

THE EFFECT OF INSULIN ON THE CONTRACTION RESPONSE OF THE SMOOTH MUSCLE OF THE BLADDER IN SPONTANEOUSLY HYPERTENSIVE RATS

Hypothesis / aims of study

Insulin resistance is a hallmark of metabolic syndrome, including type 2 diabetes mellitus and obesity that are characterized by endothelial dysfunction. It is presumed that metabolic syndrome may lead to erectile dysfunction (ED) and lower urinary tract symptoms (LUTS). Spontaneously hypertensive rats (SHR) is genetically manipulated animal producing essential hypertension with insulin resistance to characterize defects in endothelial insulin action. Increased voiding frequency, lower bladder capacity and micturition volume, increased bladder sympathetic innervations, and hypertrophy in both afferent and efferent neurons supplying the bladder were reported in SHR. Recent studies suggested that this action probably increased sensitivity of calcium via RhoA/Rho-kinase pathway. However, its precise mechanism is still unknown. This study evaluated whether hyperinsulinemia may affect bladder function or not via insulin effect on the contractile mechanism of the smooth muscle in bladder.

Study design, materials and methods

The smooth muscle in the bladder of adult male SHR (300~350 gm; 6-week-old, 10-week-old) and normotensive Wistar-Kyoto rat (WKY) were obtained and strips were prepared. Using isometric tension recording, the effects of 1 μ M insulin on the contraction and relaxation by drugs such as Norepinephrine (NE), acetylcholine (ACh), bethanechol (BCh) were examined in both group.

Results

Unlikely WKY, which exhibited no change of contraction or decreased baseline, SHR exhibited increased contractile response in dose dependent manner by NE. After pretreatment of insulin, NE induced contraction in SHR were increased significantly but not WKY. Increased contractile response were potentiated by increment of age.

Interpretation of results

It is thought that an increase of insulin may play a role in contraction or relaxation response of bladder in SHR.

Concluding message

Our study suggest that hyperinsulinemia due to insulin resistance in patient with metabolic syndrome might change bladder function.

<i>Specify source of funding or grant</i>	Non
<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>	Laboratory Animal trial ethical committee of Chung-Ang University