

EFFECT OF AGING ON CYSTOMETRIC PARAMETERS AND DETRUSOR OVERACTIVITY CHARACTERISTICS IN AWAKE SPONTANEOUS HYPERTENSIVE RATS

Hypothesis / aims of study

The overactive bladder (OAB) syndrome and detrusor overactivity (DO) is especially common in the elderly, although these conditions are not regarded as a normal part of aging [1]. The spontaneous hypertensive rat (SHR) is considered a valuable tool to study the pathogenesis of DO, which is still unknown. We investigated how aging alters the cystometric DO parameters and the density of nerve growth factor (NGF) in awake SHRs of different ages.

Study design, materials and methods

Three age groups of 12 (n=5), 17 (n=6), 21 (n=6) week-old SHRs (Oriental Bio Inc, Gyeonggi-Do, Korea) were used. A catheter was implanted into the bladder to record the intravesical pressure (IVP), and a balloon-fitted catheter was positioned in the abdominal cavity to record the intraabdominal pressure (IAP), as described previously [2]. Cystometric pressure- and volume-related parameters and DO-related ones during the filling phase were investigated. The detrusor pressure was defined as the IVP minus the IAP. DO was defined as a rise in IVP above 2 cm H₂O during the filling phase, without a simultaneous change in IAP. The expression of NGF in the bladders was measured using ELISA.

Results

The body weight and bladder weight increased significantly with age, but the ratio between these parameters was not changed. Basal pressure significantly decreased with age, although there were no changes in threshold and maximal pressures. Micturition volume and micturition interval showed significant increases at ages between 17 and 21 weeks. There was no residual urine in any group. DO was not found in 12 week-old rats, while the other groups showed DO (Fig. 1). Frequency and amplitude of DO tended to increase between 17 and 21 weeks, although the difference were not significant. NGF did not show any difference among three groups.

Interpretation of results

DO could be demonstrated in our strain of SHRs after 12 weeks of age, and there was a close relationship with aging. NGF, known to be increased in the bladder wall of the patients with OAB/DO, did not show any relationship with aging.

Concluding message

SHRs develop DO after 12 weeks of age, and there seems to be a relationship between DO and aging. However, the starting age can be different in various strains of SHR, due to diverse biological characteristics resulting from different breeding techniques in different laboratories.

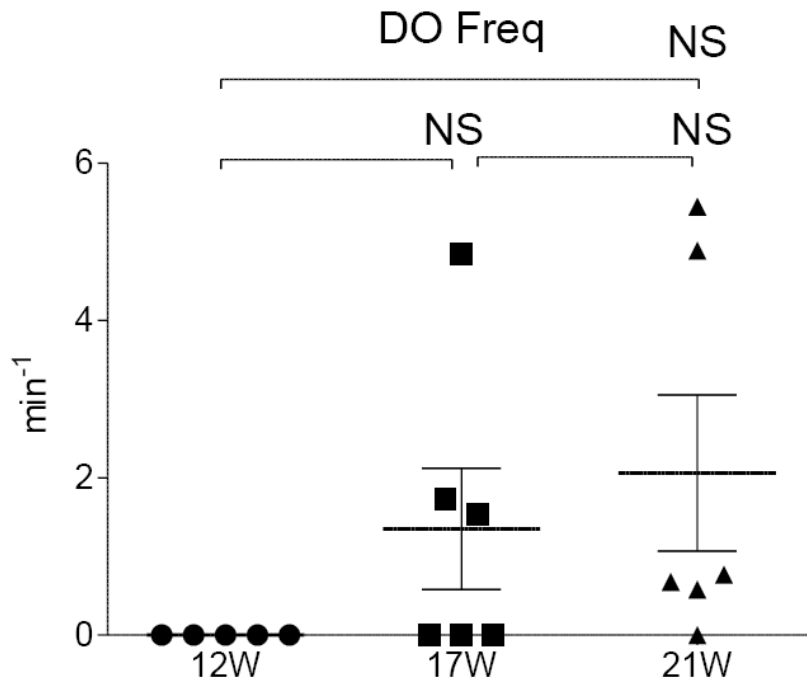


Fig. 1. The frequency of detrusor overactivity (DO) in SHR rats according to the age. all 12 week-old rats did not show DO at all, while the other groups showed the DO.

References

1. Steers WD. Pathophysiology of overactive bladder and urge urinary incontinence. Rev Urol Suppl 2002;4:S7-S18.
2. Lee T, Andersson KE, Streng T, Hedlund P. Simultaneous registration of intraabdominal and intravesical pressures during cystometry in conscious rats--effects of bladder outlet obstruction and intravesical PGE2. Neurourol Urodyn. 2008;27(1):88-95.

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<i>Is this a clinical trial?</i>	No
<i>What were the subjects in the study?</i>	ANIMAL
<i>Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?</i>	Yes
<i>Name of ethics committee</i>	the Animal Care and Ethics Committee, Inha University College of Medicine