

ARE BOTULINUM-A TOXIN INJECTIONS INTO THE DETRUSOR OF PATIENTS WITH NEUROGENIC DETRUSOR OVERACTIVITY SAFE? ULTRASTRUCTURAL DATA OF DETRUSOR BIOPSIES.

Aims of Study

Schurch/Stöhrer [J. Urol. 164:692; 2000] recently introduced a new method to achieve detrusor relaxation in neurogenic detrusor overactivity by injecting 300 IU of Botulinum-A toxin endoscopically into the detrusor muscle. On average this effects lasts at least 9 months. Structural effects of Botulinum-A toxin are only known from studies on striated muscles, where a widespread nerve sprouting occurs temporarily. In addition, these injections represent microtraumas to the detrusor and may result in microscarring. The aim of this study was to evaluate the ultrastructural effects of Botulinum-A toxin injections on the human detrusor.

Methods

Detrusor biopsies were taken from 22 patients with spinal cord injury [SCI] (n=16), myelitis (n=1), idiopathic spinal cord ischemia (n=1) or meningocele [MMC] (n=4). All had videourodynamically proven neurogenic detrusor overactivity (NBD). Patients were divided into two groups: Group A included 11 biopsies from patients before the first Botulinum-A toxin injection. Group B included 4 biopsies from patients within 3 months after the first injection and 7 biopsies after repeated injections (after 2 - 4 injections). The biopsies were processed by standard procedure for detailed electron microscopic study and evaluated by 2 examiners without prior knowledge of clinical/urodynamic data. They were assessed qualitatively and quantitatively for intrinsic nerve changes, especially sprouting, muscle cell fascicle structure including width of intercellular space, muscle cell junctions and amount of collagen and elastin.

Results

No statistically significant detrusor changes have been found concerning muscle cell fascicle structure, width of intercellular space and number and kind of muscle cell junctions. 50% to 86% of all intrinsic nerves presented with signs of degeneration in both groups. No nerve sprouting was found in group A, but it could be observed in 3 specimen from group B (p=0.214). 3 months after the botulinum-A toxin injection sprouting was observed in 0/4 biopsies, in 3/7 biopsies obtained after a mean of 8.8 months after the last injection sprouting occurred (p=0.043). Specimen from group A and group B showed only limited collagen deposits within the detrusor without any statistically significant difference between the groups.

Conclusions

This study verifies our earlier report of severe intrinsic nerve degeneration in the human detrusor in patients with SCI or MMC. It also shows nearly no muscular structural differences of the detrusor before and after even repeated Botulinum-A toxin injections. Similar to the findings in striated muscle significant nerve sprouting occurred temporarily in patients with clinically reduced effect of Botulinum-A toxin after a mean of 8.8 months after detrusor injections.