

CLINICAL EFFECTIVENESS OF SUBUROTHELIAL INJECTION OF BOTULINUM A TOXIN IN THE TREATMENT OF REFRACTORY DETRUSOR OVERACTIVITY

Hypothesis / aims of study

Intra-detrusor injection of botulinum A toxin has been used to treat patients with neurogenic or non-neurogenic detrusor overactivity. However, the therapeutic results are not satisfactory, patients may still have frequency urgency in their daily life although the cystometric capacity has increased. Paralysis of portions of detrusor muscle may increase bladder capacity, but the triggering of detrusor reflex or sensory transmission might not be blocked through intramuscular injection. If botulinum-A toxin is delivered to the suburothelial space and modulate the release of neurotransmitter from sensory nerve endings, it might effectively inhibit the occurrence of detrusor overactivity mediated by suburothelial sensory nerve dysfunction. This study is thus designed to investigate the clinical effectiveness of suburothelial injection of botulinum A toxin in patients with detrusor overactivity.

Study design, materials and methods

Twenty patients with detrusor overactivity of varying etiology refractory to anticholinergics were enrolled and treated with 200 units botulinum-A toxin injection into submucosal space. The clinical effectiveness of improvement in lower urinary tract symptoms and urodynamic parameters were assessed at baseline and 3 months after treatment.

Results

Among the 20 patients with detrusor overactivity, 3 had chronic stroke, 5 had spinal cord lesion, 6 had previous bladder outlet obstruction and 6 had idiopathic detrusor overactivity. After suburothelial botulinum A-toxin treatment, 8 regained continence (40%), 8 had improvement (40%) and 4 had failed treatment (20%). The total success rate was 80%. Hematuria was noted in 2 patients (10%), urinary tract infection in 3 (15%), and urinary retention in 1 (5%). Patients had significant improvement in frequency urgency and incontinence after treatment, but hesitancy in initiation and difficult urination was also noted. Successful result was noted in 2 of 3 (67%) with chronic stroke, 5 of 5 (100%) with spinal cord lesion, 5 of 6 (83%) with previous bladder outlet obstruction, and 4 of 6 (67%) with idiopathic detrusor overactivity. Bladder capacity increased significantly (195.4 ± 92.9 v 360.9 ± 139.1 ml, $p = 0.000$). However, the postvoid residual also increased (40.7 ± 79.9 v 199.3 ± 173.8 ml, $p = 0.002$) and voiding efficiency was significantly decreased (82.2 ± 25.6 v $45.7 \pm 28.4\%$, $p = 0.000$) after treatment. Bladder neck opening time showed significantly increased (16.1 ± 20.3 v 39.5 ± 42.5 sec, $p = 0.028$). Voiding pressure decreased significantly (34.3 ± 16.7 v 21.7 ± 13.8 cm water, $p = 0.015$) and flow rate showed no significant decrease (11.9 ± 7.7 v 10.5 ± 5.5 ml/s, $p = 0.481$) after treatment. Although the postvoid residual increased, most of the patients did not have residual urine sensation after voiding, indicating a decrease of bladder sensation has occurred after suburothelial botulinum-A toxin treatment.

Interpretation of results

This study has shown that the suburothelial injection of 200 units of botulinum A toxin is effective in treatment of detrusor overactivity of varying etiology and the effectiveness of suburothelial injection of botulinum A toxin is better than detrusor injection on detrusor overactivity.

Concluding message

Patients with detrusor overactivity treated with suburothelial injection of botulinum-A toxin had better results compared with those treated with detrusor botulinum-A toxin. Suburothelial injection of botulinum-A toxin might inhibit acetylcholine release in the muscarinic receptors locating at submucosal space or modulate neuropeptides release from C- afferent fibers and other sensory fibers. Furthermore, suburothelial treatment of botulinum-A toxin might be more suitable for the patients with detrusor overactivity and inadequate contractility.