Motor Response Matters Optimizing Lead Placement Improves Sacral Neuromodulation Outcomes

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Abstract

Purpose: We sought to determine the usefulness of motor responses during sacral neuromodulation lead placement by testing the hypothesis that a greater number of motor responses during intraoperative electrode testing would be associated with more durable therapy. Materials and Methods: We retrospectively reviewed all sacral neuromodulation lead placements at a large academic center from 2010 to 2015. Included in study were all unilateral sacral lead placements for which the presence or absence of a motor response was documented discretely for each electrode. Motor responses were quantified into separate subscores, including bellows and toe response subscores (each range 0 to 4) for a possible maximum total score of 8 when combined. Revision surgery was the primary outcome. Univariate and multivariate analyses were performed for factors associated with lead revision. Results: A total of 176 lead placements qualified for analysis. Mean ± SD cohort age was 58.4 ± 15.9 years, 86.4% of the patients were female and 93.2% had undergone implantation for overactive bladder. Median followup was 10.5 months (range 2 to 36). Overall 34 patients (19%) required lead revision. Revision was negatively associated with the total electrode response score ($p = 0.027$) and the toe subscore ($p = 0.033$) but not with the bellows subscore ($p = 0.183$). Predictors of revision on logistic regression included age less than 59 years at implantation (OR 5.5, 95% CI 2–14) and a total electrode response score less than 4 (OR 4.2, 95% CI 1.4–12.8). Conclusions: Fewer total electrode responses and specifically fewer toe responses were associated with sacral neuromodulation lead revision. These data suggest that placing a lead with more toe responses during testing may result in more durable sacral neuromodulation therapy. .

Keywords

motor activity, urinary bladder, overactive, reoperation, implantable neurostimulators, toes.