

CBF, SVCF increased by  $20.1\% \pm 7.4\%$  ( $P = .01$ ), and MDao increased by  $14.6\% \pm 4.1\%$  ( $P = .007$ ) during PSV-VG. In the group with patent ductus arteriosus, although MDao decreased by  $10.5\% \pm 4.4\%$  ( $P = .04$ ) during PSV-VG, the Placa and SVCF remained constant. We also observed noticeable changes in the pattern of SVCF Doppler waveform as infant-ventilator interaction changed with switching the ventilation mode. Such pattern changes are described here for the first time.

**CONCLUSIONS:** The interaction between the ventilation mode, the shunt across the duct, and probably CBF autoregulation determines the effect of mechanical ventilation on CBF. Studying the SVCF Doppler waveform pattern may be a useful tool for assessing ventilator-patient interaction.

### LIPID PROFILE OF PREMATURE INFANTS UP TO THE AGE OF 3 YEARS

#### Submitted by Helen Apostolou

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**INTRODUCTION:** Current literature indicates a high incidence of cardiovascular disease in later life of premature infants with low birth weight.

**OBJECTIVE:** The purpose of this study was to investigate serum lipid levels of prematurely born infants up to the age of 3 years.

**METHODS:** From 2001 to 2005, 171 premature newborns were studied in the follow-up clinic. Patients were divided into 4 groups according to gestational age ( $\leq 30$  and  $> 30$  weeks) and birth weight ( $\leq 1000$  and  $> 1000$  g). Serum levels of cholesterol, triglycerides, high-density lipoprotein, and low-density lipoprotein were recorded at 12, 24, and 36 months of life.

**RESULTS:** Cholesterol levels were within the reference range in every given period, independent of age. Infants with low birth weight ( $\leq 1000$  g) had significantly increased cholesterol levels compared with those with higher birth weight ( $> 1000$  g) ( $P = .013$ ). All groups had significantly higher serum triglyceride levels ( $P = .001$ ) during the first year of life in comparison to all other periods. In addition, infants with low birth weight had significantly higher serum triglyceride levels ( $P = .015$ ) during the second year of life than infants with higher birth weight.

**CONCLUSIONS:** Premature infants with low birth weight have increased cholesterol and triglyceride levels during the early years of life, which is a finding that might be related to a high incidence of atherogenesis in later life and requires additional investigation.

### IONIZED SERUM CALCIUM, NOT SERUM TOTAL MAGNESIUM, PREDICTS OUTCOME IN NEONATAL HYPOXIC-ISCHEMIC ENCEPHALOPATHY

#### Submitted by Hoda Atwa

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**INTRODUCTION:** Perinatal hypoxic-ischemic encephalopathy (HIE) is a significant cause of neonatal mortality. Previous studies have attempted to find a sensitive parameter that will accurately predict outcome in infants with perinatal asphyxia.

**OBJECTIVE:** With this study we aimed to determine whether the serum total magnesium (Mg), ionized Ca (iCa), and sodium (Na) levels could predict the outcome of HIE.

**METHODS:** This was a hospital-based prospective study of admission to a newborn NICU. A total of 60 term neonates with HIE were included in the study. HIE was classified according to the criteria of Sarnat and Sarnat. Twenty healthy term newborns were chosen as controls. Total Mg, iCa, and Na levels were measured in umbilical cord blood and after 48 hours in blood. Neurologic examination was performed at 6 and 12 months. Outcome was scored as normal, disability, or death.

**RESULTS:** In normal infants there was a significant increase in serum total Mg and decrease in iCa concentrations by the second day of life as compared with that from umbilical cord blood. Infants with mild HIE had significantly higher umbilical cord blood total Mg levels compared with that of infants with moderate ( $P = .001$ ) and severe ( $P = .02$ ) HIE. On the second day of life, infants with severe HIE had significantly higher serum total Mg levels ( $P < .001$ ) and lower iCa levels ( $P < .001$ ) compared with those in the mild-HIE group. No significant differences between infants with severe and moderate HIE were observed regarding cord blood and 48-hour total Mg, iCa, and Na levels. The serum cord-blood and 48-hour iCa concentrations were significantly lower in the group of infants with HIE who had a poor outcome (odds ratios:  $0.82 \pm 0.10$  and  $0.70 \pm 0.09$ ) as compared with those with a good outcome ( $0.91 \pm 0.08$  and  $0.86 \pm 0.08$ ) ( $P < .001$  and  $P < .000$ , respectively).

**CONCLUSIONS:** Cord-blood and 48-hour levels of iCa and 48-hour Na could predict poor outcome in infants with HIE.

### CEREBRAL OXYGENATION RESPONSES DURING SKIN-TO-SKIN CARE IN LOW BIRTH WEIGHT INFANTS

### Submitted by Esmot Ara Begum

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**INTRODUCTION:** Kangaroo care (KC) has been thought of as an important intervention for improving the care of low birth weight infants; however, the physiological effect of KC is still controversial.

**OBJECTIVE:** The aim of this study was to investigate physiological responses during KC.

**METHODS:** Sixteen low birth weight (<1600 g) infants with gestational ages of 24 to 32 weeks were studied. Heart rate (HR), respiration rate, pulse oxygen saturation (SpO<sub>2</sub>), and regional cerebral oxygenation (rSO<sub>2</sub>) were obtained in 3 periods continuously: before, during, and after KC. Spectral analysis was performed. Total amplitude, the power of low-frequency (LF; 0.06–0.10 Hz) band, high-frequency (HF, 0.15–0.40 Hz) band, and the ratio of LF/HF were calculated. Three groups were compared by analysis of variance.

**RESULTS:** Significant differences were not observed during KC in terms of mean HR, SpO<sub>2</sub>, and rSO<sub>2</sub>. By amplitude, these parameters were significantly decreased during KC ( $P < .001$ ) and increased after KC ( $P < .001$ ). The power of LF or HF was either significantly decreased during KC in HR, SpO<sub>2</sub>, and rSO<sub>2</sub> ( $P < .05$ ); however, the ratio of LF/HF was increased during KC in HR, whereas the ratio was decreased in rSO<sub>2</sub> ( $P < .05$ ).

**CONCLUSIONS:** These results suggest that KC influences the stability of rSO<sub>2</sub> as well as HR and SpO<sub>2</sub>. Discrete results in the LF/HF ratio of rSO<sub>2</sub> may indicate that KC has different effects on rSO<sub>2</sub> associated with cerebral function.

### AMNIOTIC FLUID TRANSFORMING GROWTH FACTOR $\beta$ AND THE DEVELOPMENT OF NEONATAL CHRONIC LUNG DISEASE

#### Submitted by Hiroyuki Ichiba

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**INTRODUCTION:** Chorioamnionitis can initiate fetal lung injury and result in neonatal chronic lung disease

(CLD). Although neonates with CLD have higher amniotic fluid concentrations of proinflammatory cytokines, overexpression of transforming growth factor  $\beta$  (TGF- $\beta$ ) also seems to be important in the pathogenesis of neonatal CLD.

**OBJECTIVE:** Our goal was to investigate how TGF- $\beta$  is related to fetal lung injury induced by chorioamnionitis.

**METHODS:** Forty-four amniotic fluid samples were obtained at delivery from preterm infants (median gestational age: 28 weeks; median birth weight: 908 g). TGF- $\beta$  and interleukin 6 (IL-6) concentrations in amniotic fluid were measured with enzyme-linked immunosorbent assays.

**RESULTS:** TGF- $\beta$  concentration in amniotic fluid correlated with IL-6 concentration ( $P < .0001$ ). Both TGF- $\beta$  and IL-6 concentrations in amniotic fluid increased with increasing histologic severity of chorioamnionitis (each  $P < .0001$ ). Coexisting presence of neonatal CLD and histologic chorioamnionitis was associated with significantly higher amniotic fluid TGF- $\beta$  and IL-6 concentrations than presence of neonatal CLD without histologic chorioamnionitis or absence of both (mean TGF- $\beta$  level: 454.3 vs 119.2 vs 151.8 pg/mL [ $P < .0001$ ]; mean IL-6 level: 5.14 vs 0.99 vs 1.64 ng/mL [ $P = .0005$ ]). Both TGF- $\beta$  and IL-6 concentrations in amniotic fluid correlated with duration of neonates' need for oxygen administration (each  $P < .0001$ ).

**CONCLUSIONS:** Amniotic fluid TGF- $\beta$  may be important in chorioamnionitis-induced fetal lung injury that results in neonatal CLD.

### AGE-RELATED SERIAL PLASMA CITRULLINE LEVELS IN PRETERM NEONATES

#### Submitted by Hariklia Ioannou

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**INTRODUCTION:** Citrulline is a nonessential amino acid that is synthesized almost exclusively in the small intestine. In adults and children with short-bowel syndrome, citrulline has served as a reliable index of the remaining small intestine length. Citrulline is also a precursor of arginine, the role of which is crucial for neonatal metabolism and growth.

**OBJECTIVE:** We sought to determine serial plasma citrulline levels of preterm neonates to assess levels in accordance with age and intestinal maturation, which may serve as a baseline in the event of intestinal abnormalities such as necrotizing enterocolitis (a devastating complication in this age group).

**CEREBRAL OXYGENATION RESPONSES DURING SKIN-TO-SKIN CARE  
IN LOW BIRTH WEIGHT INFANTS**

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