

Title: HEMODYNAMIC EFFECTS OF DOBUTAMINE IN CARDIAC SURGICAL PATIENTS

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Introduction. Dobutamine an analog of dopamine has been shown to improve ventricular performance in patients with low output cardiac failure. It has also been shown that dobutamine decreases systemic vascular resistance and has chronotropic effects. Since tachycardia was associated with larger doses of dobutamine and because tachycardia may be detrimental to certain cardiac patients, lower doses were used in the present study and the hemodynamic responses to the infusion of 3 $\mu\text{g/kg/min}$ of dobutamine were evaluated.

Methods. Nine adult patients with low cardiac output and elevated pulmonary capillary wedge pressure were studied during mitral and/or aortic valve replacement. Hemodynamic measurements were made prior to and 5 to 10 min after starting 3 $\mu\text{g/kg/min}$ of dobutamine. Measured hemodynamic variables included heart rate (HR), systemic (AP) and pulmonary arterial (PAP), pulmonary capillary wedge (PCWP) and right atrial pressures (RAP). Calculated measurements included cardiac index (CI), stroke index (SI), and systemic and pulmonary vascular resistance (SVR, PVR). Statistical differences were determined by the Student t-test for paired data.

Results. (mean \pm SEM) The infusion of 3 $\mu\text{g/kg/min}$ of dobutamine caused no significant change in heart rate (84 \pm 3 to 89 \pm 4). Mean AP was unchanged (76 \pm 4 to 77 \pm 4 mmHg) mean PAP decreased from 35 \pm 3 to 31 \pm 2 mmHg ($p < 0.05$) and PCWP decreased from 25 \pm 2 to 19 \pm 2 mmHg ($p < 0.01$). Cardiac index increased from 2.25 \pm 0.4 to 2.79 \pm 0.3 l/min/m² ($p < 0.05$) and stroke index from 27 \pm 2 to 32 \pm 2 ml/b/m² ($p < 0.05$). SVR decreased from 1,532 \pm 167 to 1,183 \pm 108 dyn.sec.cm⁻⁵ ($p < 0.05$) and PVR from 210 \pm 36 to 150 \pm 22 dyn.sec.cm⁻⁵ ($p < 0.05$).

Discussion. The infusion of 3 $\mu\text{g/kg/min}$ of dobutamine in patients with valvular heart disease improved myocardial performance without significant changes in heart rate. Systemic arterial (myocardial perfusion) pressure was unchanged secondary to a balanced decrease in SVR and increase in SI. Pulmonary artery pressure, however, did decrease significantly.

From this study it appears that low dose dobutamine is a useful drug to improve myocardial performance where increased heart rate may be detrimental to the patient (e.g., mitral stenosis). Furthermore, the decrease in both pulmonary and systemic vascular resistance suggests that dobutamine at 3 $\mu\text{g/kg/min}$ can reduce the afterload of both the left and right ventricle and may therefore be beneficial to patients with predominant

valve regurgitation were reduction of SVR can improve forward ejection fraction.