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How carnosine affects cardiovascular parameters in remnant kidney model

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Purpose : Chronic kidney disease (CKD) is a major public health concern affecting millions of people .Oxidative stress is a mediator of systemic complications of chronic renal failure (CRF) and involved in the pathogenesis of hypertension, endothel dysfunction, shortened erythrocyte lifespan and deformability(1). One of the main effects of oxidative stress is the decrease

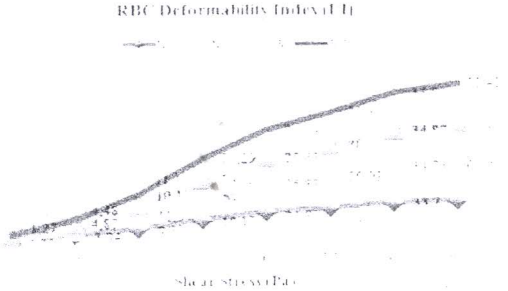
in the biological activity of nitric oxide (NO). Endothelial dysfunction is characterized by a reduced synthesis of bioavailability of NO (2). The remnant kidney (RK) model is widely considered to be the classic model of progressive renal disease and it is known that inhibition of NO synthesis has been known to worsens renal disease is the RK model by hemodynamic changes (3). As we know L-carnosine is an antioxidant known to possess free radical scavenging functions (4). In this study, our aim is to induce renal failure in rats with subtotal nephrectomy (RK model) and observe the effect of carnosine on both hemorheologic parameters and blood pressure levels of nephrectomyzed rats and compare the results with their sham operated control group rats.

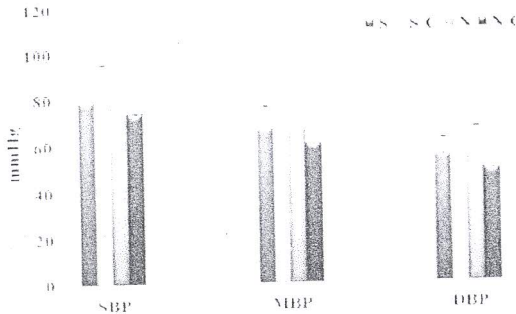
Material and Methods: 4 months old Male Sprague-Dawley rats were used in the study. The Animals were divided into 4 groups consisted of 6 rats each. 3 days after the subtotal nephrectomy and sham operations, the surviving rats were divided into the four groups; 1 - Sham (S), 2 - Sham + Carnosine (S-C), 3 - Subtotal nephrectomy (N), 4 - Subtotal nephrectomy + Carnosine (N-C). Carnosine was injected i.p. (50 mg/kg in each injection every day for 15 days). The control group received the same volume of physiological saline.RBC dformability indexes, arterial blood pressure and heart rate, MDA and NO levels were measured.

Results:In N group MDA level was statistically increased compared to sham group as we expected ($p<0.05$). MDA level was significantly decreased in N-C group compared to N group ($p<0.05$).NO level of N group was found to significantly decrease compared to S group NO levels($p<0.05$). There was significantly decreased in N group EI level than in S group level ($p<0.05$). N-C group EI level was found to significantly increase compared to N group EI level ($p<0.05$). EI values demonstrates to us that carnosine shows this effect in all shear stress values.In all systolic blood pressure (SBP), diastolic blood pressure (DBP) and mean blood pressure (MBP) measurements, there was no any significant difference between S and N groups ($p>0.05$).

S-C group heart rate level was significantly increased compared to S group heart rate level ($p<0.05$). There is no important difference between other groups in terms of heart rate levels.

Conclusion:As a result, we see that carnosine has important effect o RBC deformability indexes, lipid peroxidation and NO levels but it doesn't affect blood pressure and heart rate levels in RK model in rats.





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Where applicable, the authors confirm that the experiments described here conform with The Physiological Society ethical requirements.