Sacral rhizotomies and electrical bladder stimulation in spinal cord injury. 2: Cost-effectiveness and quality of life analysis
Wielink G, Essink-Bot M L, van Kerrebroeck P E, Rutten F F

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.

Health technology
Using sacral posterior rhizotomies and sacral anterior root (bladder) stimulation for treating lower urinary tract dysfunction in spinal cord injury relative to conventional care.

Type of intervention
Treatment.

Economic study type
Cost-utility analysis.

Study population
Patients with complete spinal cord lesions (both cervical and thoracic).

Setting
Hospital. The economic study was carried out in Rotterdam and Enschede, The Netherlands.

Dates to which data relate
The effectiveness and resource use data corresponded to patients recruited from June 1991 to June 1994. The price year was not clearly reported.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken prospectively for the short-term (up to 2 years after surgery) on a different patient sample from that used in the effectiveness analysis.

Study sample
No power calculations were reported. A total of fifty-two patients was included in the study.

Study design
A before-and-after design was employed in the clinical study which was conducted as a multicentre study (three centres). The duration of follow-up was one year after surgery. The loss to follow-up, relative to baseline (n=44), was 18% at three months, 14% at six months, and 25% at one year.
Analysis of effectiveness
The analysis was based on treatment completers only. The primary health outcome was health status as measured by a quality of life questionnaire administered at baseline (before surgery), and at 3 months, 6 months and 1 year after surgery. The instruments employed in the questionnaire were the Nottingham Health Profile, the Karnofsky Performance Index, the Affect Balance scale and self-developed items to assess the degrees of experienced discomfort caused by bladder, urinary incontinence, and micturition problems.

Effectiveness results
The only significant differences (p<0.05) found between postoperative and preoperative assessments were in terms of patient discomfort and the After Balance Scale measurements. The latter yielded mean levels (worst = -5 to best = +5) of 1.1 (SD, 2.0) before implantation (surgery), 2.1 (SD, 2.3) at three months, 1.4 (SD, 2.6) at six months, and 2.1 (SD, 2.1) at 1 year (p <0.05). The satisfaction with bladder emptying measure (worst = 7 to best = 1), yielded the following values: 5 (SD, 12), 2 (SD, 1), 1 (SD, 1), and 1 (SD, 1), respectively. The figures for discomfort at performing selected activities showed favourable differences for postoperative assessments, relative to baseline, in terms of household work, shopping, odd jobs, sports, and going out, (p<0.05).

Clinical conclusions
The general indicators of quality of life showed no significant changes after the implantation of the bladder stimulator. Psychological well-being and patients' satisfaction both improved after the implantation of the stimulator.

Modelling
A model was used in extending the cost calculation beyond the 2-year period after surgery. This model incorporated the incidence rates of major diseases due to urinary tract dysfunction (stones in the upper and lower urinary tract, bladder cancer, kidney insufficiency), duration of latent periods, and survival rates associated with those diseases (information obtained from the literature). Costs so calculated covered a period of 30 years.

Measure of benefits used in the economic analysis
No summary benefit measure was identified in the economic analysis, and only separate clinical outcomes were reported.

Direct costs
Costs were discounted. Some quantities of resource use were reported separately from costs. The cost items were reported separately. The costs measured were those associated with operating costs (hospital care), outpatient costs (self-care, travel expenses, visits, and medications), and cost of complications (major illnesses due to lower urinary tract dysfunction). The perspective adopted in the cost analysis was not explicitly specified. The short term costing was based on actual data from the patient sample included in the study (except for one patient), with the follow-up period data analysed using the sum limit method (to account for those who did not have an entire 2-year follow-up period). The long-term costs (beyond two years after the implantation), were estimated based on a model using data found in the literature. However, the dates associated with these data were not given. The costs were calculated for up to 30 years after surgery. The costs associated with the comparator were calculated by extrapolating the actual costs from the period before the decision to implant the stimulator. The price year was not reported clearly.

Indirect Costs
Not included in the analysis since most of the patients were unemployed.

Currency
Dutch guilders (Dfl). The exchange rate was US$1 = Dfl1.70 at 1995 values.
Sensitivity analysis
A threshold analysis was performed to identify the break-even points, but it was only presented graphically.

Estimated benefits used in the economic analysis
Not applicable.

Cost results
The discount rate was 5%. The short-term costs per patient (not discounted) associated with the intervention were Dfl 33,402, whereas the cost associated with ‘conventional care’ was Dfl 4,710 per patient per year. The long-term costs associated with the intervention were Dfl 20,993, whereas the corresponding figure for the comparator was Dfl 33,723. The discounted cost comparison was presented as a graph only.

Synthesis of costs and benefits
Costs and benefits were combined by identifying break-even points, but they were presented only graphically. The intervention was shown to be the dominant strategy up to ten years after surgery.

Authors’ conclusions
Sacral rhizotomies and electrical stimulation of the bladder is a cost-effective method of treatment of the bladder of patients with spinal cord injury; considerable savings on health care costs are possible in the long run with simultaneous positive effects on patient health status.

CRD COMMENTARY - Selection of comparators
Although conventional care was explicitly stated as the comparator, the authors gave no explanation of what that was, in practice.

Validity of estimate of measure of benefit
Given the fact that conventional care was not defined, the internal validity of the study results cannot be properly assessed. The type of study design employed may also have introduced bias into the results.

Validity of estimate of costs
Only the resource use quantities corresponding to the short-term period were reported. The cost analysis may be biased since the comparator costs were calculated by extrapolation. The dates associated with the long-term cost data were not reported and the price year used in the analysis was not clearly stated. The authors reported that indirect costs were not relevant due to the general employment status of the patient population, which nevertheless had a mean age of 28 years. They also stated that the omission of long-term costs associated with stimulator replacement or repair was due to its minor importance.

Other issues
The results of the threshold analysis could have been reported more transparently and in greater detail. Given the lack of randomisation, a comprehensive sensitivity analysis, and statistical analysis, the results need to be treated with some caution. The conclusions reached by the authors may not be justified, given the uncertainties in the data. The issue of generalisability was not addressed.

Source of funding
None stated.
Bibliographic details

PubMedID
9187905

Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Adult; Cost-Benefit Analysis; Electric Stimulation; Electrodes, Implanted /economics /standards; Female; Follow-Up Studies; Humans; Longitudinal Studies; Lumbosacral Plexus /physiology; Male; Middle Aged; Prospective Studies; Quality of Life; Rhizotomy /economics /standards; Spinal Cord Injuries /economics /physiopathology /surgery /therapy; Urinary Bladder /physiology; Urinary Incontinence /therapy; Urination; Urologic Diseases /therapy

AccessionNumber
21997000821

Date bibliographic record published
30/04/1999

Date abstract record published
30/04/1999