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EXTRACT OF PEUCEDANUM JAPONICUM, AN UMBELLIFERAE PLANT, ALLEVIATED ACETIC ACID-INDUCED HYPERTENSIVE BLADDER RESPONSE POSSIBLY THROUGH THE NO PATHWAY IN RATS

Hypothesis / aims of study

Phytotherapeutic agents are very popular in many European countries as herbal remedies represent up to 80% of all drugs prescribed for these disorders [1]. *Peucedanum Japonicum* (PJ) is one of umbelliferae plants, inhabited at southern parts of Japan such as Kyusyu island, Yakushima and Okinawa. It was reported that the extract of PJ and its pharmacologically active constituent (isosamidin) exerted a significant relaxant effect of rat isolated arterial strip and a concentration-dependent inhibition of agonists-stimulated contraction of isolated strips of rabbit prostate and bladder. These results led us to the assumption of improvement by PJ extract of lower urinary tract symptoms such as overactive bladder. Therefore, the aim of this study is to clarify the effect of PJ extract on urodynamic functions in anesthetized rat cystometry. Furthermore, the binding activity of PJ extract on muscarinic α_1-adrenergic, β-adrenergic, P2X, 1,4-dihydropyridine(DHP) receptors was examined.

Study design, materials and methods

The effect of single oral administration of PJ extract (10 mg/kg) was examined on urodynamic parameters in cystometrograms of anesthetized rats induced by intravesical infusion of 0.1% acetic acid containing 100 μM L-NNA, NO synthase inhibitor, or not. Muscarinic, α_1-adrenergic, β -adrenergic, P2X, 1,4-DHP receptors binding activity of PJ extract in the rat tissue was examined by radioligand binding assay using [^{3}H]*N*-methylscopolamine (NMS), [^{3}H]prazosin, [^{125}I]cyanopindolol(CYP), [^{3}H] α β-methlene ATP (MeATP) and [^{3}H]PN200-100 as selective radioligands of muscarinic, α_1-adrenergic, β -adrenergic, P2X, 1,4- DHP receptors.

Results

Single oral administration of PJ extract (10 mg/kg) in 0.1% acetic acid-infused rat cystometry caused an increase in the micturition interval and a significant decrease of micturition frequency during the intravesical infusion of 0.1% acetic acid (Fig. 1). But PJ administration in 0.1% acetic acid containing 100 μM L-NNA infused rat cycstometry had little effect on the micturition intercal and micturityion frequency (Fig. 2). PJ extract had little effect on the muscarinic α_1-adrenergic, β -adrenergic, P2X, 1,4-DHP receptor binding activity in rat tissues, evaluated by radioligand binding assays using [^{3}H]prazosin, [^{125}I] CYP, [^{3}H] α β - MeATP and [^{3}H]PN200-100.

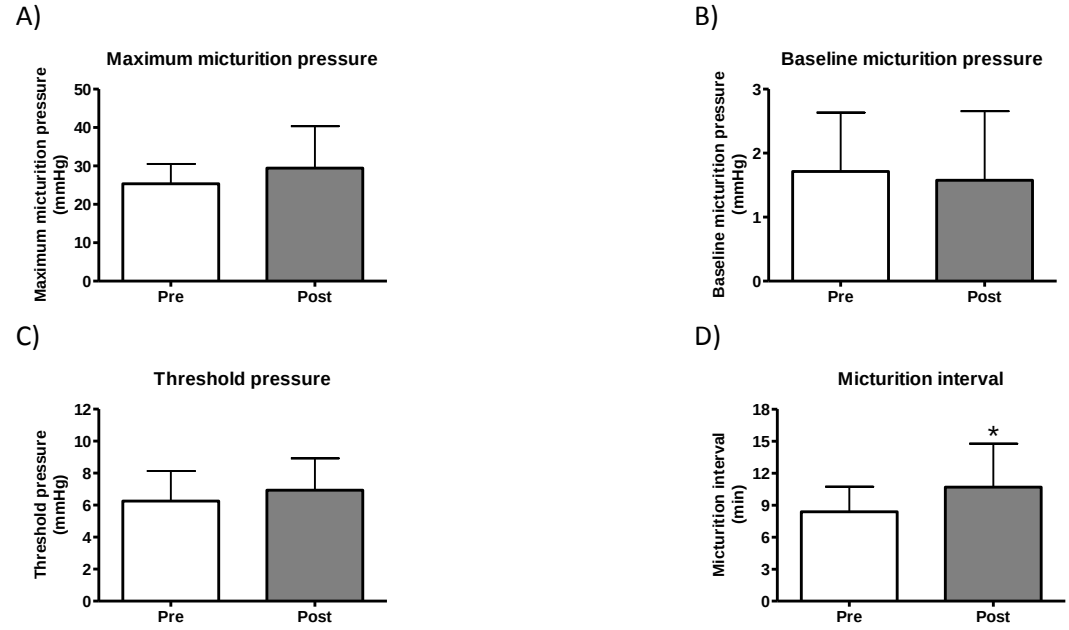

Fig.1 Effect of oral administration of PJE on urodynamic parameters in rats with 0.1% acetic acid-induced frequent urination. Each column represents mean±S.D. of 9 experiments. Asterisks show significant differences from the pre-treatment values by Student's paired t-test,*P<0.05.

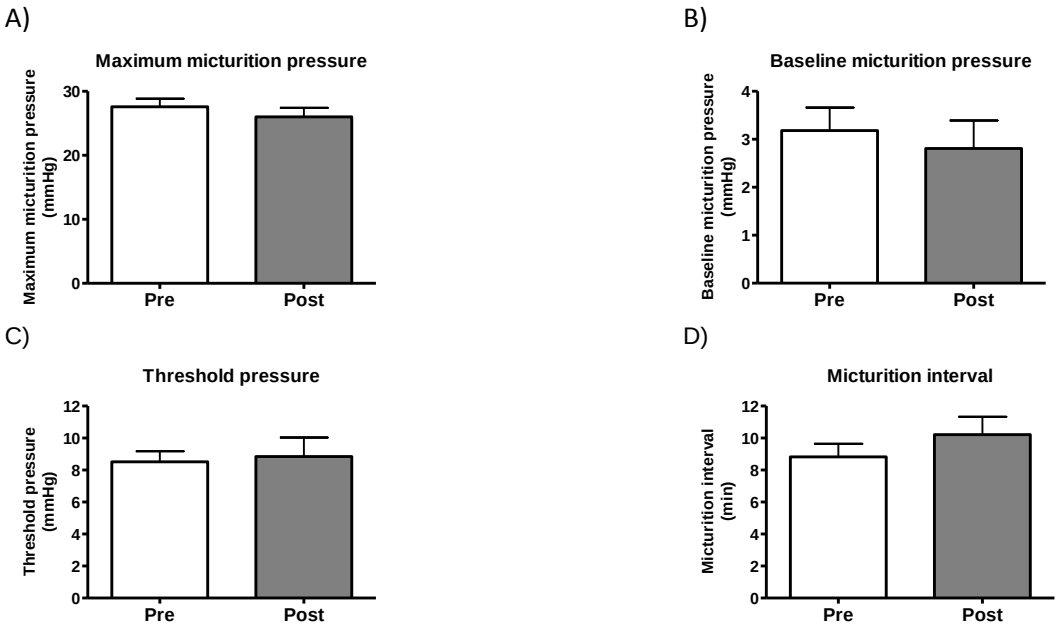

Fig. 2 Effect of oral administration of PJE on urodynamic parameters during intravesical 0.1%acetic acid with 100 μM L-NNA instillation in rats. Each column represents mean±S.D. of 7-8 experiments.

Interpretation of results

Single oral administration of PJ extract alleviated significantly urodynamic symptoms in hyperactive rat bladders by prolonging the micturition interval and decreasing micturition frequency. L-NNA attenuated alleviating effects of PJ extract for hyperactive bladder. Although the precise mechanism which PJ extract improved a hyperactive bladder response in acetic acid-infused rats remains to be clarified, nitric oxide (NO) pathway may contribute to the beneficial effect.

Concluding message

PJ extract improved significantly urodynamic symptoms in hyperactive rat bladders by decreasing the micturition frequency possibly through the NO pathway. Thus, the current results may support the clinical efficacy of PJ extract in the treatment of lower urinary tract symptoms accompanying overactive bladder.

References

1. Br J Urol, 78: 325 (1996)

Disclosures

Funding: University of Shizuoka **Clinical Trial:** No **Subjects:** ANIMAL **Species:** Rat **Ethics Committee:** The Institutional Animal Care and Use Committee of University of Shizuoka