

THE EFFECTS OF CHRONIC VARIABLE STRESS ON THE BLADDER FUNCTION IN RATSHypothesis / aims of study

Stress can provoke and aggravate chronic cystitis, interstitial cystitis, overactive bladder and so on. The responsible mechanisms, however, are poorly understood. The primary aim of this study was to investigate the effect of chronic variable stress on bladder function using cystometry in conscious rats. Additionally we investigated the contractility changes of the bladder related to the muscarinic subtype receptors in both groups using in vitro organ bath study, as well as the expression of the contraction associated protein in rats.

Study design, materials and methods

Sixteen adult female Sprague-Dawley rats weighing approximately 250 g were randomly assigned and divided into control (n=8, CON) and chronic variable stress (CVS , n=8) group. The rats of the CVS group spent 6 weeks under CVS protocol consisted of confinement in a small cage, ice water sprinkling, white noise, stroboscope, light on at night, and irregular vibration. Each period of stressors lasted 2~16 h each week. After 6 weeks of experiment, continuous filling cystometry was performed in conscious animals 2 days after the bladder catheter implantation in both group of rats and basal pressure (BP), threshold pressure (TP), maximal voiding pressure (MVP), micturition duration time (MDT) and micturition interval time (MIT) was measured in each rat. The next morning after measuring cystometric parameter, the dome part of the bladder was removed after decapitation as fastly as possible and used for in vitro organ bath study and western blotting for detecting the changes of contractile related protein expression.

Results

Compared to the CON group, basal pressure, maximal vesical pressure and threshold pressure were significantly higher ($p<0.05$) and voiding volume and micturition duration time were significantly reduced in the CVS group ($p<0.05$). In the organ bath study, acetylcholine-induced contractility in the CVS group was significantly lower than that in the CON group at concentration above 10^{-7} M ($p<0.05$), however, there was no difference in the acetylcholine response under the M2 (AQ-RA) or M3 (4-DAMP) antagonist pretreatment between two groups. Western blot showed the weaker bands of RhoA in CVS group than those of CON group.

Interpretation of results

Chronic stress increased basal bladder pressure and voiding pressure. RhoA pathway expressions may play a role in stress-related functional changes of the bladder of the in the chronically stressed rats.

Concluding message

These results suggest that chronic stress might induce the changes of the bladder function through the RhoA changes and it might be related with the M2 receptor changes of the bladder in stressed rat.

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Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?	Yes
Name of ethics committee	Animal laboratory ethics committee of wonkwang university school of medicine