Conclusions: This alternation of SOD may be one of the important factors for the vulnerability of the heart from oxygen free radicals or may be related to the pathogenesis of hypertension in this species.

Key Words: Oxygen free radicals; superoxide dismutase; spontaneously hypertensive rats

H006

PROTECTIVE EFFECTS IN BRAIN LACUNAE FORMATION IN INDUCED HYDROCEPHALUS

J.Y. Lee*. Department of Medicine, University of Minnesota, Minneapolis, MN

In our previous studies, induced hydrocephalus prevented NaCl hypertension. Effects of hydrocephalus in brain lacunae formation were investigated. To do so, an aqueductal block was made to induce hydrocephalus in 4 week-old Dahl S rats. A 6% (n=34 blocked; n=23 sham) or 0.23% (n=54) The NaCl diets were introduced on the day of surgery. Intra-arterial blood pressure (BP) was measured for baseline and at 14 weeks. In a kidney cross-section, the number of glomeruli was 28% higher in the truly blocked group with a 6% high NaCl diet, p < 0.0001, as compared with the sham control group with the same diet. The number of cast was reduced in 54%, p < 0.0001 with the high NaCl diet in aqueduct-blocked rats. A brain cross section showed many small lacunae in high NaCl fed rats, mainly in the cerebral white matter and brain stem, averaging 193 lacunae in sham rats vs 77 lacunae in blocked rats on a 6% NaCl diet (2.5 fold reduction, p < 0.0001). Group BPs averaged 130 on 0.3% NaCl in sham, 145 and 160 in blocked and sham with a 6% NaCl diet, respectively. BP in 15 mm Hg higher in sham group on a 6% NaCl diet could partially explain the reduction of glomeruli, increase in tubular casts, and increased brain lacunae. Moreover, on a high NaCl diet, 10% truly blocked and 11% sham blocked rats had BPs between 150 and 175 mm Hg (averaging 160 and 162, respectively) and brain lacunae averaged 199 in the sham vs 73 in the blocked. Thus with equal BFs, the blocked group had 63% fewer brain lacunae, indicating far fewer vascular lesions. Aqueduct blocked rats showed markedly reduced BFs, mortality rates, cardiac hypertrophy and urinary albumin. The protective effects may be due to a necessary fluid adjustment or electrolyte rebalance in reduced pressures in the hydrocephalic brain volume expansion.

Key Words: Sylvian aqueduct; hydrocephalus; NaCl signal; hypertension; renal injury; brain lacunae

H007

AN EXPERIMENTAL ACUTE ANGIOTENSIN-MEDIATED RENAL HYPERTENSION

G. Recordati, F. Zorzoli, A. Zanchetti. Centro Fisiologia Clinica e Ipertensione, Universita’di Milano and Ospedale Maggiore, Milano, Italy

The aim of the present study was to characterize the acute hypertensive and tachycardic episode which follows the reopening (REOP) of the right kidney hylus after a period of complete renal ischemia produced by discrete ligatures of the renal artery and vein (functional right nephrectomy: FRN). Blood pressure (BP), heart rate (HR), rate of breathing (RB), rectal temperature (T), urine flow rate, osmolality and Na⁺, K⁺ excretion from the right kidney were continuously monitored for one hour before, during FRN, and for 1–3 hours after REOP in pentobarbital anesthetized, spontaneously breathing Sprague-Dawley (250–300g) rats with the left kidney intact (group 1) and in rats nephrectomized on the left side (group 2). In group 1 REOP after a FRN of 30 and 60 min was followed by only slight and insignificant changes in BP and HR. In group 2 the REOP of the only remaining and completely ischemic right kidney after 30 min (group 2a, n = 5), 60 (group 2b, n = 3) and 180 min (group 2c, n = 5) of FRN was followed by an average peak increase of 23.0 ± 4.3, 49.1 ± 14.1 and 72.8 ± 10.5 mmHg in systolic BP respectively. A marked tachycardia was observed in group 2c only. In an additional group of left nephrectomized rats a i.v. bolus injection of 3 mg/Kg Captropil 15 and 30 min before REOP (n = 5), almost completely prevented the development of hypertension and tachycardia. In two animals i.v. Captopril injections at the peak of the hypertensive episode quickly returned BP to normal.

These data indicate that in mononephrectomized rats (group 2) the hypertension (and tachycardia) which follows the REOP of the completely ischemic and only remaining kidney is due to acute release of renin and the consequent generation of angiotensin II. These effects are absent if the left kidney is intact (group 1). This finding points to an interaction between an intact kidney and renin release from an ischemic kidney or the peripheral response to angiotensin II. Our observations also offer an experimental model of an acute angiotensin II-mediated hypertensive response of renal origin.

Key Words: Experimental acute hypertension; hypertensive crisis; functional right nephrectomy; ACE inhibitors

H008

METHOTREXATE FAILS TO SUPPRESS CARDIAC CYTOKINE INDUCTION IN PRESSURE OVERLOAD HYPERTROPHY IN RATS

A. Jeron, S. Frederdsorf, R. Straub, Günter A.J. Riegger, and F. Muders. Medizinische Klinik II, Universität klinik Regensburg, Germany

Elevated plasma levels of IL-6 and IL-1b were found in patients with heart failure and left ventricular hypertrophy (LVH) and correlated with poor outcome. Immunosuppressive agents like Methotrexate (MTx) may lower these cytokines and affect disease progression. Here we studied the effects of MTx in a rat model of LVH.

LVH was induced by aortic banding in 27 rats. Rats were injected with MTx i.p. once a week (M1: 0.3mg/kg; M2: 0.9mg/kg, n=9) or NaCl (AS, n=9) for 8 weeks, starting 4 weeks after aortic banding. Body weight was measured weekly. Cytokines were measured in the superfusion solution of myocardium slices (6/heart) and in plasma (obtained at week 4, 8 and 12). Body weight and systolic blood pressure were significantly lower in all aortic banding groups compared to 6 sham operated controls (C) (468g–477g vs 532g, p<0.05; 114–120mmHg vs 135mmHg, p<0.01)