Mineralocorticoid Escape is Associated with Downregulation of Renal Sodium Transporters and Upregulation of Natriuretic Peptides in Deoxycorticosterone Acetate (DOCA)-salt Hypertensive Rats

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Background : The present study was aimed to investigate whether there is an altered role of aquaporin water channels (AQP) and sodium transporters in the kidney in association with "mineralocorticoid escape" in DOCA-salt hypertension.

Methods : One week after left unilateral nephrectomy, rats were subcutaneously implanted with silastic DOCA (200 mg/kg) strips and maintained on 0.9% saline to drink. Four weeks later, the protein expression of AQP, sodium transporters, and neutral endopeptidase (NEP) was determined in the kidneys by semiquantitative immunoblotting and immunohistochemistry. The mRNA expression of NPs was determined by real-time polymerase chain reaction. The amount of urinary ANP excretion was measured by radioimmunoassay.

Results : In DOCA-salt rats, urine osmolality was decreased, while urinary excretion of sodium increased. The expression of AQP1-3 as well as that of Na,K-ATPase α-1 subunit, NHE3, NKCC2 and NCC proteins was decreased. The expression of ANP, BNP and CNP mRNA was increased. The expression of NEP was decreased, along with an increased urinary ANP excretion.

Conclusion : The "mineralocorticoid escape" may in part be attributed to downregulation of AQP and sodium transporters, along with increased expression of various NPs, in the kidney.

Key Words : DOCA, 수분통로, 나트륨 수송체
Deoxycorticosterone acetate, Aquaporins, Sodium transporters