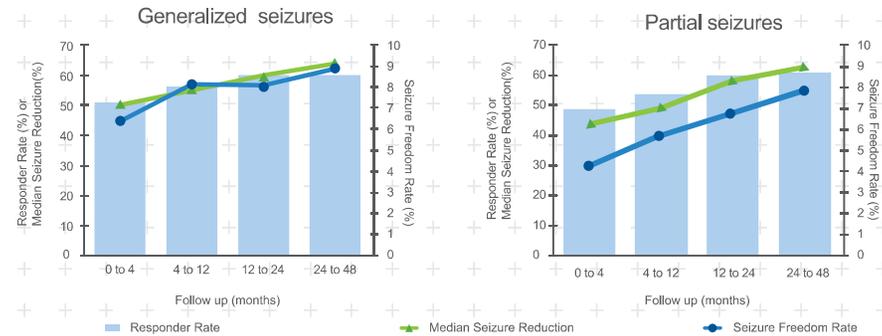


The postoperative following up after surgery 2-4 years shows: Seizure frequency decreased at least 50% among 63% patients
Epileptic symptoms were fully controlled in 8.2% of patients

Conclusion of the reference

VNS is suggested for treating patients with refractory epilepsy

VNS can effectively reduce the frequency of generalized seizures and partial seizures



Reducing Seizure frequency

VNS Efficacy

Reference: Englot DJ, Neurosurgery, 2015 Nov 28

Improving cognitive function

VNS efficacy



1

The reference statistically analyzed short-term and long-term efficacy of VNS in cognitive functions improvement of patients

2

Short-term efficacy: within 2 months of operation VNS has positive effects upon patients' memory VNS is able to improve patients' cognitive function

3

Long-term efficacy: VNS is able to increase the level of norepinephrine (NA) in locus ceruleus (LC), thus improving patients' cognitive function

Reference: Vonck K, et al. Neurosci Biobehav Rev, 2014, 45: 63-71



PINS VNS Parameter Ranges & Product Specifications

	G111	G112
Output current	0-3.5mA in 0.1-mA steps	
Pulse width	130, 250, 500, 750, 1000 μ s	
Frequency	1, 2, 5, 10, 15, 20, 25, 30 Hz	
Signal ON time	7, 14, 21, 30, 60 s	
Signal OFF time	0.2, 0.3, 0.5, 0.8, 1.1, 1.8, 3, 5 - 180 min (5 - 60min in 5 min steps)	
Magnet mode	Provided by magnet application (output current, pulse width, and signal ON time may be independently programmed for this purpose)	
Battery capacity	1850mAh	980mAh
Dimensions	50*47*6.8 mm	42*36*6.8 mm
Weight	23g	14.3g

VNS



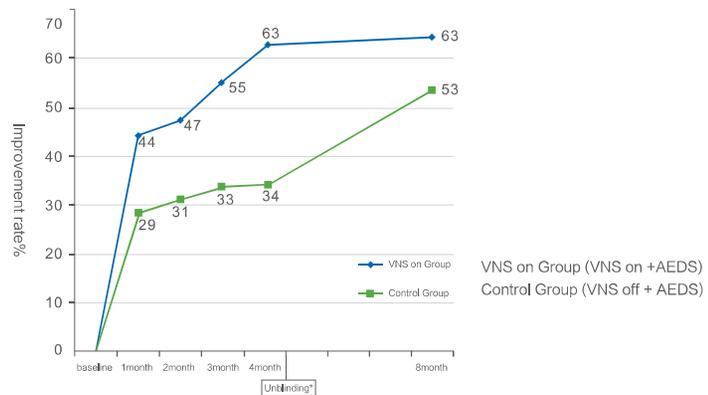
Clinical trial results of PINS VNS

Recruiting standards:

- Aged 6–60
- With refractory epilepsy which cannot be effectively controlled after AEDS treatment for 2 years or more
- 6 or more of seizures per month
- Normal results in MMSE Screening
- Good compliance, willing to cooperate in post-operative following-up

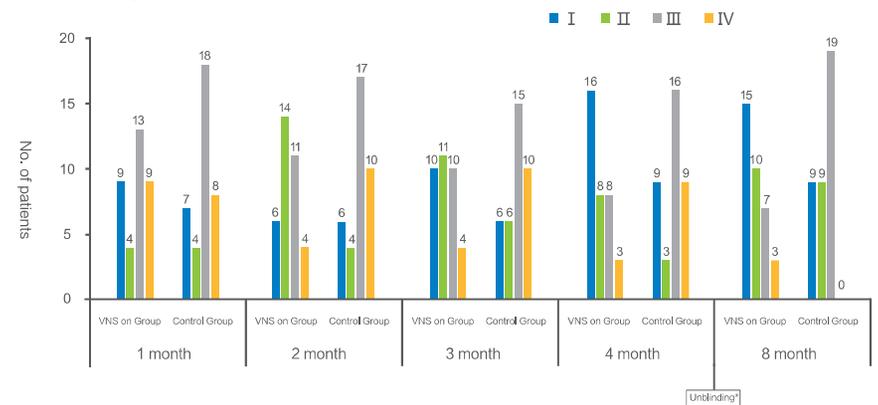
Results

Improvement comparing with baseline seizure

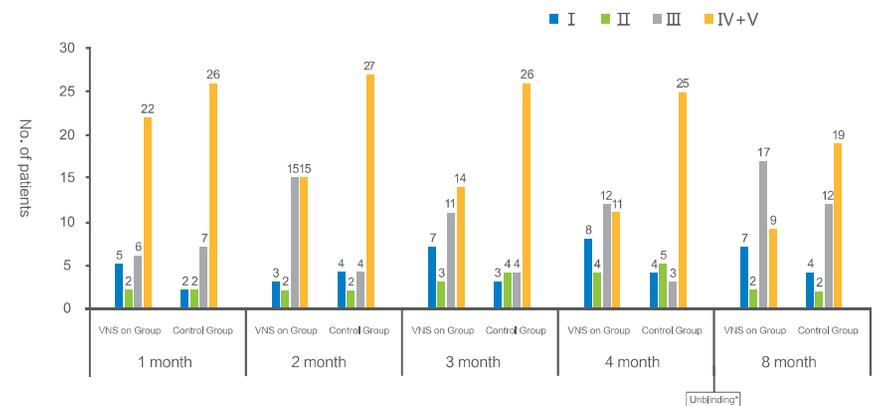


** Unblinding: VNS on Group keeping, control Group VNS on

Mchugh Assessment



Revised Engel Assessment



** Unblinding: VNS on Group keeping, control Group VNS on

VNS

AAN clinical guidance

Neurology

Evidence – based guideline update: Vagus nerve stimulation for the treatment of epilepsy: Report of the Guideline Development Subcommittee of the American Academy of Neurology

George L.Morris III, David Gloss, Jeffrey Buchhalter, et al.
Neurology 2013;81:1453-1459 Published Online Before Print August 28,2013
DOI 10.1212/WNL.06013e3182a393d1

This information is current as of August 28,2013

According to the guidance

- VNS have positive effects such as evoking emotions and controlling depression in some patients
- Efficacy of VNS lasts for a relatively long time, thus makes up for defects of medication honeymoon effect
- VNS reduces incidence of SUEP. Especially in epilepsy patients combined with OSA, VNS is suggested as assistant therapeutic treatment.
- VNS can be used for treating children with refractory epilepsy and EIEE such as LGS