102 Is sacral neuromodulation effective and safe in patients with neurogenic lower urinary tract symptoms? A systematic review and meta-analysis

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Hypothesis / aims of study

Neurogenic lower urinary tract symptoms (nLUTS) occur after the abnormal function of the bladder and urethra in the setting of a neurologic disorder. Sacral neuromodulation (SNM) involves the electrical stimulation of the sacral nerve to modulate the neural pathway, and the Neuro-Urology EAU Guidelines, present a strong recommendation to consider it in selected patients with refractory nLUTS. However, there is no standardization to determine which patients will benefit from this treatment.

This study aims to determine the effectiveness and safety of sacral neuromodulation in patients with nLUTS according to their neurological pathology and symptomatology.

Study design, materials and methods

The literature search was performed in the databases OVID, MEDNAR, Embase, Scopus, Web of Science, and PubMed, counting all the studies until March 2024. We included the observational studies that evaluated adults with nLUTS who underwent SNM. Gray literature, case reports, studies on children, and articles written in languages other than English and Spanish were excluded. PRISMA diagram in figure 1.

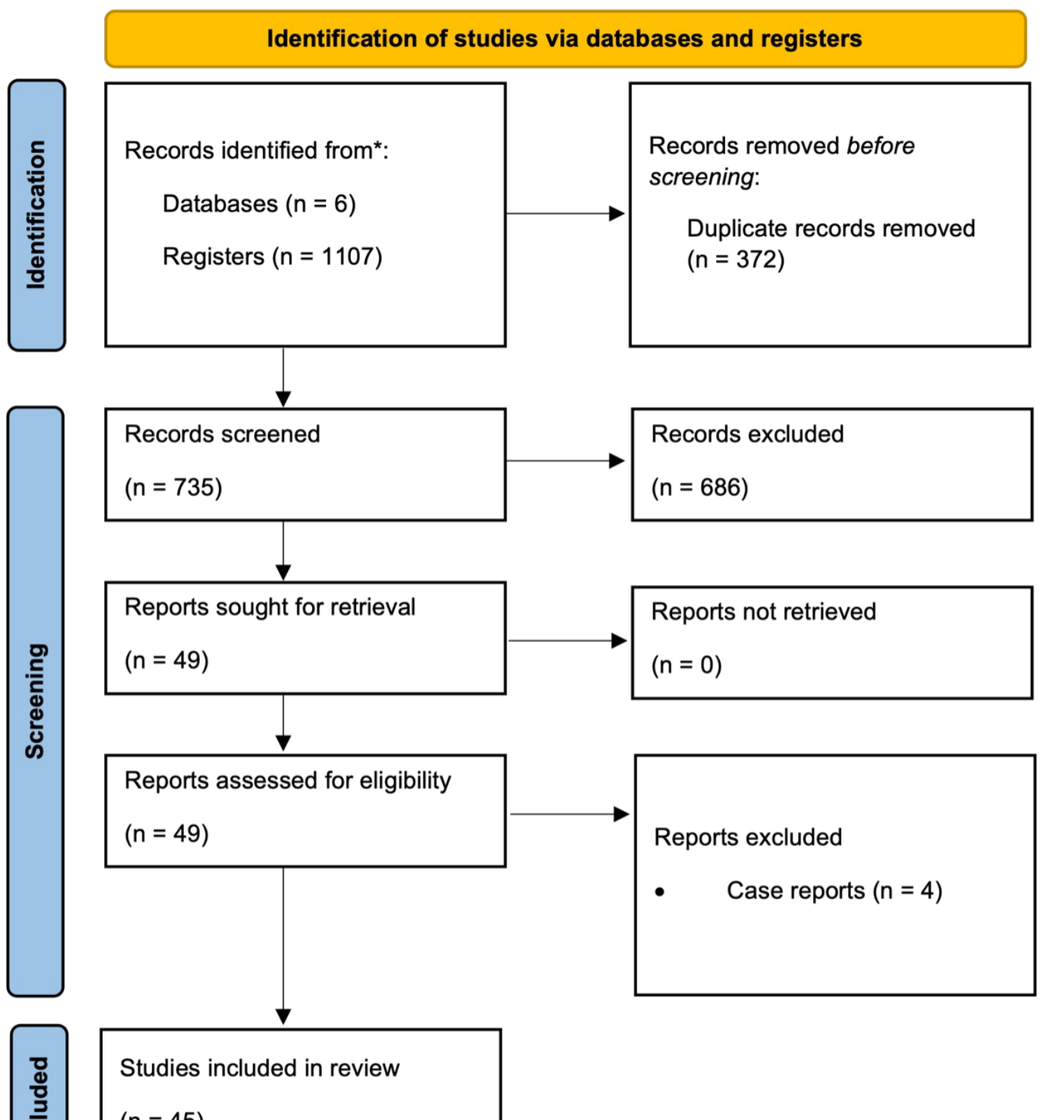

Figure 1. The PRISMA diagram for the systematic review of the literature

The success variable was evaluated as a proportion. For every study, the size effect (TE) and the TE standard error (seTE) were calculated. The meta-analysis was performed under the model of random effects and graphed in forest plots stratified by neurological pathology, symptomatology, and SNM Phase. Heterogeneity was evaluated with the coefficient I2. A p-value of <0.05 was considered significant. All the analyzes were performed with R 3.3.0+ (R Core Team, Vienna, Austria, 2023) and RStudio 2023.12.1+402 (RStudio Team, Boston, MA, 2020).

Results and interpretation

A total of 1221 patients with nLUTS were included from 45 studies. The global improvement after SNM Phase I was 61%, with better outcomes in patients with multiple sclerosis (75%) and less improvement in Parkinson disease (50%), cerebrovascular disease (50%) and spinal cord injury (39%), regardless the symptomatology (figure 2). Complications occurred in 8% of cases (figure 3).

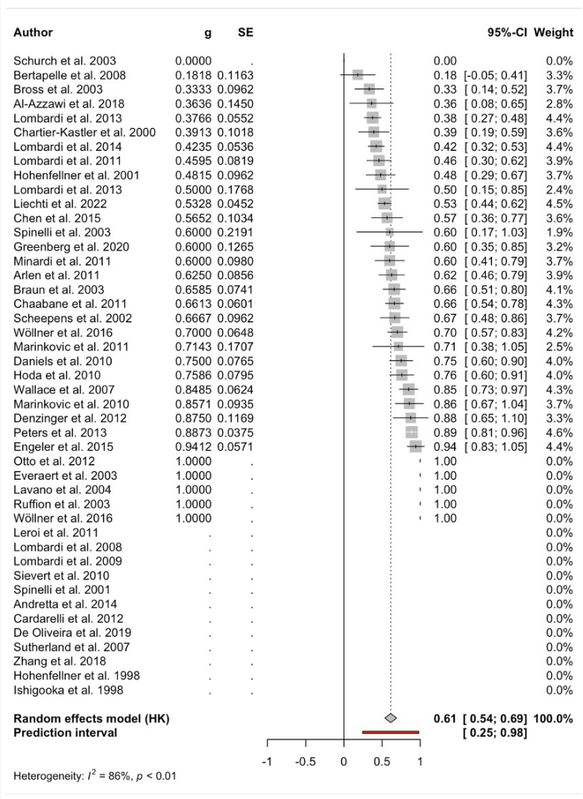

Figure 2. Forest plot of meta-analysis of proportions for cure after SNM Phase I in all patients with nLUTS

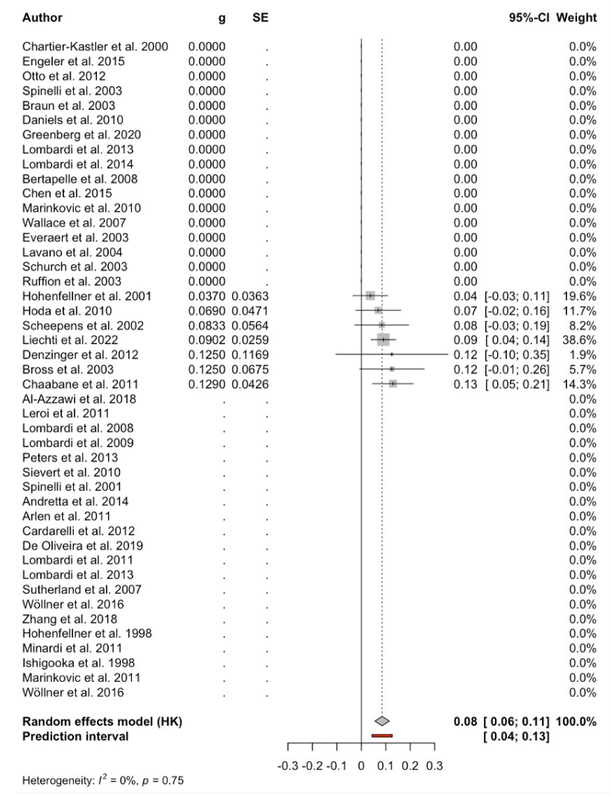

Figure 3. Forest plot of meta-analysis of proportions for complication after SNM Phase I in all patients with nLUTS

After SNM Phase II, the global improvement was 78%, with better outcomes in patients with multiple sclerosis (84%), spinal cord injury (82%) and pelvic surgery (82%), and less improvement in Parkinson disease (0%), cerebral palsy (0%) and spinal disc disease (0%) (figure 4). All symptomatology improved and complications happened in 26% of patients (figure 5).

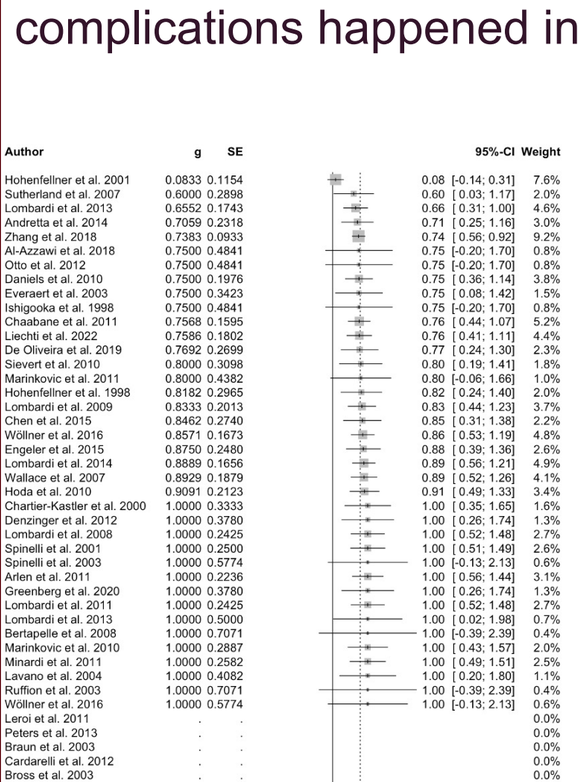

Figure 4. Forest plot of meta-analysis of proportions for cure after SNM Phase II in all patients with nLUTS

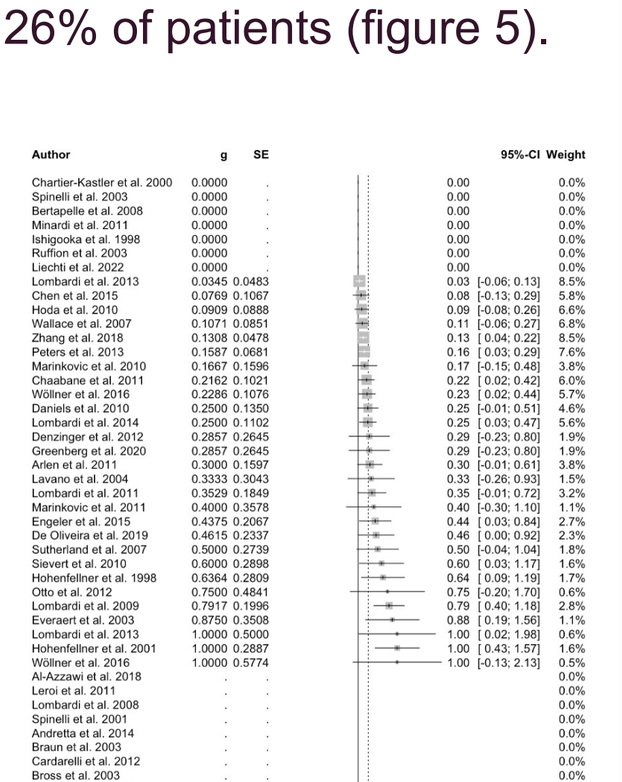

Figure 5. Forest plot of meta-analysis of proportions for complication after SNM Phase II in all patients with nLUTS

Conclusions

Sacral neuromodulation must be offered to all patients with multiple sclerosis, spinal cord injury, pelvic surgery, and other causes different than Parkinson's disease, spina bifida, cerebrovascular disease, cerebral palsy, and spinal disc disease, with refractory neurogenic lower urinary tract dysfunction regardless their symptomatology.