TITLE: PLASMA CATECHOLAMINE AND DOPAMINE CONCENTRATIONS DURING COARCTATION RE PAIR. ISOFLURANE - *VERSUS* NEUROLEPTAN-AESTHESIA

AUTHORS:Dr. H. J. Schmitt, R. J. Knoll, U. G. Danner
AFFILIATION:Inst. for Anesth.,Univ. Erlangen-Nürnberg, 8520 Erlangen

Introduction: Repair of coarctation of the aorta sometimes is followed by increased plasma catecholamine concentrations (1, 2). The purpose of this study was to compare the effect of isoflurane and neuroleptanaesthesia on plasma catecholamine concentration during coarctation repair in children.

Method: Fourteen children scheduled for coarctation repair were randomly assigned into two groups of seven after informed consent was obtained from parents. The study was approved by the local Ethical Committee of the hospital. After premedication (flunitrazepam 0,1 mg/kg orally) children in the neurolept group (F) received thiopental 5 mg/kg intravenously for induction, incremental doses of i.v. fentanyl (total 50 - 70 µg/kg), flunitrazepam i.v. (total 0.04 - 0.06 mg/kg) and for relaxation pancuronium. Haemodynamic breakthrough especially during cross-clamping was treated in this group with nifedipine i.v. After induction with thiopental i.v. (5 mg/kg) patients of the isoflurane group (J) were anaesthetized with isoflurane 1.5 - 2.0 Vol% and relaxed with pancuronium, too. Patients of this group received no antihypertensive agents. All children were controlled ventilated ($PaCO_2$ 35 - 40 mmHg) with a mixture of nitrous oxide: oxygen 50:50. Right radial arterial blood pressure, heart rate, blood gas, pH and rectal temperature were recorded. Arterial blood for plasma catecholamine and dopamine levels was drawn at following times:(O) before skin incision, (I) 1 minute before cross-clamping of the aorta, (II) 10 minutes after cross-clamping of the aorta, (III) at the end of the surgical procedure. Catecholamine and dopamine concentrations were quantified using the HPLC method (3). Results are expressed as mean ±SD, comparison between groups was performed using the U-test of Mann-Whitney.

Results: Although the mean age of group F was lower (F 46.8 ± 45.5 vs J 88.4 ± 48.2 months), the groups were comparable as for weight (F 17.5 ± 14.6 vs J 23.9 ± 12.7 kg) and duration of cross-clamping (F 21.8 ± 5.5 vs J 25.3 ± 4.5 min). Data are presented in table 1. No significant differences for norepinephrine (NE), epinephrine (E), blood pressure and heart rate between the two groups were found. The dopamine plasma levels were at all times in group J significantly higher than in group F. In both groups there was no significant catecholamine concentration changing through cross clamping of the aorta.

Discussion: These data demonstrate that the anaesthetic proceeding - isoflurane or neurolept - for coarctation repair in children leads to similar catecholamine plasma concentrations. Cross-clamping of the aorta causes no significant changing of plasma catecholamine concentrations in neither group. The importance of the higher dopamine levels in the J group has to investigate in future.

References:
1. Circulation, 57; 598 - 602: 1978 2. J Surg Research 34: 97 - 103, 1983
3. Life Sci 25: 131 - 138, 1979

Table 1:Plasma catecholamine levels, blood pressure (BP) and Heart rate (HR) of the 2 groups

Timing		O	I	II	III
NE	F	330 ± 237	455 ± 304	464 ± 398	537 ± 427
pg/ml	J	250 ± 180	462 ± 191	440 ± 155	385 ± 271
E	F	231 ± 107	333 ± 232	277 ± 156	273 ± 137
pg/ml	J	624 ± 809	492 ± 199	391 ± 150	1905 ± 3403
Dopa	F	475 ± 495	224 ± 161	146 ± 68	544 ± 462
pg/ml	J	1439 ± 1967*	3692 ± 7093*	1226 ± 1695*	1108 ± 1110*
BP	F	124 ± 18	114 ± 13	118 ± 25	104 ± 23
syst. mmHg	J	105 ± 13	109 ± 13	125 ± 13	97 ± 13
BP	F	71 ± 9	60 ± 12	63 ± 18	63 ± 19
diast. mmHg	J	65 ± 8	63 ± 5	73 ± 11	55 ± 5
HR	F	97 ± 16	119 ± 18	120 ± 22	115 ± 14
b/min	J	107 ± 19	123 ± 12	119 ± 13.	103 ± 22

Data are mean values ± SD * p < 0.05 between groups

A58

Title: EFFICACY OF SUFENTANIL IV INFUSION AFTER CORONARY ARTERY SURGERY

Authors: WJ Durkan MD, JE Tobiason MD, K Diveley MD
Affiliation: Anes. Dept., Naval Hospital, San Diego CA 92134

Introduction: Patients who have undergone coronary artery surgery require hemodynamic and ventilatory support in the intensive care unit following their surgery. Many stimulating events occur during this postoperative recovery period. As the patient's anesthetic level decreases, morphine and midazolam are given intermittently to decrease the stress occurring in the intensive care unit and to increase the patient's comfort. This schedule results in erratic peak and trough levels of drug which can disrupt the patient's cardiopulmonary stability. Sufentanil is a very potent narcotic with a short duration of action and low toxicity potential compared to morphine.(1) The purpose of this study is to evaluate whether a difference exists in the frequency and total dose of morphine and midazolam administration, time to extubation, time to ICU discharge, hemodynamic changes, and vasoactive drug consumption in the post-CABG patient receiving a sufentanil infusion compared to the control patient not receiving a sufentanil infusion.

Methods: After IRB approval, informed consent was obtained from 44 patients for coronary artery surgery. A standardized anesthetic technique was provided, which included morphine sulfate IM premedication and intraoperative sufentanil 7 mcg/kg and midazolam 0.45 mg/kg. Enflurane or isoflurane was provided as needed intraoperatively. The patients were divided into two groups of twenty-two. In a double blinded fashion, one group received a sufentanil infusion (1 mcg/ml) and the other group received an infusion of normal saline. The infusions were started after CPB was discontinued and delivered at a rate of 1 ml/kg/hr for four hours, 0.5 ml/kg/hr for four hours, 0.25 ml/kg/hr for four hours, and then discontinued. Morphine was administered IV in 1 mg increments up to 4 mg every 30 minutes for analgesia whenever the patient's pain level was greater than 3 on a scale from 0 to 10. Midazolam was administered IV in 1 mg increments up to 4 mg every 30 minutes for sedation whenever the patient's anxiety/agitation level was greater then 3 on a scale from 0 to 10. Intravenous sodium nitroprusside and/or nitroglycerin were administered to keep the blood pressure < 140/90 mmHg, pulmonary artery occlusion pressure < 18mmHg, and systemic vascular resistance < 1200 dynes.sec.cm-5. Cumulative doses of morphine, midazolam, and vasoactive drugs, hemodynamic data, blood gas tensions, extubation time, ICU discharge time, and hospital discharge time were recorded. Data were compared using Student's t-test. P-value ≤ 0.05 was considered significant.

Results: We found no statistical difference in time to extubation or ICU discharge between the two groups. We also noted no statistical difference in the ICU hemodynamic parameters HR, MAP, PAD, or CI; however, SVR was less in the sufentanil group during the first 9 hours. 24 hour morphine requirement was higher in the placebo group, 29.59±15.00 (Mean±SD) vs 19.55±10.87 mg, but 24 hour midazolam requirement was not different, 11.25±6.71 vs 10.45±6.70 mg. 24 hour SNP requirement was significantly higher in the placebo group, 156.06±95.64 vs 77.58±91.51 mg. 24 hour NTG consumption, although not statistically significant, was higher in the placebo group, 50.04±37.88 vs 40.40±20.83 mg.

Discussion: Rockaerts et al. reported minimal hemodynamic changes and a low incidence of hypertensive reactions during a propofol-sufentanil infusion for postcoronary surgery sedation, but no control group was used and potential interaction between propofol and sufentanil was not addressed(2). We chose to evaluate sufentanil alone as an infusion to avoid this interaction and found no difference in sedation requirements (24 hour midazolam consumption) when compared to placebo. Concentrating on protecting and enhancing myocardial function in the early hours postoperatively will allow a repaired heart to withstand the stress of weaning from hemodynamic and ventilatory support more easily. By reducing nitroprusside and morphine consumption as well as controlling afterload by reducing SVR, sufentanil infusion provides protection during this stressful recovery period in the intensive care unit without the cost of prolonged ventilatory support or prolonged ICU stay.

References: 1)Bovill JG, et al: The pharmacokinetics of sufentanil in surgical patients. Anesthesiology 61:502-506,1984 2)Roekaerts P, et al: Haemodynamic effects of a propofol-sufentanil infusion for sedation in the ICU following coronary artery surgery. SCA 11th Annual Mtg Abstracts p224, 1989.