260

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EFFECTS OF BOTULINUM TOXIN TYPE A INJECTION ON THE BLADDER FUNCTION IN FEMALE RAT

Aims of Study

Botulinum toxin type A (Botox) has been known to block the release of acetylcholine into the synaptic gap by impeding the fusion of the acetylcholine-containing vesicles in the neuron membrane. A wide variety of clinical applications of Botox have been reported, and several recent investigations demonstrated the utility of Botox injection into the detrusor in patients with overactive bladder. However, its detailed effect on the detrusor remains unclear. We investigated the effect of Botox injection on the detrusor muscle by a frequency/volume study and cystometric analysis in conscious rats.

Methods

Female Sprague-Dawley rats weighing 250-350gm were used. Ten units of Botox were paraurethrally injected into 3 and 9 oclock positions at the bladder neck (n=17). The control group rats (n=8) underwent saline injection as in the same manner. The animal was put into a metabolic cage (Tecniplast, Tokyo, Japan), which was connected with PC. The rats had free access to food and water, and each rat was housed in a temperature 20? and subject to 12/12-hour dark/light cycle. 2-day-frequency/volume analysis was performed 2,4 and 8 weeks after Botox injection. Filling cystometry was done before and 4 weeks after Botox injection (n=4).

Results

Tables show the frequency/volume characteristics and cystometric results.

Table 1. The micturition characteristics of the rat after Botox injection

	Voided volume (ml/day)	Frequency/day	Volume/micturition (ml)
Control (n=8)	11.273	19.2	0.578
After 2 weeks (n=7)	16.126	18.6	0.871 (p?0.05)
After 4 weeks (n=4)	14.609	19.0	0.758 (p?0.05)
After 8 weeks (n=6)	11.451	18.3	0.619 (p?0.05)

Table 2.Cystometric analysis of the rat after Botox injection

	Voiding pressure (cmH2O)	Bladder capacity (ml)	Residual urine (ml)
Control (n=4)	16.335	0.482	0.04
After 4 weeks (n=4)	9.720 (p?0.05)	0.991 (p?0.05)	0.240 (p?0.05)

Conclusions

The present study demonstrated that voided volume, bladder capacity and residual urine volume significantly increased, while the voiding pressure was significantly lower than that of control group. These findings suggest that Botox injection on the detrusor may be a novel method to create a rat model of the underactive bladder.