

URODYNAMIC FINDINGS DURING PERCUTANEOUS TIBIAL NERVE STIMULATION (PTNS)

Aims of Study

Percutaneous tibial nerve stimulation (PTNS) is a relatively new technique of neuromodulation. This technique has the advantage, versus traditional sacral root neuromodulation (SNS), to be less invasive and better accepted from the patient. While the urodynamic effects of sacral root neuromodulation can be observed immediately after the start of the stimulation (1), the urodynamic results of PTNS can be demonstrated only after several weeks of treatment (2). On the other hand, there are few data on the acute urodynamic effects of PTNS: a previous report showed that this treatment obtains poor or no acute urodynamic effects (3). This finding, if confirmed, would suggest that PTNS and SNS work using different mechanisms of action. Thus, aim of our study was to evaluate the acute urodynamic results of PTNS in patients with overactive bladder syndrome.

Methods

8 patients (6 women, 2 men; mean age 46 [+/-13] years), affected by symptoms of overactive bladder syndrome, were evaluated with urodynamic studies at rest and during PTNS stimulation. The first urodynamic evaluation was performed at rest and the second during PTNS in four patients, while in the remaining four patients the first examination was performed during PTNS stimulation: this procedure was used to reduce the artifacts due to the repetition of urodynamic evaluations. PTNS was performed using the traditional technique (a 34G needle was inserted 5 cm cephalad to the medial malleolus and connected to the stimulation device; pulse width 200 µsec; frequency 20 Hz; adjustable current 0-10mA). Both urodynamic evaluations were constituted by a medium filling (50 ml/min) water cystometry. A 6 Fr transurethral double lumen catheter was used for the registration of intra-vesical pressure and for bladder filling with isotonic saline. Patients were in sitting position during both examinations. The following urodynamic parameters were evaluated: first sensation of bladder filling (FD), involuntary detrusor contractions amplitude (AIDC) and threshold of appearance (TIDC) and bladder capacity (BC). Results obtained in the urodynamic evaluations at rest and during PTNS were statistically compared.

Results

Results are reported in table 1.

| Patients: 8 | Rest | PTNS | p-value |
|---------------------------|-----------|-----------|---------|
| | Mean (SD) | | |
| FD (ml) | 148 (84) | 115 (56) | 0,16 |
| TIDC (ml) | 249 (142) | 304 (143) | 0,23 |
| AIDC (cmH ₂ O) | 40 (21) | 36 (18) | 0,34 |
| BC (ml) | 362 (82) | 391 (71) | 0,23 |

Conclusions

Our results confirm previously reported findings: urodynamic parameters observed during acute PTNS stimulation do not vary significantly from baseline. This finding confirms that PTNS does not suppress acutely detrusor overactivity and, consequently, that mechanisms of action of PTNS seem different from those of SNS. For the latter, a regulation of the micturition reflex via the blockade of amyelinic afferent fibers can be hypothesized; for PTNS, mechanisms of long term potentiation/depression or of neuroplasticity are more likely to be involved.

References

1. Kirkham AP, Shah NC, Knight SL et al.: The acute effects of continuous and conditional neuromodulation on the bladder in spinal cord injury. *Spinal Cord*. 2001 Aug;39(8):420-8.
2. van Balken MR, Vandoninck V., Finazzi Agrò E. et al: Percutaneous tibial nerve stimulation (PTNS) for the treatment of bladder overactivity: urodynamic data. *Proceedings of ICS 2001 Congress, Seoul, Korea* (www.icsoffice.org).
3. Vandoninck V, van Balken M, Heesakkers J et al: Urodynamic findings in acute percutaneous afferent nerve stimulation (SANS) for the treatment of chronic voiding dysfunction. *Eur. Urol*. 2001; 39 (S5): 13.