

The Impact of Vagus Nerve Stimulation on the Most Disabling Seizures:

A Retrospective Study in Adults with Drug-Resistant Epilepsy

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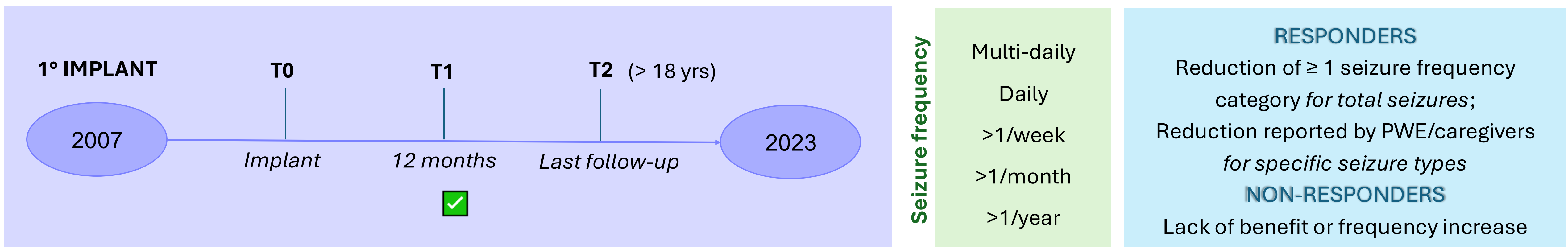
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OBJECTIVES

To assess the long-term efficacy of vagus nerve stimulation (VNS) in reducing tonic-clonic seizures (TCS), drop attacks (epileptic falls), and seizure clusters in adults with drug-resistant epilepsy (DRE).

MATERIALS & METHODS

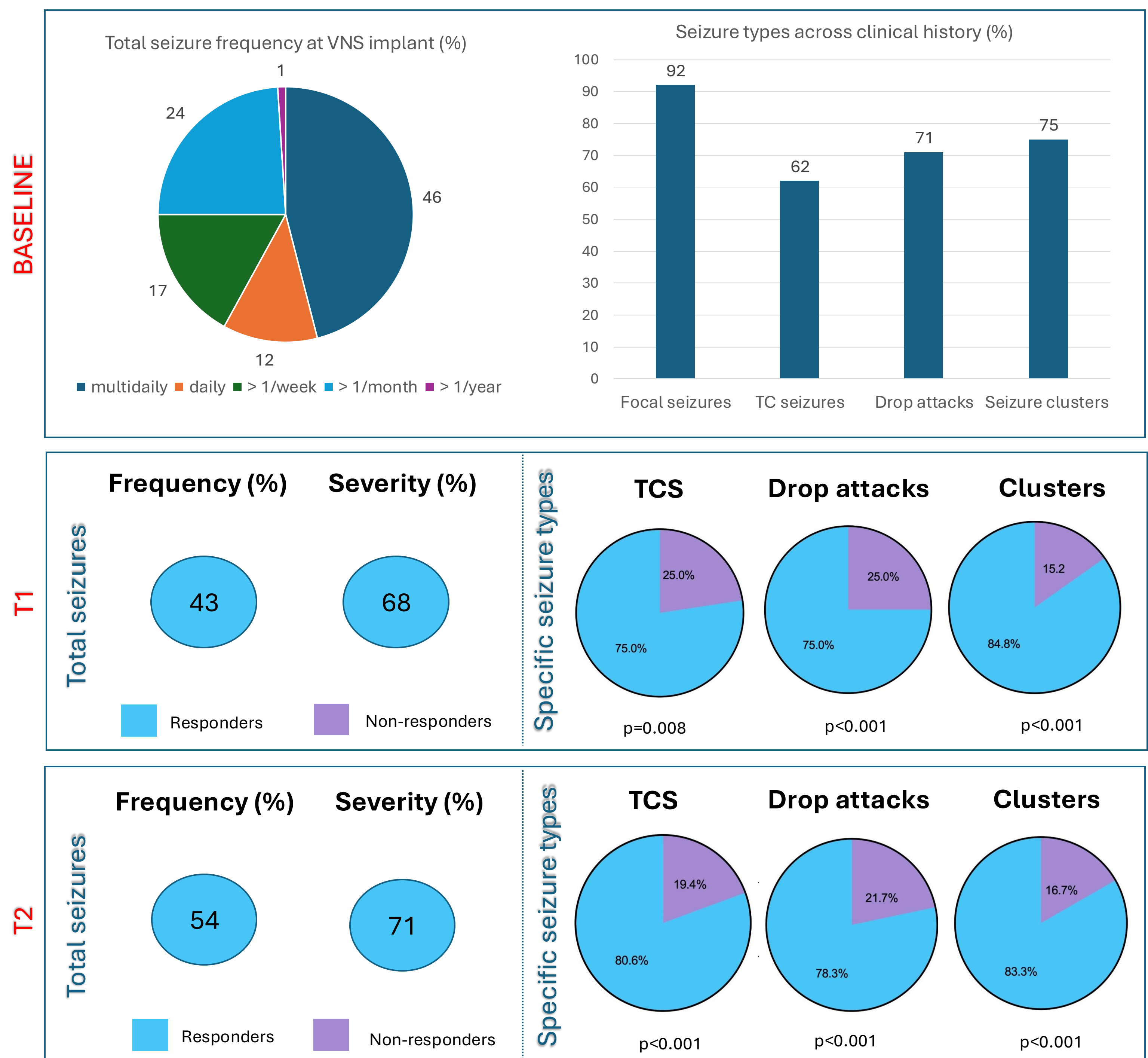
This retrospective, single-center study included all adults with DRE who received VNS therapy and had ≥12 months of follow-up. Clinical data were collected pre-implantation (T0), 12 months post-implantation (T1), and at last follow-up (T2). The outcomes included reduction in total seizure frequency and severity, TCS and drop attacks frequency, and frequency and/or duration for seizure clusters. The decision for battery replacement and tolerability were also evaluated.



RESULTS

The final cohort consisted of 87 subjects (51 males, median age 33 at T0), with a mean follow-up of 8 years at T2. Response rates for specific seizure types significantly exceeded non-response rates ($p < 0.001$). Among subjects with TCS at baseline, 20.6% (T2) achieved seizure freedom. Drop attacks had complete resolution in 21.8% (T2). Battery replacement was performed in **85.7%** of individuals upon or near depletion.

Study population (n = 87)	
Epilepsy duration prior to VNS implant (yrs) (median)	23
Etiology, n (%)	
Genetic	10 (11.5)
Structural	43 (49.4)
Genetic and structural	3 (3.4)
Genetic and metabolic	3 (3.4)
Unknown	28 (32.2)
Syndrome, n (%)	
Focal syndromes	24 (27.6)
◊ Mesial Temporal Lobe Epilepsy with Hippocampal Sclerosis	4 (4.6)
◊ Sleep Hypermotor Epilepsy (SHE)	1 (1.1)
◊ Others	19 (21.8)
Developmental and epileptic encephalopathy (DEE)	36 (41.3)
◊ Lennox-Gastaut Syndrome	12 (13.8)
◊ Dravet Syndrome	2 (2.3)
◊ GLUT1 Deficiency Syndrome	1 (1.1)
◊ Progressive Myoclonic Epilepsies	3 (3.4)
◊ Others	18 (20.7)
Unknown	27 (31)



Auto-stimulation mode was activated in 33.3% cases, while magnet use was reported by PWE or caregivers in 34.5%, proving effective in 80% of them. Side effects were observed in 49.4% of individuals, the majority (approximately 90%) being transient, and included voice alteration/hoarseness (36), vocal cord palsy (2), worsening of obstructive sleep apnea (2; one resolved with day/night programming), and electrode rupture (2).

DISCUSSION AND CONCLUSIONS

VNS exerts a profound effect on the most disabling seizures - TCS, drop attacks, and seizure clusters - surpassing its impact on overall seizure burden, with benefits emerging within the first year and remaining stable over time. Our findings support a more tailored approach to VNS candidate selection, advocating for earlier implementation in people who experience refractory, harmful seizures and are not eligible for curative surgery.

