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VARIATION BETWEEN CLINICAL AND URODYNAMIC RESPONSES IN PATIENTS RECEIVING INTRADETRUSOR BOTULINUM A FOR REFRACTORY NEUROGENIC OVERACTIVITY

Hypothesis / aims of study

We studied whether patients' clinical response to intradetrusor botulinum A is accompanied by concomitant urodynamic changes. In particular, we sought to ascertain whether the changes in these 2 sets of parameters are consistent.

Study design, materials and methods

We conducted a prospective, single-arm, open labelled trial on patients with neurogenic overactivity (DO). All required clean intermittent catheterisation (CISC) and were incontinent despite maximal anti-cholinergic therapy. Those with myasthenia gravis, pregnancy and active infection were excluded. Clinical parameters consist of number of episodes of leakages, number of CISC/ 24 hours and maximum catheterisable volume. Urodynamic parameters include volume of infusion at which DO first occurs (RV), maximum detrusor pressure ($P_{det(max)}$), duration of DO, cystometric capacity (CC) and compliance. Each patient received 300 units of botulinum toxin type A (Botox®, Allergan Inc., Irvine, California) delivered at 30 sites via cystoscopic needle. The institution's Ethics Committee approved the study.

Results

Over a 31-month period, 15 patients were recruited. Twelve (80.0%) had spinal cord injuries, 1 (6.7%) transverse myelitis, 1 (6.7%) spinal arteriovenous malformation which bled, and 1 (6.7%) central cord syndrome. Mean age was 49.9 years (31 to 67) and male to female ratio was 2:1.

Complete continence was achieved in 13 (86.7%). Twelve (80%) were able to withdraw completely from anti-cholinergic medication. Of the 2 non-responders, 1 did not experience any change in either clinical and urodynamic parameters whilst the other had improvements in urodynamic parameters only.

Overall, the mean number of leakages measured over a 24-hour period declined from 3.38 ± 1.47 to 0.71 ± 1.36 ($p<0.001$). The mean maximal catheterisable volume increased from 322.2 ± 146.2 ml to 441.7 ± 191.6 ml (ns). Number of CISC episodes declined from 5.89 ± 1.27 to 5.25 ± 0.75 (ns).

With regards to urodynamic parameters, DO was completely abolished in 5 (33.33%). RV increased from 127.8 ± 97.5 ml to 239.2 ± 110.1 ml ($p <0.05$). $P_{det\ (max)}$ declined from 66.3 ± 22.6 cm water pressure to 20.6 ± 23.6 ($p<0.001$). The duration of DO remained unchanged; 152.6 $\pm$ 73.9 s to 133.6 $\pm$ 101.9 (ns). Mean CC increased from 209.4 ± 62.5 ml to 355.6 ± 108.7 ml ($p<0.001$). Compliance remained unchanged; 76.7 $\pm$ 69.5 ml/cm water pressure to 57.8 $\pm$ 33.7 (ns).

No major complications were encountered and only 1 had lower urinary tract infection, which was easily treated with antibiotics

Interpretation of results

There is a variation in clinical and urodynamic responses. Although 13 (86.67%) patients reported complete continence, DO was abolished in only 5 (33.33%), indicating that the presence of residual DO did not necessarily imply persistent leakage. One possible explanation is the increase in RV. Although DO is present, the volume at which it occurs is such that it exceeds the usual catheterisable volume of urine. The patient would have performed CISC before RV is reached. A more plausible explanation is the reduction in $P_{det(max)}$. It has declined to such an extent that it is lower than the inherent outlet resistance, thus maintaining continence. As for the duration of DO, we are uncertain why it remains unchanged. However, it appears that the duration of DO does not have a clinical impact.

Our results also show that the number of CISC episodes and mean maximal catheterisable volume remained unchanged although the mean cystometric capacity increased significantly. These differences are probably reflective of patients' usual routine of performing CISC at a fixed time intervals, rather than allowing the bladder to fill to capacity.

Concluding message

There is a variation between clinical and urodynamic responses in patients receiving intradetrusor botulinum A for refractory DO. Those who become continent may continue to have underlying urodynamic changes. Conversely, improvements in urodynamic parameters do not necessarily translate to improved clinical parameters.

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