Cost of neuromodulation therapies for overactive bladder: percutaneous tibial nerve stimulation versus sacral nerve stimulation

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study assessed the cost-effectiveness of percutaneous tibial nerve stimulation, compared with sacral nerve stimulation, in the treatment of an overactive bladder. The authors concluded that both treatments were safe and effective, and percutaneous tibial nerve stimulation was cheaper; the cost per additional patient with sacral nerve stimulation was over $500,000. The methods appear to have been appropriate and the results were satisfactorily reported, but some methods were not fully described, making it difficult to assess the conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study assessed the cost-effectiveness of percutaneous tibial nerve stimulation and sacral nerve stimulation, for patients with an overactive bladder.

Interventions
Percutaneous tibial nerve stimulation consisted of 30-minute sessions, weekly, for 12 weeks, followed by long-term treatment if effective, or other treatment if not effective. This was compared with sacral nerve stimulation, which started with a test, and if this was effective, patients received an implanted system, otherwise they moved to other treatment.

Location/setting
USA/hospital.

Methods
Analytical approach:
A Markov model, with monthly cycles, was constructed to assess the costs and outcomes of the two interventions, for a hypothetical cohort of 100,000 patients. The time horizon was two years. The authors stated that a health care payer’s perspective was adopted.

Effectiveness data:
A literature review of studies in MEDLINE, published since 1998, was conducted to derive the effectiveness data. The main estimates of effectiveness were the treatment success rates, adverse event frequency, and therapy discontinuation rates. The model probabilities and event rates were estimated based on weighted averages of all the estimates in the cited sources.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The benefit measure was the percentage of patients who were still on therapy.

Cost data:
The economic analysis considered the costs of reimbursements for the provider and facility services, including the
physician, hospital in-patient and out-patient neuromodulation therapy, and the management of relevant adverse events. The cost data were from national (Medicare) physician fee schedules, diagnosis-related group data, and ambulatory payment classification allowances. The price year was 2011, and all costs were reported in USA $. They were discounted at an annual rate of 3%.

Analysis of uncertainty:
One-way and two-way sensitivity analyses were carried out on the key model inputs, including the costs, success rates, efficacy and rates of adverse events.

Results
Over two years, the costs were $3,850 for percutaneous tibial nerve stimulation, and $14,160 for sacral nerve stimulation. There were 48% of patients remaining on percutaneous tibial nerve stimulation, and 49% remaining on sacral nerve stimulation. The incremental cost per additional patient on sacral nerve stimulation was $573,000.

The sensitivity analyses indicated that percutaneous tibial nerve stimulation remained less costly than sacral nerve stimulation over a wide range of model inputs.

Authors' conclusions
The authors concluded that percutaneous tibial nerve stimulation and sacral nerve stimulation were safe and effective, and percutaneous tibial nerve stimulation was cheaper. The cost per additional patient for sacral nerve stimulation over percutaneous tibial nerve stimulation was more than $500,000.

CRD commentary
Interventions:
The two interventions were clearly described and appear to have been appropriate comparators. The rationale for their selection was clear; their effectiveness and safety were demonstrated in clinical studies. More details on the other treatment would have been useful to judge if this was relevant to other settings.

Effectiveness/benefits:
It appears that the authors conducted a systematic literature review to identify the relevant sources of evidence. This should ensure that the best available evidence was analysed. The authors reported the database searched and the search terms, but other key details, such as the inclusion criteria, were not discussed. This makes it difficult to assess the quality of the review. Limited information on the source studies was provided, and no references were given.

Costs:
For the explicitly stated payer perspective, all the relevant cost categories and costs appear to have been included. The sources for the unit costs and resource use were reported, and they appear to have been appropriate for the study setting. Other details, such as the price year and discounting, were reported.

Analysis and results:
The authors provided appropriate details of the model structure, including a diagram. An incremental approach was used to combine the costs and benefits of the alternative strategies. Extensive deterministic sensitivity analyses were conducted to investigate the impact of variations in a wide range of inputs, but a probabilistic sensitivity analysis could have evaluated the overall model uncertainty. The results of the main analysis and sensitivity analyses were well reported. The results are likely to be generalisable to similar settings.

Concluding remarks:
The methods appear to have been appropriate and the results were satisfactorily reported, but some of the methods were not fully described (especially for the effectiveness sources), making it difficult to assess the authors' conclusions.

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