

ACUTE CYSTOMETRIC EFFECTS OF TRANSCUTANEOUS PUDENDAL NERVE ELECTRICAL STIMULATION IN WOMEN WITH IDIOPATHIC DETRUSOR OVERACTIVITY

Aims of Study

Pharmacological therapy (such as anticholinergic agents) is not always successful in achieving satisfactory bladder inhibition when treating detrusor overactivity. Other techniques, such as sacral neuromodulation, are relatively invasive. Transcutaneous pudendal nerve electrical stimulation is a non-invasive tool for the treatment of bladder overactivity. The aim of this study was to urodynamically assess the acute effects of this technique on women with idiopathic detrusor overactivity.

Methods

Thirteen non-neurogenic women with overactive bladder syndrome were prospectively examined. The mean age of the patients was 64.2 years (range 45-76 years). Six of 13 patients (46.15%) had been treated previously with anticholinergic agents, but without satisfactory results. Two cystometric studies were performed on each patient: the first without transcutaneous pudendal nerve electrical stimulation, and the second in concurrence with the stimulation. Cystometries were performed under the same conditions (bladder filling rate, catheter size, subject's position etc.) in each patient. Methods, definitions and units conform to the standards recommended by the International Incontinence Society, except where specifically noted. Transcutaneous electrical stimulation was applied to the dorsal clitoris nerve with a clip electrode. A repetitive stimulation with low frequency (10 Hz), pulse duration of 0.2 ms and stimulation strength just below the pain-threshold (14-20 mA) was performed. The cystometric traces were analysed by one of the authors, who was blinded to which traces corresponded to electrical stimulation.

Data were analysed with a Wilcoxon test using paired data. A significance level of 0.05 was adopted.

Results

All subjects tolerated the stimulation well and completed the procedure. In all cases, detrusor overactivity was seen in both cystometric evaluations. The first involuntary detrusor contraction occurred at a mean bladder volume of 110.8 ± 80.6 without electrical stimulation of the pudendal nerve, and 171.5 ± 115.3 during the stimulation: the difference was statistically significant ($p < 0.022$). Mean maximum involuntary detrusor contraction amplitude without and during stimulation was 39.6 ± 22.7 cm H₂O and 36.7 ± 20.9 cm H₂O, respectively. The difference was not statistically significant ($p > 0.05$). Mean maximum cystometric capacity was 206.5 ± 117.6 mL without stimulation and 206.9 ± 140.5 mL with stimulation: the difference was not statistically significant. No significant effects of electrical stimulation were seen on detrusor pressure at maximum flow and maximum flow values either.

Conclusions

Transcutaneous clitoral or dorsal penile nerve electrical stimulation, using clip electrodes in the female and ring electrodes in the male, is the most direct way of stimulating the pudendal nerve in order to inhibit detrusor overactivity (1,2). In a mixed patient group with neurogenic and non-neurogenic detrusor overactivity, significant effects on some urodynamic parameters (such as the bladder capacity at the first detrusor contraction and the maximum cystometric capacity) were found by Knoll et al. (2). In neurogenic patients with detrusor hyperreflexia, the short-term effects of pudendal nerve stimulation on bladder capacity were directly related to the strength of the electric current (3). In our study, the only statistically significant difference between the cystometries performed with and without pudendal nerve stimulation was found in the mean bladder volume at the time of the first involuntary detrusor contraction, which clearly improved during electrical stimulation. Conversely, no significant improvement in the mean amplitude of the maximum detrusor contraction or in maximum cystometric capacity was shown.

In conclusion, we assessed the acute effects of pudendal nerve electrical stimulation on detrusor overactivity in non-neurogenic women. Maximum cystometric capacity did not improve, but a significant improvement (increase) was seen in the volume at which the first involuntary detrusor contraction appeared. This could explain the favourable effects on the lower urinary tract symptoms in patients undergoing a course of pudendal nerve electrical therapy.

References

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