umbilical arteries of healthy term SGA, LGA, and AGA newborns ($n = 12$ in each group). Optical densities of proteins of interest were normalized in relation to that of glyceraldehyde-3-phosphate dehydrogenase (GAPDH) as a standard.

Results: Protein expression of NO synthases, of prooxidative enzymes, and of antioxidative enzymes was similar in the three groups.

Conclusions: Protein expression patterns of enzymes involved in endothelial function and redox status did not differ in umbilical arteries of term SGA, LGA, and AGA newborns. Thus, indicators of arterial endothelial dysfunction in terms of aberrant enzyme expression in SGA or LGA newborns vs. AGA newborns were not present at birth.

212

RANDOMIZED CLINICAL TRIAL ON ECHOCARDIOGRAPHICALLY GUIDED (ECHO) VERSUS STANDARD IBUPROFEN TREATMENT (SIBT) FOR PATENT DUCTUS ARTERIOSUS (PDA): PILOT STUDY

M.D.C. Bravo¹, F. Cabañas¹, E. Pérez-Fernández², J. Quero¹, A. Pellicer¹

¹Neonatology, ²Division of Statistics, La Paz University Hospital, Madrid, Spain

Background: Pharmacological closure of PDA with SIBT protocol consists of three doses of ibuprofen (10-5-5 mg/kg) given 24h apart. Associated side effects during treatment have been reported. Therefore, treatment strategies deserve further evaluation.

Aims: To explore whether successful PDA closure with ibuprofen could be accomplished with a reduce number of doses.

Methods: Preterm babies older than 12 h of postnatal life with PDA ≥ 1.5 mm were randomized to EchoG (additional ibuprofen doses only if PDA ≥ 1.5 mm) or SIBT. Infants were serially scanned on days 1, 2, 3, 4, 7, 10 and 17 after being included in the study. The primary outcome was PDA reopening rate needing further treatment. Non-parametric tests were used for comparisons.

Results: 17 (EchoG) and 28 (SIBT) infants were enrolled [gestational age 28 (2.2) vs 29.6 (2.7) wk, $p < 0.05$; birth weight 1032 (280) vs 1237 (382) g, $p = 0.08$, respectively]. Patients received 2.8 (2.2) (EchoG) and 3.5 (1.3) (SIBT) ($p = 0.06$)

ibuprofen doses, at a mean age of 56.1 (17-168) h, without differences between groups. PDA was closed after the first ibuprofen dose in 44% of the study population. Rates for PDA reopening were 10.7% and 0% ($p = 0.28$), and rates for surgical closure 28.6% and 5.9% ($p = 0.12$), in EchoG and SIBT, respectively. Trends pointed towards lower incidence of necrotizing enterocolitis (7.1% and 17.6%, $p = 0.35$), urine output change (+8% and -30% $p = 0.05$), and serum creatinine rise (+5.9% and +34.2%, $p = 0.08$) in EchoG vs SIBT.

Conclusions: EchoG PDA treatment is a feasible strategy and avoids unnecessary ibuprofen doses.

213

MECHANISM OF CARDIOVASCULAR DYSFUNCTION IN INFANTS OF ACTIVE SMOKERS

M. Katz-Salamon, M. Ericson, H. Lagercrantz, G. Cohen

Women and Child Health, Neonatal Unit, Karolinska Institutet, Stockholm, Sweden

Recently we showed that blood pressure and heart rate control is impaired in infants of mothers who smoke. This dysfunction resembles classic orthostatic intolerance and could indicate susceptibility to raised blood pressure later on. We analyzed whether this dysfunction reflects abnormal autonomic neural modulation of the heart, or the vasculature, or both.

Methods: Subjects: term-born infants of mothers who smoked during pregnancy (15 cigarettes/day; $n = 15$) and infants of non-smokers ($n = 27$). All were examined at least twice between 1 week and 18 months age. Supine blood pressure (BP; Finometer) and heart period (HP) were recorded for 4 min during quiet sleep. We used autoregressive cross-spectral analysis to compare age-related changes in low (LF; 0.04-0.15 Hz) and high frequency (HF, 0.15-0.4 Hz) power of HP and systolic BP (SBP). The gain of the heart-pressure relationship (α) was estimated by frequency domain analysis. We considered (i) LF_{HP} and LF_{SAP} power as markers of the sympathetic efferent modulation of the heart and blood vessels, respectively, and (ii) α as an index of baroreflex sensitivity.

Results: Absolute values of, and variance in HP / BP of infants of smokers and non-smokers were comparable. In tobacco-exposed infants LF_{SAP} (but not LF_{HP}) decreased and α increased with age.

Conclusions: Early-life tobacco exposure attenuates sympathetic drive to the blood vessels and augments baroreflex gain but leaves cardiac sympatho-vagal drive unchanged.

214

EARLY VERSUS SYMPTOMATIC TREATMENT FOR PATENT DUCTUS ARTERIOSUS (PDA) WITH IBUPROFEN IN PRETERM INFANTS

M.D.C. Bravo¹, F. Cabañas¹, E. Pérez-Fernández², J. Quero¹, A. Pellicer¹

¹Neonatology, ²Division of Statistics, La Paz University Hospital, Madrid, Spain

Background: Timing to indicate pharmacological PDA closure is controversial and varies widely among NICUs.

Aims: To assess whether early versus symptomatic treatment of PDA could affect failure rate and need for surgery.

Methods: Between May 2009 and March 2010, infants < 29 wks or < 1000 g, and those with 29-33 wks and respiratory distress syndrome, underwent echocardiography within the first 72 hours of postnatal life, and received ibuprofen if PDA ≥ 1.5 mm (study group). A historic cohort (May 2008 to March 2009) consisting on infants with symptomatic PDA that received ibuprofen was used as control group. The primary outcomes were PDA closure failure rate and need for surgery. Non-parametric tests were used for comparisons.

Results: 88 infants were included, the study group [n= 38; gestational age 28.7 (2.4) wk; birth weight 1121 (338)g] and the control group [n=50; gestational age 28.3 (2.1) wk; birth weight 1032 (336) g] being comparable with respect to main perinatal data. Trends towards lower failure rate (26.3% vs 40%) and need for surgery (21.1 vs 32%) were found in the study and control group, respectively, although not significant. Onset of ibuprofen treatment (p< 0.000), number of administered doses (p=0.001) and days to reach total enteral nutrition (p< .05) were significantly lower in the study group. Other clinical outcomes did not differ.

Conclusions: Early treatment with ibuprofen seems to report benefits without additional side effects.

215

CARDIAC OUTPUT MONITORING: EXPERIMENTAL STUDY IN AN INFANT SHOCK ANIMAL MODEL COMPARING PULMONARY ARTERIAL THERMODILUTION, FEMORAL ARTERIAL THERMODILUTION AND BIOREACTANCE

Y.B. Diez¹, J.U. Villaescusa¹, M.J.S. Garcia¹, M.B. Prieto¹, D. Vinciguerra¹, J.M. Bellón², J.L.-H. Cid¹

¹Pediatric Intensive Care, ²Preventive and Quality Control Service, Hospital General Universitario Gregorio Marañón, Madrid, Spain

Introduction: Bioreactance, is a new non-invasive for cardiac output measurement (NICOM). We compared NICOM bioreactance to pulmonary and femoral thermodilution (PATD and FATD) in an infant shock animal model.

Methods: A prospective study was made in 9 Maryland pigs weighing 9 to 12 kg. Swan-Ganz and arterial PiCCO were introduced for PATD and FATD measurements respectively. 4 dual surface electrodes were placed at the thoracic body surface for NICOM measurement. In each animal, 7 cardiac index (CI) measurements were made simultaneously by PATD, FATD and NICOM before, during, and after hypovolemia and during and after volume infusion.

Results: The mean CI was 4.32 ± 1.52 L/min/1.77 m² with PATD, 3.49 ± 0.79 L/min/1.77 m² with FATD and 2.61 ± 1.18 L/min/1.77 m² with NICOM (p < 0.001). Mean differences between PATD and FATD were 0.84 (1.87 to 3.51) L/min/1.77 m², between PATD and NICOM 1.95 (-1.79 to 5.69) L/min/1.77 m², and between FATD and NICOM 1.06 (-1.40 to 3.52) L/min/1.77 m². Moderate correlation was found between PATD and FATD r = 0.43 (p= 0.01) and no correlations between bioreactance and PATD and FATD. CI measured by three methods decreased with hypovolemia and increased during volume infusion but only CI values measured with PATD and FATD were significant (p= 0.001). Changes recorded with bioreactance were small without significant differences between hypovolemia and infusion (p = 0.181).

Conclusion: PATD and FATD have a similar answer during hypovolemic shock and volume infusion. Bioreactance underestimates CI values during hypovolemia and volume expansion.