

Efficacy of rapid cycling vagus nerve stimulation in pharmaco-resistant epilepsy

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Background and Objective: Vagus Nerve Stimulation is an established therapy for the treatment of medically refractory epileptic seizures. Various vagus nerve stimulation parameters are used clinically. However, comparison data for various protocols is scant.^{1,2} This study compares the efficacy of standard cycling with signal off time ≥ 3 minutes (SC) to that of rapid cycling with signal off time ≤ 1.8 minutes (RC).

Methods: This study was a retrospective analysis of the database. Patients with intractable epileptic seizures who underwent implantation of the vagus nerve stimulator due to pharmaco-resistant epilepsy were included in the study. Post-implantation seizure characteristics at 6 months were analyzed and were compared to the 3-month pre-implantation data.

Results: A total of 60 patients, 30 consecutive patients from each group, were included in the study. The age range was 5-70 years with a mean of 25.7 years in SC group and was 5-72 years with a mean of 25 years in RC group.

Eighteen patients (60%) treated with SC versus 22 patients (73%) treated with RC showed $\geq 50\%$ seizure reduction. Five patients (20%) from SC group versus 12 patients (40%) from RC group had $\geq 90\%$ seizure reduction. No major difference was observed in adult patients treated with either protocol. Eleven adult patients in each group (65% in SC group versus 69% in RC group) showed $\geq 50\%$ seizure reduction; and 4 patients in each group (24% in SC group versus 25% in RC group) had $\geq 90\%$ seizure reduction. However, in pediatric patients (age ≤ 16 years), 8 (62%) in SC group versus 12 (86%) in RC group showed $\geq 50\%$ seizure reduction; and 4 (31%) in SC group versus 8 (57%) in RC group had $\geq 90\%$ seizure reduction. The best response was observed in the subgroup of pediatric patients with Lennox-Gastaut Syndrome (60% in SC group versus 78% in RC group with $\geq 50\%$ response). Statistical analysis with Chi-square test showed non-significant p value. However, a positive trend towards rapid cycling was observed.

Conclusions: Our study demonstrates that in pharmaco-resistant epilepsy, both SC and RC sequences of vagus nerve stimulation reduce frequency of seizures. Rapid cycling is more efficacious than SC in pediatric group, but not in adult group. Lennox-Gastaut syndrome in pediatric patients yields a greater response to RC. Non-significant p value in Chi-square with a positive trend towards rapid cycling may be due to small number of patients in this study. Therefore, a larger study is indicated to confirm these findings.

References

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