

THE EFFECT OF DIURESIS FROM AFTER PARTIAL OUTLET OBSTRUCTION ON THE CONTRACTILE ABILITY OF RAT URINARY BLADDER

Aims of Study

We previously reported that diuresis (water intake) since before bladder outlet obstruction (BOO) has resulted in an increase in bladder mass and wall thickness resulting in an increase in contractile strength. This augmented contractile strength of bladder smooth muscle resulted in protection against the contractile dysfunction secondary to BOO. Clinically, most patients with BOO are likely to be advised to take in water enough. However, it has been still unclear whether diuresis from after BOO is beneficial to the bladder contractile function. The aim of this study is to determine the effect of diuresis from after BOO on the contractile ability of rat bladder smooth muscle.

Methods

Male Sprague-Dawley rats were separated into 4 groups; group 1: no BOO without diuresis (control), group 2: no BOO with diuresis, group 3: BOO without diuresis, and group 4: BOO with diuresis. Partial outlet obstructions were performed on group 3 and 4. After obstruction surgery, rats in group 2 and 4 were given 5% sucrose instead of water to induce diuresis according to our previous study, whereas group 1 and 3 were fed normal water. After 3 weeks of obstruction and/or 5% sucrose feeding, bladders were rapidly excised, and then longitudinal muscle strips of bladder were obtained, and mounted in isometric organ baths for physiological studies (the responses to carbachol, KCl and electrical field stimulation).

Results

Sucrose-induced diuresis resulted in a significant augmentation in bladder mass (weight) and a mild increase in smooth muscle contractility of rat bladder as compared to water-drinking group. Although partial outlet obstruction caused an increase in bladder mass and a decrease in smooth muscle contractility in both sucrose and water drinking rats, these alterations in bladder wall property in sucrose drinking rats were significantly much less than in water drinking rats. While water drinking rats with partial BOO showed a remarkable attenuation, sucrose-induced diuretic rats with partial BOO revealed no discernable decrease in smooth muscle contractility as compared to control.

Conclusions

Sucrose-induced diuresis even from after partial BOO showed an increase in contractile strength resulting in increase in bladder mass, and tended to protect against the contractile dysfunction secondary to BOO. These results suggested that conduct of a water intake might be clinically proper for patients with mild BOO.