

## URINE STORAGE DYSFUNCTION IN RATS WITH SALT-LOADING HYPERTENSION DEPENDS ON BLADDER BLOOD FLOW.

### Hypothesis / aims of study

SHRs provide a genetic model for exploring the pathogenesis of urine storage dysfunction related to hypertension (HT). In humans, however, HT develops by both genetic and environmental factors including lifestyle factors such as a high-calorie diet, excessive salt intake and stress. We previously reported the relationship between salt-sensitive HT and urine storage dysfunction in Dahl salt-sensitive (DS) rats. The storage dysfunction was suggested to depend on an increase in ATP and PGE<sub>2</sub> release from the urothelium via suppression of bladder blood flow (BBF). In the present study we investigated whether salt restriction restored the bladder function and influenced BBF.

### Study design, materials and methods

Six-week-old male DS rats were fed with high-salt (8%) diet and 35 ml water/day for 12 weeks. Blood pressure was measured through the tail artery in a non-anesthetized state. Urine volume and frequency were recorded all day long in a metabolic cage. Next, we changed the high-salt (8%) diet to low-salt (0.08%) diet and kept water intake within 35ml/day for further 6 weeks. We measured blood pressure and calculated the inactive period (sleeping) urine volume after changing diet. Changes in surface BBF were determined with a laser speckle blood flow imaging system (Omegazone OZ-1; Omegawave, Tokyo).

### Results

Mean voided volume gradually increased in Dahl salt-resistant (DR) rats fed with a normal or high-salt diet, while it did not change in DSr fed with a high-salt diet. There were significant differences in mean voided volume after 10-week salt loading between DRs and DSr fed with a high-salt diet. Salt restriction decreased systolic and diastolic blood pressure from 140 to 110 mmHg and increased body weight from 200 to 370 g. However, mean voided volume did not increase. There were significant differences in mean voided volume between DS and DR rats fed with a normal-salt diet.

### Interpretation of results

We previously reported that the decrease in BBF might be a causative factor inducing storage dysfunction in DS rats fed a high-salt diet. Even after 6-week low-salt diet, BBF might be kept low level in DS rats. Therefore, 6-week salt restriction may not be long enough to improve pathological changes in the bladder. It is necessary to examine the change in ATP and PGE<sub>2</sub> release from the urothelium after changing high- to low-salt diet.

### Concluding message

These results indicate that salt loading induces HT and decreases the voided volume, and 6-week salt restriction is not long enough to restore the bladder function. This kind of model, which develops HT and urine storage dysfunction by genetic and environmental factors, may be useful in defining the mechanisms to induce storage dysfunction in patients with HT.

### Disclosures

**Funding:** none **Clinical Trial:** No **Subjects:** ANIMAL **Species:** Rat **Ethics Committee:** Fukui University