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HEATSTROKE –INDUCED RENAL ISCHEMIA AND RENAL DAMAGE AND INVOLVEMENT OF ANGIOTENSIN AND STRESS PROTEIN IN DIABETES MELLITUS.

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BACKGROUND/AIMS Experiments were carried out to ascertain whether the expression of angiotensin-II (AII) and stress protein involved renal damage in the heatstroke-induced circulatory shock. We validated the hypothesis that A-II receptor subtype 1 (AT_1) blocker may confer renal protection against heatstroke-induced circulatory shock in diabetic rats by blocking the expression and action of AII in the kidney.

METHODS To deal with the matter, we assessed the effects of heatstroke on mean arterial pressure (mSAP), heart rate (HR), renal blood flow (RBF), total peripheral vascular resistance (TPR), colonic temperature, blood gases, and serum or tissue levels of AII and tumor necrosis factor–alpha (TNF-α) in urethane-anesthetized rats with and without pretreatment with AT_1-blocker (candesartan) for 2 wks. In addition, heat shock protein (HSP) expression in the kidney was determined in different groups of normal and diabetic rats. Heatstroke was induced by exposing the animals to high blanket temperature.

RESULTS/CONCLUSION mSAP, RBF, blood pH, onset time of heatstroke and survival time after heat stress were all lower in diabetic rats. However, blood lactate concentrations, TPR, levels of A-II and TNF- were greater in diabetic rats exposed to heat stress. Diabetic rats with and without pretreatment with candesartan , when exposed to the same heat stress (43^{o}C), had longer onset and survival times, greater renal blood flow, lower mean arterial pressure and total peripheral resistance, and lower TNF-α level when pretreated with candesartan. Western blot assay revealed heat stress-induced HSP expression in the kidney. After the onset of heatstroke, HSP and injury markers in renal tissue were found to be significantly higher and lower, respectively, with AT_1-blocker related to attenuation of tissue hypoperfusion and elevation of HSP expression in kidneys during heatstroke in diabetic rats.

Keywords: Angiotensin. Candesartan. Stress Protein.