

Haemodynamic response to a small intravenous bolus injection of epinephrine in cardiac surgical patients

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Background and objective: The aim was to study the rapid changes in cardiac output and systemic vascular resistance produced by intravenous epinephrine (5 microg) on a beat-by-beat basis.

Methods: Ten patients were studied during cardiac surgery. Radial or brachial arterial pressure was recorded continuously during intravenous administration of epinephrine (5 microg). Cardiac output and systemic vascular resistance were derived for each beat using arterial pulse contour analysis calibrated by lithium indicator dilution. In each patient a further dose of epinephrine (5 microg) was administered during cardiopulmonary bypass with the blood flow kept constant so that changes in arterial pressure corresponded to changes in systemic vascular resistance.

Results: When the patients were not on cardiopulmonary bypass, the epinephrine produced an initial increase in systemic vascular resistance to 129 +/- 15% (mean +/- SD) of control, followed by a more prolonged reduction to 57 +/- 13% of control. Cardiac output showed a small initial reduction coincident with the increase in systemic vascular resistance, followed by an increase to 152 +/- 24% of control. During cardiopulmonary bypass, the changes produced by epinephrine on systemic vascular resistance were qualitatively similar but smaller in amplitude, probably because of a greater volume of dilution in the bypass circuit.

Conclusions: Small bolus doses of epinephrine produce an initial increase in systemic vascular resistance followed by a much greater reduction that may cause hypotension.