TITLE: **HEMODYNAMIC ALTERNATIONS DURING AUTOLOGOUS BLOOD DONATION FOR CHILDREN IN SEVERE CYANOTIC HEART DISEASE**

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INTRODUCTION

Hemodilution is an accepted therapeutic method to prevent coagulopathies in children with severe cyanotic heart disease (CHD). Additionally the storage and retransfusion of collected blood may help to avoid homologous blood transfusions with all their wellknown complications. The aim of this study, therefore, was to investigate possible hemodynamic changes caused by hemodilution in cyanotic children with fixed obstructed pulmonary blood flow (mean gradient 73 ± 3 mm Hg) and ventricular septal defect.

PATIENTS AND METHODS

After approval by the Ethics comittee of the Medical Faculty 10 children (5,8 ± 2,3 yrs, 18,5 ± 8 kg) with CHD (5 TOF, 5 TGA with PST) were investigated. The children were anesthetized with ketamine (1 - 2 mg/kg) and diazepam (0,5 mg/kg) for routine preoperative catheterization. During catheterization autologous blood (20 ml/kg) was collected and replaced by hetastarch (1:1). Hemodynamics were measured before (I) and after hemodilution (II). Following parameters were recorded heart rate (HR), mean arterial (MAP), mean pulmonary pressure (MPAP), arterial (S_aO_2), mixed venous (S_vO_2) and pulmonary (S_pO_2) oxygen saturation. Using standard formulae pulmonary (Q_p) and systemic (Q_s) blood flow as well as pulmonary (R_p) and systemic (R_s) resistance and left to right (LR) and right to left (RL) shunts were calculated. Wilcoxon signed rank test was used for statistics.

RESULTS

Laboratory and hemodynamic data are summarized in table 1.

	Hct(%)	Hb(g/dl)	HR(bpm)	MAP
I	57.4 ± 11	18.1 ± 3.5	112 ± 19	76 ± 11
II	47.4 ± 12	14.9 ± 4.0	113 ± 20	74 ± 16
	**	**	ns	ns

	SaO_2(%)	SpO_2 (%)	SvO_2 (%)	MPAP
I	68 ± 12	71.6 ± 10	58.9 ± 5	9.1 ± 4
II	67 ± 11	68.0 ± 12	55.8 ± 6	8.0 ± 4
	ns	*	*	*

	Q_s(l/min)	R_s(U)	Q_p(l/min)	R_p(U)
I	4.8 ± 1.8	13.3 ± 7.8	3.0 ± 2.5	0.99 ± 0.5
II	3.8 ± 0.8	13.4 ± 5.1	2.8 ± 2.5	0.90 ± 0.5
	ns	ns	*	ns

	LR(%)	RL(%)	Q_p/Q_s	R_p/R_s
I	32.8 ± 25	71 ± 13	0.7 ± 0.6	0.09 ± 0.07
II	32.8 ± 26	67 ± 11	0.7 ± 0.6	0.08 ± 0.05
	ns	ns	ns	ns

* $p < 0,05$, ** $p < 0,01$

DISCUSSION

During routine preoperative catheterization collecting autologous blood in children with CHD up to 20 ml/kg can be safely performed. The decrease of Hct and Hb may contribute to a small decrease of MPAP, Q_p, S_pO_2 and S_vO_2. These findings are clinically not relevant because S_aO_2 and intracardiac shunts remained unchanged. With adequate hemodynamic monitoring the advantage of autologous blood transfusion can also be used in pediatric cardiac surgery.

TITLE: RESPIRATORY COMPLICATIONS AND HYPOXIC EPISODES DURING INDUCTION WITH ISOFLURANE IN CHILDREN - EFFECT OF INDUCTION TECHNIQUE.

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Induction of anesthesia with isoflurane in unpremedicated children using a technique incorporating oxygen, nitrous oxide and a gradually increasing inspired vapour concentration is frequently accompanied by respiratory complications and hypoxic episodes(1,2). We wished to determine whether modifications to this "traditional" induction technique affected the incidence of these adverse occurences. Having obtained institutional approval and parental consent, 75 healthy unpremedicated children were randomly allocated to have anesthesia induced by one of three techniques:

Group A: (n=23) N_2O/O_2/Isoflurane. Initial inspired vapour concentration 0.5% (increased by 0.5% every 10 breaths to a maximum of 4%).

Group B: (n=23) As group A until 2% isoflurane attained, this concentration maintained for 2 minutes, then increased as in group A.

Group C: (n=29) 4% isoflurane in oxygen. No alterations to inspired mixture until induction complete.

Jackson-Rees modification of Ayre's T-piece was used for induction in all children. Heart rate, arterial oxygen saturation (SaO_2) and inspired vapour concentration were monitored continuously and recorded every 15 seconds. Any events of coughing, breath-holding or laryngospasm were noted, together with the lowest SaO_2 associated with them. Time taken to induce anesthesia was recorded. In each case induction was performed by the same anesthesiologist who was blind to the oximeter display but was informed if SaO_2 fell below 91%. All recordings were made by an independent observer.

Parametric data were tested for statistical significance by analysis of variance; if a difference in the means was found, further analysis was carried out with Student's unpaired t test. The Kruskal-Wallis and Mann-Whitney U tests were similarly used for non-parametric data. Nominal data were tested using the Chi-squared test with Yates' correction.

Respiratory complications ($p < 0.01$) and hypoxic episodes ($p < 0.0005$) were less common in group C children than in groups A and B. Induction time was shorter in group C ($p < 0.0005$). In the presence of respiratory complications children in groups A and B tended to desaturate whereas those in group C did not ($p < 0.05$).

We conclude that inhalation induction of anesthesia with isoflurane in unpremedicated children can be accomplished more rapidly and with a lower incidence of respiratory complications and hypoxic episodes with 4% isoflurane in oxygen than with "traditional" techniques.

REFERENCES: 1. Anaesthesia, 1988, 43:927-9
2. Brit. J. Anaesth., 1989, 62:199-201