POSTER VII—CLINICAL CIRCULATION

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TITLE: ESMOLOL VS NITROPRUSSIODE FOR HYPOTENSION: DOSE RESPONSE DURING ISOFLURANE ANESTHESIA.

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INTRODUCTION: Esmolol and nitroprusside (SNP) are both used for controlled hypoten-
sion during isoflurane anesthesia. To bet-
ter understand the interaction between isoflurane and both SNP and esmolol, we
undertook the following study using an IRB-
approved protocol.

METHODS: Subjects were 15 consenting adult males undergoing radical genitourinary cancer surgery. Cardiovascular, endocrine (catecholamine levels and plasma renin activity) and blood gas data were collected at the following times: 1) prior to anesthetic, 2) during infusion of either SNP (0.5, 1.0 or 2.0 ug/kg/min) or esmolol (75, 150 or 300 ug/kg/min) while isoflurane concentra-
tion was adjusted to maintain mean arterial pressure at 60 mm Hg. The hypoten-
sive agent and its dosage sequence were chosen randomly. Data were analyzed using ANOVA and linear regression. P<.05 was re-
garded as significant.

RESULTS: We observed a linear, dose-depen-
dent reduction in isoflurane requirement

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EFFECT OF NITROGLYCERIN INFUSION ON EFFECTIVE PULMONARY CAPILLARY PRESSURE IN THE POST-OPERATIVE PERIOD OF MAJOR VASCULAR SURGERY.


Patients recovering from major aortic surgery often present signs of interstitial pulmonary edema even in the absence of major heart or respiratory disease (1). We took advantage of the cardiovascular monitoring of such patients by a Swan-Ganz catheter to measure the effects of a nitroglycerin infusion on effective pulmonary capillary pressure (EPCP). We estimated EPCP using a computerized analysis of the pressure time profile obtained during pulmonary arterial occlusion by the Swan-Ganz catheter balloon. This time pressure profile presents a fast-decaying segment reflecting the uncompliant arterial compartment emptying which is followed by a second slow-decaying segment before reaching the level of pulmonary capillary wedge pressure (PCWP). The second segment reflects the slow emptying of the compliant capillary compartment. An estimation of EPCP from the arterial occlusion pressure time profile was obtained from the backward extrapolation of the slow exponential-like segment to the time of complete occlusion. An apnea lasting 10 seconds was necessary to record a reliable pulmonary arterial pressure time profile. The average of 6 profiles was recorded before and after nitroglycerin infusion (0.25 µg / kg / min) and the EPCP estimations were adjusted for a similar occlusion pressure. The capillary and venous to total resistance ratio (Rcv/Rt) was calculated as EPCP - PCWP / PAPm - PCWP (PAPm: mean pulmonary arterial pressure). Nitroglycerin induced a decrease in cardiac output (6.3 ± 1.4 to 5.3 ± 1.2 l/min), a decrease in mean systemic arterial pressure (103 ± 14 to 85 ± 20 * mmHg) and the following changes in lung hemodynamics:

<table>
<thead>
<tr>
<th>n = 11</th>
<th>PAP</th>
<th>PCWP</th>
<th>PCPE</th>
<th>Rcv/Rt</th>
</tr>
</thead>
<tbody>
<tr>
<td>control</td>
<td>14.9</td>
<td>4.8</td>
<td>9.2</td>
<td>0.44</td>
</tr>
<tr>
<td>±SD</td>
<td>8.2</td>
<td>3.4</td>
<td>4.4</td>
<td>0.09</td>
</tr>
<tr>
<td>nitroglycerin</td>
<td>10.8</td>
<td>2.6</td>
<td>6.7</td>
<td>0.51</td>
</tr>
<tr>
<td>±SD</td>
<td>4.9</td>
<td>3.3</td>
<td>4.0</td>
<td>0.08</td>
</tr>
</tbody>
</table>

(* = p<0.05)

In order to check if nitroglycerin induces a change in lung segmental vasomotion, nitroglycerin (0.08 µg / kg / min) was infused directly into the pulmonary circulation using the distal lumen of the Swan Ganz catheter in 7 patients: no changes in cardiac output, systemic arterial pressure and Rcv/Rt were observed.

In conclusion, nitroglycerin infusion into the systemic circulation of patients recovering from aortic surgery results in: (1) a decrease in the estimated EPCP; (2) an increase in Rcv/Rt with a decrease in cardiac output and systemic arterial pressure. We speculate that the decrease in cardiac output could increase capillary resistance through a partial derecruitment of the pulmonary capillary bed.