

ABSTRACT

The Effects of Dexamethasone and Captopril Treatment to Glucose and Insulin Level on Male Rats (*Rattus norvegicus*)

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Objective : This study explores the effects of daily treatment of dexamethasone subcutaneously and captopril via drinking water on glucose and insulin level in rats (*Rattus norvegicus*).

Design and Methods : This study used the *Post-test Control Group Design*. The sixty male rats (*Rattus norvegicus*) 3-4 months old were divided to 5 groups (control, receiving daily subcutaneous injection of NaCl 0,9%; dexamethasone phosphate 0,130 mg/kg in NaCl 0,9% subcutaneously; dexamethasone phosphate 0,130 mg/kg in NaCl 0,9% subcutaneously and captopril 0,025 mg/ml via drinking water; dexamethasone phosphate 0,130 mg/kg in NaCl 0,9% subcutaneously and captopril 0,05 mg/ml via drinking water; dexamethasone phosphate 0,130 mg/kg in NaCl 0,9% subcutaneously and captopril 0,10 mg/ml via drinking water). Dexamethasone and captopril were given for 21 days. After treatment periode, the blood were collected intracardially. Glucose and insulin level were measured by GOD-PAP and radio immunoassay (RIA) respectively.

Result : Dexamethasone phosphate 0,130 mg/kg in NaCl 0,9% subcutaneously did not influence the glucose level ($P > 0,05$) but increased the insulin level significantly (over 2-fold, $P < 0,01$). It's means, dexamethasone induced insulin resistance. Dexamethasone phosphate 0,130 mg/kg in NaCl 0,9% subcutaneously and captopril 0,025 mg/ml via drinking water decreased the glucose level significantly ($P < 0,05$) but did not influence the insulin level (the insulin level did not decrease, $P > 0,05$). Dexamethasone phosphate 0,130 mg/kg in NaCl 0,9% subcutaneously and captopril 0,05 mg/ml via drinking water decreased the glucose level significantly ($P < 0,05$) but did not influence the insulin level ($P > 0,05$). Dexamethasone phosphate 0,130 mg/kg in NaCl 0,9% subcutaneously and captopril 0,10 mg/ml via drinking water decreased the glucose level significantly ($P < 0,05$) and did not influence the insulin level ($P \approx 0,052$; significance level tends to increase). These result means that daily treatment of dexamethasone and captopril inhibit insulin resistance and increase glucose uptake in skeletal muscle. The mechanisms may be mediated via increase in insulin receptor affinity to insulin, phosphorylation of tyrosine kinase receptor, IRS-1, PI3K and PKB accompanied by increase in GLUT4 translocation from sitoplasma to plasma membrane and ultimately increase glucose uptake.

Conclusion : Captopril can inhibit insulin resistant and increase glucose uptake when given with dexamethasone concomitantly.

Key words : Dexamethasone phosphate, captopril, glucose, insulin, insulin resistance, insulin signaling, IRS-1, PKB, PI3K and GLUT4.