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ANTIDIURETIC EFFECT OF ANTICHOLINERGIC AGENTS DEPEND ON C-FIBER AFFERENT NERVES IN THE BLADDER

Hypothesis / aims of study
Treatment of nocturia typically involves attempts to resolve detrusor overactivity or bladder outlet obstruction. However, while either or both of these etiologies may exist in the individual complaining of nocturia, treatment may fail due to an often overlooked component of nocturnal polyuria. The administration of anticholinergic agents is anticipated to diminish storage symptoms, as well as nocturia. Nevertheless, the effect of this treatment on polyuria related to nocturia is not yet clear. In the present study, we evaluated the effect and underlying mechanism of antimuscarinic agents on urine production in the diuretic rat.
Study design, materials and methods
Female Sprague-Dawley rats were divided into three groups: (1) control group, (2) imidafenacin i.v. group, (３) atropine i.v. group. The influence of imidafenacin and atropine on urine production was investigated in water-loaded condition, which was induced by intraperitoneal injection of 15ml saline. Urine production was measured every 2 hours. Blood samples were collected to determine the antidiuretic hormone (ADH), aldosterone (ALD), atrial natriuretic peptide (ANP), and brain natriuretic peptide (BNP) levels 2 hours after administration of antimuscarinics. To induce desensitization of C-fiber afferent nerves in the bladder, resiniferatoxin (RTX; 0.3 mg/kg) was subcutaneously or intravesically injected 2 days before experiments.
Results
Urine production increased and reached the maximum two hours after intraperitoneal injection of 15ml saline. Imidafenacin decreased urine production in water-loaded rats, however, plasma ADH, ALD, ANP, and BNP levels were not changed between imidafenacin-administrated rats and vehicle-administrated rats. The inhibitory effect on urine production was not found in RTX-treated rats. Atropine did not reduce urine production.
Interpretation of results
These results suggest the antimuscarinic agent improves nocturnal polyuria through C-fiber afferent nerves in the bladder. We previously reported that atropine had no effect on suppression C-fiber afferent nerves. Therefore, in the present study, atropine did not decrease urine production.
Concluding message
These results suggest the antimuscarinic agent improves nocturnal polyuria through C-fiber afferent nerves in the bladder.

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Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?	**Yes**
Name of ethics committee	**University of Fukui**