

Sacral neuromodulation for urinary storage and voiding dysfunction

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Impact paragraph

Treatment for overactive bladder (OAB) or non-obstructive urinary retention (NOR) has been improved significantly by SNM over the past three decades.

SNM involves electrical stimulation of afferent nerve roots to restore the balance via central and peripheral pathways. Researchers worldwide are working to refine SNM. Some weaknesses such as lack of ability to incorporate the patients' feedback, invasiveness of the treatment, complex implantation techniques, the burden of the SNM testing period and limited battery life still leave room for improvement. Our studies conclude that ambulatory urodynamic studies may aid in predicting failure or success in SNM, as the diagnosis of an acontractile bladder in NOR patients implicate a high risk of failure for SNM.

Patients suffering from OAB report a significant impairment of overall QoL because symptoms interfere with daily activities¹. The majority of patients with NOR considered clean intermittent self-catheterisation (CISC) to be an easy and painless procedure which did not interfere with daily activities². A smaller but significant number of patients find the psychological implications of performing CISC the leading disadvantage. One-third experienced CISC as aversive and had significantly higher distress scores³.

Not only personal burden but also individual costs are high and both OAB and NOR account for considerable annual societal costs. Total societal costs comprise direct and indirect costs including for example loss of work productivity⁴. Estimated disease-specific total cost of OAB in 2007 added up to 24.9 billion dollars in the US⁵. In the Netherlands, health care costs concerning urinary incontinence (of any kind) were 297.7 million euros in 2017⁶. Annual costs per capita amounted up to 17 euros. Indirect costs were not calculated. NOR belongs to a compilation of many different health care problems ('other urogenital problems'), but the costs of - for example - disposable catheters (for all indications) in the Netherlands totaled 74.6 million euros in 2018⁷.

Cost is a significant factor in the decision making process for SNM. SNM is a long-term treatment option. Patients should be informed about the need for periodic replacement of the implantable pulse generator (battery), with an interval that depends on the stimulation parameters used. Although this need for replacement is becoming less frequent as there are more durable, rechargeable systems currently at hand. By taking into consideration the negative effects of the overactive bladder symptoms on patients' quality of life, it is possible to state that the benefits from SNM outweigh the

risks and discomforts of the treatment in selected, carefully educated patients. Our research shows that the clinical benefit of SNM is durable, confirmed by the finding that more than 70% of the patients are still using the device after 20 years of follow-up.

It is still unclear whether SNM is the most cost-effective therapy for refractory OAB. Successful treatment of refractory OAB can lead to savings that represent a 92% reduction in outpatient doctor visits and diagnostic and procedural costs and an additional 30% reduction in drug expenditures⁸. Bertapelle et al. found that higher initial costs of SNM were balanced out by excellent long-term outcomes. SNM was found to be cost-effective after 3 years and more cost-effective, with both lower cost and higher efficacy, than botulinum toxin A bladder injections at 10 years⁹. Currently the choice between botulinum toxin A and SNM is mainly determined by the availability of treatments at the hospital where the patient is treated. A better option would be to make it a decision of the patient after careful counseling, taking also in consideration the efficacy, cost and subsequent (time) commitment^{10, 11}.

Annual (2017) mental health care costs in the Netherlands for depression and anxiety as affective disorders, equaled 1127.5 million euros and 773.6 million euros respectively⁶. Our systematic review emphasizes the association between OAB and these affective symptoms. More successful treatment of OAB (and possibly also other LUTS), thus can not only improve direct complaints, but also these indirect the affective symptoms present. In the past experts were hesitant to offer SNM to patients with affective symptoms, but this thesis shows that SNM should not be withheld from patients with affective conditions, but should be offered from an integrated care perspective.

Predicting outcome success or failure of sacral neuromodulation treatment is not only important in improving quality of life, but also in saving health care costs.

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