THE SYSTEMIC AND CORONARY HEMODYNAMIC AND METABOLIC EFFECTS IN THE INTACT ANESTHETIZED DOG OF A. PAIRED PACING THE VENTRICLE AND B. SLOWING OF THE HEART WITH ALTERNATING CURRENT STIMULATION OF THE ATRIUM

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ABSTRACT

Paired pacing (PP) of the ventricles was studied in three different intact anesthetized dog preparations: 1) normal sinus rhythm, 2) tachycardia induced by atropine and 3) cardiac failure induced by pentobarbital infusion. PP at the sinus rate increased cardiac output (CO) 14.0% ($p=0.05$), increased stroke volume (SV) 16.7% ($p<0.01$) and decreased total peripheral resistance 10.6% ($p<0.02$) in the normal animal. When PP the heart after the administration of atropine heart rate (HR) was reduced 40%. The cardiac Index of efficiency (CIE) was reduced 34% ($p<0.05$), coronary vascular resistance (CVR) reduced 26.9% (<0.01), coronary blood flow (CBF) increased 30.8% ($p=0.05$), left ventricular oxygen usage (LV O_2 U) increased 30.6% ($p<0.05$) and mean systemic arterial blood pressure (MABP) decreased 6.9% ($p<0.02$).

When PP the failing heart at a rate of 30.7% below sinus rhythm CIE decreased 37.8% ($p<0.01$), CVR decreased 26.6% ($p<0.001$), CBF increased 23.7% ($p<0.001$) and LV O_2 U increased 16.7% ($p<0.01$), left ventricular work decreased 26.1% ($p<0.05$), MABP decreased 8.2% ($p<0.02$) and mean right atrial blood pressure (MRABP) increased 13.3% ($p<0.02$) and SV increased 18.8% ($p<0.05$). Alternating current stimulation of the atria was studied as a means of slowing HR in intact anesthetized dogs. When HR was slowed an average of 31.3% ($p<0.001$), mean pulmonary blood pressure was decreased 14.3% ($p<0.05$), MRABP decreased 13.3% ($p<0.05$) and SV increased 42.0% ($p<0.001$). PP has an adverse effect on cardiac metabolism and does not improve systemic hemodynamics when slowing the ventricular rate below the sinus rate and when applied to the failing heart. Alternating current stimulation of the atria is an effective method for slowing heart rate without producing adverse hemodynamic or metabolic effects.

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