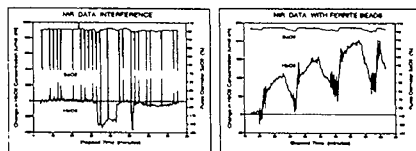


## ● 139

**COMPARISON OF FOREARM OXYGENATION DURING ISCHAEMIA BY NEAR INFRARED SPECTROSCOPY AND PO<sub>2</sub> HISTOGRAPHY** Andrew J Macnab, Andrew I Minchinton, Roy E Gagnon, Karen H Fryer, Mike Secar, Elke H Roland, Alan Hill. BC's Children's Hospital, University of British Columbia, Vancouver, Canada. **Background:** There is concern regarding the quality and validity of the Cyt<sub>aa3(cu-ox)</sub> signal (Cyt) from near infrared spectroscopy (NIRS); including, the increase in brain Cyt seen by us during circulatory arrest on cardiac bypass. **Purpose:** To study episodes of arrested blood flow with simultaneous measurements between NIRS and pO<sub>2</sub> histogram to compare rates of change and reproducibility, for Hb, HbO<sub>2</sub>, Cyt and tissue pO<sub>2</sub>. **Method:** NIRS optodes were placed 3cm apart on the forearm of healthy adults. A pO<sub>2</sub> tissue probe was inserted subcutaneously 5cm lateral to the optodes. Four periods of ischaemia (4 minutes each), were generated by sphygmomanometer cuff occlusion. **Results:** Twenty-two paired data sets were obtained. Hb and HbO<sub>2</sub> were practically noise free. Cyt signals were very small, but had a distinctive pattern of response. Rates of change during ischaemia: mean HbO<sub>2</sub> -6.82 ± 0.73 umol/min, Hb 6.99 ± 0.83 umol/min, Cyt 0.23 ± 0.12 umol/min, HbSum 0.02 ± 0.82 umol/min, vO<sub>2</sub> -2.57 ± 0.27 umol/100g/min, pO<sub>2</sub> -3.32 ± 0.99 mmHg/min. **Discussion:** There was a minor shift in NIRS baselines perhaps due to incomplete recovery from ischaemia. Hb, HbO<sub>2</sub> and pO<sub>2</sub> changes were consistent and reproducible; Cyt had a less obvious trend (large signal to noise ratio). Tissue pO<sub>2</sub> fell at a comparable rate to HbO<sub>2</sub>. **Conclusion:** pO<sub>2</sub> (an absolute measure) relates to HbO<sub>2</sub>; the small positive change in Cyt was consistent with our cardiac bypass studies.

## ● 140

**NEAR INFRARED SPECTROSCOPY (NIRS) INTERFERENCE FAULTS DURING NEONATAL DATA COLLECTION** Andrew J Macnab, Roy E Gagnon, Michael Smith, Manikum Moodley, Elke H Roland, Alan Hill, BC's Children's Hospital, University of British Columbia, Vancouver, Canada. **Purpose:** To determine if data transmission errors are related to electromagnetic interference (EMI). **Background:** During NIRS measurement of cerebral oxygenation in neonates data misreads occurred in real time transmission at a rate of 10-15% of the data collection/subject. **Method:** Data was collected from a neutral density filter array. The NIRO-500 was simultaneously on two computers. This procedure was repeated with/without: shielded cables, copper shields between devices, and ferrite beads installed on the cables. **Results:** Rate of data misreads was unaffected except with ferrite beads, when misreads ceased. Data collections on both computers were identical. Data misreads only occurred at collection intervals longer than two seconds. **Discussion:** Success with ferrite beads implies EMI may cause interference. The tests were not able to discriminate where the fault resides.



**Conclusion:** Application of ferrite beads to each terminal end of the cable linking the NIRO-500 to an auxiliary computer totally eliminated data interference faults during routine real-time data collection.

## ● 141

**QUALITY ASSURANCE SCORES FOR PAEDIATRIC TRANSPORT.** Andrew J Macnab, Norman Phillips, David F Wensley, ICU, BC's Children's Hospital, Vancouver, Canada. **Background:** Various scores (eg PRISM/CRIB) allow for quality assurance (QA) of care. Interhospital transport needs similar audit. **Method:** 108 children coming to our ICU were assessed prospectively at 3 stages of care (initial contact, admission, next day) using 5 overlapping scores measuring clinical/physiological condition: PCS (Pediatric Coma Score), RAPS (Rapid Acute Physiology Score), PTS (Pediatric Trauma Score), RTS (Revised Trauma Score) and modified APACHE score. **Results:** The 4 retained scales (APACHE was discarded - too complex) demonstrated substantial agreement in 3 age groups (<12 mos, 1-5 yrs, 5-12 yrs) and at all three stages of care. The sample was divided by time of transport: T<sub>1</sub> < 2 hrs (N=43), T<sub>2</sub> > 2 hrs (N=28), and NT - no transport (ER admission) (N=37). T and NT groups differed significantly at initial contact and the following morning the NT cases had elevated PTS and PCS scores. A repeated measures MANOVA of the 4 scales at initial contact and admission by T/NT group, age group and neurological versus respiratory condition indicated a significant interaction between NT group and occasion (F=2.14, df=8, 182 p=0.034) due to elevated PCS and PTS scores in the NT group at initial contact. When all three occasions were considered (N=77), a significant effect was found for occasion (F=6.22, df=8, 58 p<0.001). This was entirely due to the 4 scale contrasts between initial contact and next day scores. No significant interactions with occasion were found. **Conclusion:** The 4 scores provide a QA measure for transport, reliably monitoring stability or change in condition.

## ● 142

**VARIOUS FORMS OF FETAL HYPOXIA IN TWIN PREGNANCIES\***

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Placental insufficiency, twin-twin transfusion, or acute complications at birth can contribute to fetal hypoxia in twins. Our aim was to differentiate between acute and prolonged fetal hypoxia in these infants.

**Patients:** 50 sets of twins (24 - 38 weeks' gestation, 660 - 3200 g birth weight). 76 infants were appropriate (AGA; 10th - 90th centiles), 20 small (SGA; < 10th centile), and 4 large (> 90th centile) for gestational age. In 24 sets, the infants' birth weight differed > 10 %. 26 singleton AGA term newborns after uncomplicated pregnancy and delivery served as controls.

**Methods:** Umbilical arterial pH as marker for acute and umbilical venous erythropoietin concentration (EPO) at birth as marker for prolonged fetal hypoxia. Mann-Whitney-U test and Wilcoxon-Matched-Pairs-Signed-Ranks test.

**Results:** EPO did not significantly differ between the 1st and the 2nd twin, whereas pH was lower (p = 0.02) in the 2nd. In 17 weight-discordant sets, EPO was higher (p = 0.02) and in 18 sets pH was lower (p = 0.03) in the smaller twin. In SGA twins, EPO was higher (p < 0.05) than in AGA twins and in controls:

	SGA twins (n=20)	AGA twins (n=76)	controls (n=26)
pH	7.29 (7.19 - 7.33)	7.30 (7.25 - 7.34)	7.31 (7.29 - 7.34)
EPO (mU/ml)	35 (23 - 325)	16 (8 - 27)	20 (15 - 32)
EPO >55 mU/ml	n = 8 (40 %)	n = 10 (13 %)	n = 0

**Conclusion:** The 2nd twin is at risk for acute birth asphyxia. Growth retarded twins are at increased risk for prolonged fetal hypoxia.

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## ● 143

**ENDOTHELIN (ET) 1-21 PLASMA LEVELS IN THE FIRST AND FOURTH DAY OF LIFE IN HEALTHY AND ILL PREMATURE INFANTS.**

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Endothelins are potent vasoconstrictor peptides implicated in the pathogenesis of various problems of the perinatal period, as intraventricular hemorrhage (IVH) and necrotizing enterocolitis (NEC). Aim of this study was to determine ET 1-21 plasma levels in premature infants and study possible changes of these levels with time from birth as well as with the severity of the infants' stratus.

The study comprised 28 healthy (22/28) or minimally affected (6/28) prematures, requiring FiO<sub>2</sub> ≤ 0.35 for ≤ 6 hours (group A - gestational age (GA) and birth weight (BW), mean ± SD 32.5±2.7 w, 1657±445 g respectively) and 8 moderately (2/8) or severely ill (6/8) prematures with RDS treated with CPAP or IPPV and surfactant, IVH grade ≥ II (group B - mean±SD GA: 31.4±2.0 w, BW 1633±449 g). ET 1-21 plasma levels (pmol/L), determined in groups A and B on day 1 (d1) and day 4 (d4) of life with a radioimmunoassay kit by Amersham (RPA 5559) were: (mean±SD): Ad1: 17.31±10.60, Ad4: 12.89±4.56, Bd1: 21.81±5.87, Bd4: 16.16±5.43. The paired t-test applied for Ad1:Ad4 and Bd1:Bd4 showed statistically significant differences (p<0.01 and p=0.01 respectively), while the unpaired t-test applied for Ad1:Bd1 and Ad4:Bd4 gave respectively p: NS and p<0.05. We conclude that a) high ET 1-21 levels on d1 in both groups, reflecting high fetal values and possibly also due to delivery stress, rapidly decrease significantly on d4 of life after adaptation to independent extrauterine life. b) ET 1-21 levels remain high on d4 in ill prematures compared to healthy ones, representing thus excessive vasoconstriction leading consequently to various complications (IVH, NEC), encountered in these infants.

## ▲ 144

**QUALITY OF CARE IN PEDIATRIC CHRONIC DISEASES: A STUDY IN ITALY** Federico Marchetti<sup>1</sup>, Maurizio Bonati<sup>2</sup>, Gianni Tognoni<sup>1</sup>, Giuseppe La Gamba<sup>3</sup>, Giancarlo Biasini<sup>4</sup> for the Italian Collaborative Group on Pediatric Chronic Diseases

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A collaborative survey of parents and family physicians of children with eight chronic diseases was conducted to assess the views of parents on case management, to compare their views with those of physicians and to identify factors that could be modified to improve the health of children with chronic illness. In all, 761 children were enrolled, with both household family interview and postal questionnaire answered by 549 family physicians. A wide difference in parental satisfaction was found between the chronic diseases. In fact, about 90% of the parents were satisfied with case management for children with celiac diseases (98/106), asthma (74/82) and diabetes (77/89), whereas more than 35% of parents of patients affected by cerebral palsy and Down's syndrome were dissatisfied (75/198 and 57/155, respectively). Similar profile was reported by family physicians regarding their views on case management, with an agreement equal to 75% of the total sample. Distance from the hospital and the need for more information on financial aid and management of diseases were the sources of greatest dissatisfaction. Absence for routine referral was the most frequent strategy for diabetes and cystic fibrosis adopted by the physicians, whereas for asthma more than 60% referred their patients for all aspects of care. About 50% of the physicians agreed that better communication with other medical services could facilitate their role as case managers. This established collaborative network now provides a framework for periodic surveillance to monitor the evolution in this field of care for improving the health of children with chronic disease.