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Literature Review

The ReCharge randomized, double blind, sham-controlled clinical trial failed to meet pre-defined primary outcome measures for mean percentage excess weight loss and to prove the superiority of vagal nerve block. Both the study and publication had major limitations that likely confounded the data and results. Nevertheless, this clinical trial reported statistically greater weight loss in the vagal block group than in the sham device group and met its primary safety objective with a well-tolerated treatment and device.

Although the treatment device consistently delivered at least 12 hours of therapy a day, the exact amount of stimulation received was not controlled or recorded, potentially confounding the data. The ReCharge study was preceded by the EMPOWER study, which the authors even stated had identified “a relationship between hours of use and weight loss.” Although “all participants attended a weight management program”, this study is limited in its lack of control over diet and exercise regimen across subjects. As such, subjects could have variable amounts of weight loss due to lifestyle changes and not from the vagal nerve stimulation. This error is most prominently reflected in the assumption that the vagal nerve block and sham groups would achieve 25% and 5% excess weight loss, compared to an actual average excess weight loss of 24.4% and 15.9%, respectively. Even with post-hoc imputation analysis, average weight loss percentages increased for the sham group, as well as the block group, even though the recalculated mean difference (9.2 percentage points) was closer than the actual (8.5 percentage points) to the primary objective value (10.0 percentage points).

The lack of detail and describing and validation of the mechanism of action regarding the “intermittent, reversible vagal nerve blockade therapy for obesity treatment” does not easily persuade the reader about the legitimacy of these clinical results. Methods only state that the stimulation was set “to the desired amplitude of 6 to 8 mA” without any information regarding pulse train parameters such as waveform, frequency, or pulse width. Certainly, given the proprietary nature of EnteroMedics, the ReCharge trial is not likely to publish exact stimulation parameters, but giving only amplitude values challenges the validation process of vagus nerve block to past literature on conduction block in other nerves. Furthermore, as stated by the authors, the trial faced demographic limitations with the majority of subjects being white women without diabetes and other metabolic complications that are common comorbidities of obesity.

Despite the limitations of both the trial and the publication, over half of the vagal nerve block participants achieved 20% excess weight loss. Even though after 20% excess weight reduction, subjects would still be severely obese, this trial demonstrated a potential solution for individuals to undertake at least some change to improve their health, whether it is due to placebo, lifestyle changes, or vagal nerve stimulation.