THE BIOCHEMICAL AND ECHOCARDIOGRAPHIC EFFECTS OF ANAEMIA OF PREMATURITY AND RED CELL TRANSFUSION ON CARDIAC FUNCTIONS IN THE VLBW INFANTS

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Aim: We investigated myocardial contractility as measured by Echocardiographic parameters of Tissue Doppler Imaging (TDI), Myocardial Performance Index (MPI), Ejection Fraction (EF) and Biochemical markers in VLBW infants before and after red cell transfusion.

Method: Prospective, observational study on VLBW infants of < 34 weeks gestation and >2 weeks of age. Blood sampling and echocardiogram performed in 12 hours before and between 3 to 7 days after transfusion. Infants with congenital heart lesions were excluded. Data was analysed using paired t-test, Wilcoxon signed rank and Kendall's Tau to compare the differences and to see correlation between pre and post values.

Results: 74 pre and post transfusion (Pst) studies were performed on 28 infants. Pre-transfusion (Prt) haematocrit (Hct) ranged between 0.20% and 0.29%. Significant improvement in each biochemical and echocardiographic parameters were seen after transfusion:

TDI (cm/sec)		Prt (Mean)	SD	Pst (Mean)	SD
Left Ventricle	Systolic	5.15	0.79	5.57	0.81
	Diastolic	5.89	1.18	6.74	1.16
Left Ventricle(MPI)		0.395	0.1622	0.248	0.1627
Biochemistry (pg/ml)					
NTproBNP		1013	718.40	681	491.65
Troponin-T		54	17.04	46	13.50

[Measurements and values] P value < 0.001 for all readings

There was also a significant improvement in EF, septal and right ventricular contractility as assessed by TDI and MPI.

Conclusion: Assessment of myocardial performance by echocardiography and biochemical markers demonstrate significant improvement following transfusion which is not proportional to the severity of the anaemia.

CEREBRAL AUTOREGULATORY CAPACITY DURING HYPOVOLAEMIA IN NEWBORN PIGLETS

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Background and aims: Hypovolaemia constitutes a stress to systemic circulation. The place of volume expansion in ill newborn infants with low arterial blood pressure (ABP) is uncertain. Our hypothesis was that hypovolaemia would further reduce cerebral autoregulatory capacity (CA-capacity) at low ABP.

Methods: Piglets (n=7, age 1-2 days) were anaesthetized with propofol and randomized to normovolaemia- hypovolaemia or hypovolaemia- normovolaemia. Hypovolaemia was induced by removal of 1/3 of the estimated blood volume. Normovolaemia was re-established by re-infusing the removed blood volume. A resting period of 30 minutes was interpolated after removal and re-infusion of the blood volume to enable recovery of cerebral autoregulation. CA-capacity was estimated from changes in cortical flux (laser-Doppler probe) to induced rises in ABP by inflation of a thoracic aorta balloon for 30 seconds. Subsequently, CA-capacity was calculated as %ΔCVR/%ΔABP (i.e. percentage of full autoregulatory capacity), where CVR was estimated as ABP/Doppler flux.

Results: A total of 104 and 94 rises in ABP were analyzed during normo- and hypovolaemia, respectively. Hypovolaemia reduced mean ABP from 54±4 to 39±5 mmHg (P=0.02) and CA-capacity from 62±9 to 37±8% (P=0.05) (mean ±SEM). CA-capacity was 56±3 at ABP above 40 mmHg compared to 33±3 below 40 mmHg (P=0.0005). Analysis of variance demonstrated an interaction between hypovolaemia and ABP such

that hypovolaemia reduced CA-capacity by 32% at ABP below 40 mmHg but not above ($P=0.03$).

Conclusions: In newborn piglets CA-capacity appears to be reduced by hypovolaemia in itself. In this experiment, however, the level of ABP was the dominating determinant of CA-capacity.

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EFFECT OF VOLUME EXPANSION ON CEREBRAL BLOOD FLOW IN HYPOTENSIVE PRETERMS

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Background and aims: To ensure adequate perfusion of the brain, cerebral autoregulation limits cerebral blood flow (CBF) to a certain range. Preterm infants might lack autoregulation, and when hypotensive, be at risk for cerebral damage.

Frequently used treatment for hypotension is volume expansion. We aimed to determine the effect of volume expansion (crystalloid) in hypotensive preterms on fractional cerebral tissue oxygen extraction (FTOE), a measure for CBF.

Methods: Preterm infants with a mean arterial blood pressure (MABP) below their GA, who received volume expansion (15 ml/kg) within the first week of life, were included.

Near-infrared spectroscopy was used to measure regional cerebral oxygen saturation (r_cSO_2). Transcutaneous arterial oxygen saturation ($tcSaO_2$) was measured simultaneously. FTOE was calculated: $(tcSaO_2 - r_cSO_2) / tcSaO_2$. We analyzed 2 episodes of 1h immediately before, and 2 hours after treatment, using Mann-Whitney-U-test.

Results: Twelve measurements in 10 preterms (7 female, median GA 27.9 weeks (range 25.6-31.3), BW 1064 grams (676-1780), 1.7 days old (0.5-6.9), CRIB-score 4 (1-9)) were analyzed. MABP increased in 10 cases (median 29.5 to 32.0 mmHg), though not significantly ($p=.21$). FTOE did not change accordingly (median 0.26 to 0.24, $p=1.0$).

Conclusions: Volume expansion tends to increase MABP but has no effect on FTOE. However, FTOE before volume expansion was always within the normal range. The question arises whether volume

expansion is warranted in preterm infants in case of marginally low blood pressure. Due to the lack of effect on MABP and limited numbers investigated, no conclusion regarding cerebral autoregulation can be drawn.

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DOES MULTIDISCIPLINARY GROUP THERAPY IMPROVE OUTCOME IN OVERWEIGHT/ OBESE CHILDREN AND ADOLESCENTS?

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Objectives: Evaluate the impact of ambulatory group therapy (GT) versus individual therapy (IT) on a large group of overweight/obese children and adolescents.

Methodology: Self-referred overweight and obese children/adolescents, were invited to participate and randomised to GT or IT for 4 months. GT included physical activity, dietary education and psychological sessions (2x3 hrs/week including 3hrs/ 2 weeks with parents). IT was made to measure and consisted of counselling of the child and its family on healthy lifestyle. Dietary advice and psychological support were available, when deemed necessary. Changes in BMI Z-score, WC-Z-score, glucose and fat metabolism, eating habits, lifestyle, wellbeing and self esteem were investigated. The study was approved by the National Medical Ethical Committee (CNER).

Results: 192 children and adolescents participated with informed consent (age range 7-17 years; F: 53.6%). After 4 months, a BMI Z-score reduction was observed with a significantly better outcome in the GT. Positive changes in weight status were observed in 19% of children in the GT compared to 5.9 % of those following IT. Biological parameters show a small change over time but not significantly different between the two groups. Positive changes in eating habits as well as lifestyle were observed more frequently in the GT children, although not all reached statistical significance. Self perceived wellbeing as well as happiness with themselves improved after the GT.