|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
NLM (National Library of Medicine ID: 101738825)
Index Copernicus Value 2019: 79.34
Short Communication Volume 5, Issue 3; March: 2021; Page No. 175-176

REFRACTORY EPILEPSY AND VAGUS NERVE STIMULATION: THE WAY FORWARD

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Article Info: Received 24 February 2021; Accepted 20 March 2021
DOI: https://doi.org/10.32553/ijmbs.v5i3.1837
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Conflict of interest: No conflict of interest.

Introduction:

Vagus Nerve Stimulation (VNS) an efficacious neurophysiological modality of treatment for both medically & surgically refractory epilepsy was first implanted in 1988 & later approved by US FDA in 1997. In clinical practice, trains of current are applied intermittently to the left vagus using a pacemaker or AICD like device 'the VNS device'. The device has four components pulse generator, lead, spiral electrodes & a magnet. The pulse generator is implanted beneath left clavicle by a simple surgical method & attached to left vagus nerve via lead & spiral electrodes.[1] The magnet provides an extra edge to control the aura or impending seizure by providing 'On Demand' stimulations. The poor cardiac innervation by left vagus helps to minimize the unwanted or at time dangerous side effects like severe bradycardia, brady arrythmia, or even cardiac asystole.[2]

Indicated in patients with refractory partial or generalised epilepsy (age above 12-14 years) the VNS is considered to be adjuvant to antiepileptic drugs. In clinical practice no particular seizure type or epilepsy appears particularly sensitive or resistant to VNS. Although the precise mechanism of action of VNS remains to be elucidated, the proposed mechanism translates a continuous, lower frequency, intermittent stimulation of vagal nerve nuclei leads to widespread activation of subcortical & cortical pathways increasing the seizure threshold thus producing antiseizure activity. This wide spread activation leads to positive neurobiological effects with increase in alertness, energy, memory and an overall improvement in quality of life.[3]

The device is never implanted in individuals with previous left or bilateral cervical vagotomies and those with progressive intracerebral disease. Caution should be exercised in patients with vasovagal syncope, asthma, cardiac arrythmia, gastric ulcers and coexisting neurological disease other than epilepsy.

Innervation of larynx by vagus nerve is responsible for temporary and reversible adverse effects like hoarsness, throat irritation or paresthesias, cough and shortness of breath but vagal nerve related ones are more complicated or even life threatening like bradycardia, arrythmia and even cardiac asystole. Most of these cardiogenic side effects are due to over stimulation.[4]

The implanted device carries lot many unmatched benefit as compared to any antiepileptic as the device work 24×7×365 days without altering serum concentration of drugs in use & does not carry potential of drug interaction. On the other hand the positive neurobiological effects in form of increase in memory, alertness, energy have a positive effect & thus help to attain an overall better quality of life.[5] The lack of cognitive or central nervous system effects adds to its beneficial effects. The device also carry an unmatched quality to deliver on demand stimulation (by magnet) to control aura or impending seizures. This extra benefit is not seen with any antiepileptic drug.

The overall efficacy of VNS is variable but it increases over time. A good no. of patients around one third demonstrate more than 50% reduction and next one third shows 30-50% reduction while the remaining does not show any change in seizure frequency.[6] The cost of VNS device is around ten to twelve thousand USD and the life of battery is 7-8 years depending upon stimulation (low or high) setting.[7] Apart from it use in adult or childhood epilepsy the future application of VNS extends to adult diseases like chronic depression, pain & alzheimer's disease. Overall the VNS is an efficacious, safe but relatively costly, palliative modality of treatment for childhood to elderly neurological disorder.

References

1. Landy, H. J., Ramsay, R. E., Slater, J., Casiano, R. R. and Morgan, R. Vagus nerve stimulation for complex partial seizures: surgical technique, safety and efficacy. Journal of Neurosurgery 1993; 78: 26–31.
2. Sackeim HA, Rush AJ, George MS. Vagus Nerve Stimulation (VNS) for treatment resistant depression: efficacy, side effects, and predictors of outcome. Neuropsychopharmacology 2001; 25:713–728.
3. Morris, G.L., Meuller, W.M. and the Vagus Nerve Stimulation Study Group E-01-E05. Long-term treatment with vagus nerve stimulation in patients with refractory epilepsy. Neurology 1999;53:1731-1735.
4. Asconapé, J. J., Moore, D. D., Zipes, D. P., Hart mann, L. M. and Duffell, W. H. Bradycardia and asystole with the use of vagus nerve stimulation for the

treatment of epilepsy: a rare complication of intraoperative device testing. Epilepsia 1999; 40: 1452–1454.

5. Helmstaedter C, Hoppe C, Elger CE. Memory alterations during acute high-intensity vagus nerve stimulation. Epilepsy Res 2001; 47:37–42.
6. Vonck K., Boon P., D'Have M., Vandekerckhove T., O'Connor S., De Reuck J. Long-term results of vagus nerve stimulation in refractory epilepsy. Seizure, 1999.
7. Bon, P., Vonck, K., D'Havé, M., O'Connor, S., Vandek erkhove, T. and De Reuck, J. Cost-benefit of vagus nerve stimulation for refractory epilepsy. Acta Neurologica Belgica 1999; 99: 275–280.