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Acta Medica Iranica

2009;47(4) : 196-200

Effects of Noradrenaline and Potassium Chloride on peripheral vessels in one experimental model of heart failure

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Abstract:

We investigated contraction to noradrenaline (NA) and KCl and sensitivity of NA at the level of larger vessels (thoracic aorta and vena cava; left renal artery and left renal vein; lateral saphenous artery and lateral saphenous vein and finally central ear artery and marginal ear vein) in a model devised to mimic heart failure. The model presented here is the rabbit coronary ligation model in which myocardial infarction was produced ligation model in which myocardial infarction was produced in male New Zealand white myocardial infarction was produced in male New Zealand white rabbits (2.6 kg-3.0 Kg) by ligation of the marginal branch of the left descending coronary artery. The development of chronic heart failure was allowed to proceed over eight weeks. Animals were killed by overdose with pentobarbitone sodium (IV injection). Arteries and veins were carefully removed with as little connective tissue as possible and placed in cold physiological salt solution (PSS). The arterial and venous rings were mounted in 10 ml isolated organ baths, bathed in Krebs maintained at 37 °c with 95% O2 plus 5% CO2. The rings were then placed under different resting tensions. After initial application of tension, tissues were left to equilibrate for a 60 min period. Then all tissues were exposed to cumulative concentration of NA (1nM-300µM). Following complete washout, the preparations were left for 45 minutes to re-equilibrate. Then all preparations were contracted with KCl (Krebs solution, sodium free and high KCl, 125 mM) and allowed to contract for 5-10 min. Following complete washout with normal Krebs an additional 30 minutes equilibration period was allowed. Then cumulative concentration-response curves (CCRS) to NA obtained by increasing the concentration-response curves (CCRC) to NA obtained by increasing the concentration of the agonist in half-log increments. In contraction responses to NA aorta, ear artery and ear vein were the most sensitive preparations (pD2 values: 9.96, 7.04 and 7.8 respectively). Renal artery and aorta had relatively very large maximum responses to NA among the arteries (6.7 and 4.3 g respectively) and saphenous vein had greatest maximum responses to NA among the arteries (6.7 and 4.3g respectively) and saphenous vein had greatest maximum response among the veins (2.9g). The results led to two major conclusions with respect to the model. First, vasoconstrictions to noradrenaline were unaltered. Second, contractions to KCl (125 mM) were preserved in large vessels (arteries and veins) in coronary ligated rabbits after 8 weeks compared with a normal control population.

Keywords:

Larger vessels . Contraction to NA . Contraction to KCl

TUMS ID: 1189

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