

# SEVEN YEAR FOLLOW-UP OF SACRAL ANTERIOR ROOT STIMULATION AND SACRAL POSTERIOR ROOT RHIZOTOMY FOR BLADDER CONTROL IN PATIENTS WITH A SPINAL CORD INJURY: COMPLICATIONS AND QUALITY OF LIFE

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## Abstract

Since 1976 sacral anterior root stimulation is one strategy for bladder control in patients with spinal cord injury. The objective of this study is to investigate the long-term effectiveness of the implanted bladder controller in spinal cord injured patients and to describe the prevalence of side effects and advantages of using such device compared to literature. Furthermore the experiences of patients themselves and their quality of life (QoL) will be described, using a condition specific questionnaire (Coloplast Qualiveen). Forty-one spinal cord injured patients, 35 male and 6 female, were selected in this study. All had surgery at the Department of Neurosurgery, MST in Enschede, the Netherlands. The post-surgery time ranged from 1.4 to 13.3 years (mean 7.1).

Data collection is presently carried out and the results will be presented at the IFESS Conference in June 2001.

## Introduction/Background

The last 30 years considerable progress has been made in the urological rehabilitation of patients with a spinal cord injury. Nevertheless these patients frequently develop complications such as urinary tract infections, stones of the upper and the lower urinary tract and deterioration of the bladder. Furthermore upper urinary tract problems can be caused due to reflux and/or obstruction, increasing the risk of deterioration of kidney function. Incontinence remains another important problem for these handicapped people [10].

The management of neurogenic bladder dysfunction after spinal cord injury exists of increasing bladder capacity, maintaining low pressure storage of urine with preservation of the upper urinary tract and preventing incontinence. Furthermore evacuation of urine without any residual should be achieved to reduce the incidence

of urinary tract infections. In patients with complete spinal cord injury at a level which leaves the sacral segments intact, detrusor hyperreflexia generally develops after a phase of spinal shock. This type of bladder dysfunction can cause important morbidity. Anticholinergic therapy is the usual treatment but is often insufficient [11].

In the seventies, Brindley developed the sacral anterior root stimulator (SARS) and the device was implanted in the first patient in 1976 [3]. Nowadays SARS is usually combined with posterior sacral root rhizotomy. Posterior sacral root rhizotomy eliminates all reflex activity of the detrusor, thereby increasing bladder capacity and controlling reservoir function of the bladder. Stimulation of the afferent nerves (anterior roots) produces a contraction of both the detrusor and the sphincter muscle. Voiding is possible because the striated muscle of the sphincter contracts and relaxes more rapidly than the smooth muscle of the detrusor [6].

In the literature remarkable results of the SARS in the management of the neurogenic bladder in SCI patients are reported including improvement of bladder capacity, significant reduced residual urine volumes, attained continence, reduced infection rates and risk of renal damage. Furthermore defaecation is easier and in 50% of the male patients a sufficiently sustained erection is conceived. Side effects, e.g. pain, increased spasms, loss of reflex erection or occasionally autonomic dysreflexia on stimulation, are rarely seen [1,2,4,7,9,12,13,14,15]. Brindley analysed the first 500 patients and found cable failures in 4% and 14 % of the tetraplegic and paraplegic patients respectively. Eighteen out of 500 implanted patients showed a receiver failure [5].

In The Netherlands the first Finetech-Brindley bladder controller was implanted in 1987. Between 1991-1994, van Kerrebroeck et. al. carried out a

prospective longitudinal phase II-III study using medical data and quality of life as outcome measures. Fifty-two patients were included for surgery. They concluded that this treatment is a major benefit for a selected group of spinal cord injured patients. Bladder function is significantly improved and control of continence and urine evacuation regained. Furthermore, the risk factors for renal function deterioration are eliminated. This results in an increase in the quality of life [11,16]. Over 120 patients have now been implanted in The Netherlands, forty-one of them at the Department of Neurosurgery, MST Enschede.

Little is known about either the experiences of patients themselves or their improvement in quality of life since using the bladder controller. Kachourbos showed an improvement in QoL using a structured questionnaire [8]. A condition specific questionnaire was, however, not available since a couple of months ago.

The objective of this study is to investigate the long-term effectiveness of the implanted bladder controller in spinal cord injured patients and to describe the prevalence of side effects and advantages of using such device comparing to those mentioned in literature. Furthermore the experiences of patients themselves and their QoL will be described, using a structured questionnaire and a condition specific questionnaire (Coloplast Qualiveen questionnaire) respectively.

## Methods

*Design:* a cross-sectional descriptive study was conducted.

*Setting:* Roessingh Rehabilitation Centre/R&D and the Neurosurgical Department Medical Spectrum Twente in Enschede.

*Patients:* 41 patients were recruited from a database at the Rehabilitation Centre Het Roessingh. All patients were implanted at the Neurosurgical Department, MST in Enschede, between 1987 en 1999. Four patients had died of unrelated causes. The patient characteristics are mentioned in table 1.

*Measurements:* a questionnaire was constructed to determine all complications and technical failures and experiences of the patients themselves with questions about expectations, advantages/disadvantages, recommendation to future patients and choosing again for surgery with the present knowledge. Furthermore a disease specific questionnaire, i.e. the Qualiveen questionnaire of Coloplast, first presented at the IMSOP in Denmark in 1999, was used.

**Table 1 Characteristics of the population**

		Range
<b>men/women</b>	32 / 5	
<b>mean age (years)</b>	43	23-63
<b>Mean time since injury (months)</b>	169	46-498
<b>time between injury and implantation (months)</b>	87	11-471
<b>mean follow-up (months)</b>	85	16-159
<b>level of injury</b>	C4-Th2 13 Th2-Th7 11 Th7-Th12 13	
<b>cause of injury</b>	36 trauma 1 vascular	
<b>4 died of unrelated causes</b>	3 men, 1 woman, mean age 41 (30-50), level of injury C4-Th2 1, Th2-Th7 1, Th7-Th12 2, all traumatic	

## Results and conclusions

The study was approved by the local Medical Ethics Committee. So far, twenty patients gave their informed consent. All questionnaires have been sent to the included subjects. Data collection is completed in nine patients and we expect that the results of all 41 patients can be presented at the IFESS Conference in June.

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