

265 **PREMATURITY, NOT INTRAPARTUM ASPHYXIA, IS THE MOST SIGNIFICANT RISK FACTOR FOR NEONATAL NEUROLOGICAL MORBIDITY IN VERY LOW BIRTH WEIGHT (VLBW) INFANTS** CYNTHIA HOLCROFT¹, ERNEST GRAHAM², KARIN BLAKEMORE³, MARILEE ALLEN⁴; ¹Johns Hopkins University, Gynecology and Obstetrics, Baltimore, MD; ²Johns Hopkins University, Gynecology and Obstetrics, Columbia, MD; ³Johns Hopkins University School of Medicine, Gynecology and Obstetrics, Baltimore, MD; ⁴Johns Hopkins University, Pediatrics, Baltimore, MD

OBJECTIVE: To identify intrapartum and neonatal risk factors that predict neonatal neurologic morbidity.

STUDY DESIGN: This was a case-control study in which obstetric and neonatal records were reviewed for all VLBW infants (<1500 grams) admitted to a single tertiary referral center between 4/99 and 3/01. The case group included neonates with neurologic morbidity: intraventricular hemorrhage, seizures, hydrocephalus & periventricular leukomalacia (PVL).

RESULTS: Of 137 infants, 36 had IVH (24 ≤grade II, 12 ≥grade III), 4 had seizures, 10 had hydrocephalus, and 7 had PVL. Several infants had more than one morbidity. Multiple logistic regression showed that gestational age (O.R. 1.37, 95% C.I. 1.17-1.60) and birth weight (O.R. 1.003, 95% C.I. 1.002-1.005) were significant predictors of neurologic morbidity. There was no difference in umbilical arterial pH. A potential association between systemic neonatal infection and neurologic morbidity did not reach statistical significance.

CONCLUSION: Prematurity is the most significant factor in determining neonatal neurologic morbidity; however, intrapartum hypoxia-ischemia, as determined by umbilical arterial acidosis at birth, is not a significant cause of the neurologic morbidity in VLBW infants.

Table

	CASES	CONTROLS	P VALUE
N	43 (31.6%)	93 (68.4%)	
Cesarean Delivery	14/43 (32.6%)	42/93 (45.2%)	
Avg. Gest. Age (weeks)	27.3 ± 2.7	29.3 ± 2.4	<.001
Avg. Birth Wt. (grams)	935 ± 261	1140 ± 248	<.001
Chorioamnionitis	7/43 (16.3%)	17/93 (18.3%)	NS
5 Min. Apgar <7	13/43 (30.2%)	18/93 (19.4%)	.13
Avg. Um. Art. pH	7.26 ± 0.10	7.28 ± 0.08	NS
Range of cord pH	6.96-7.43	7.02-7.42	
Neonatal Infection	12/43 (27.9%)	16/93 (17.2%)	.16

266 **SONOGRAPHIC AND DOPPLER PREDICTORS OF ADVERSE FETAL OUTCOME IN THE SMALL-FOR-GESTATIONAL AGE FETUS AT ≥34 WEEKS' GESTATION** PATRIZIA VERGANI¹, ALESSANDRO GHIDINI², JOHN PEZZULLO³, CAMILLA ANDREOTTI¹, NADIA RONCAGLIA¹, MICHELA TERUZZI¹, MARTA RATTI¹; ¹University of Milano-Bicocca, Obstetrics and Gynecology, Monza; ²Georgetown University, Obstetrics and Gynecology, Washington, DC; ³Georgetown University, Pharmacology and Biostatistics, Washington, DC

OBJECTIVE: To assess which ultrasonographic (US) and Doppler variables available to the obstetrician can independently identify the SGA fetuses at ≥34 weeks' gestation at risk of adverse outcome.

STUDY DESIGN: All consecutive euploid non-malformed singleton fetuses with accurate dating diagnosed as SGA (sonographic abdominal circumference, AC, <10th centile) between 1/95 and 12/98 and who delivered at ≥34 weeks were included in the study. Fetal well-being was monitored with serial non stress test (NST), amniotic fluid (AF) volume determination, biophysical profile (BPP), fetal biometry, and Doppler waveform studies. Delivery was expedited for BPP <6, oligohydramnios, absent fetal growth over 2 weeks, absent or reversed diastolic flow in the umbilical artery (UA), or preeclampsia. Detection of UA pulsatility index (PI) >90th centile was an indication for induction of labor after 37.0 week. Adverse fetal outcome was a composite variable inclusive of meconium tinged AF (moderate or thick), oligohydramnios, cesarean section (CS) for non-reassuring testing, umbilical artery pH <7.10, or 5-minute Apgar score <7. Stepwise multivariate analysis was performed including demographic and obstetric variables, last AC centile before delivery, trend in AC centiles, last UA and middle cerebral artery (MCA) PI centiles, and trends in UA and MCA centiles.

RESULTS: Of the 280 fetuses fulfilling the inclusion criteria, 67 (24%) had adverse fetal outcome. Only slope in centiles of the AC ($P = .002$), PI of the MCA ($P = .02$), and maternal age at delivery ($P = .04$) were independent predictors of adverse obstetric outcome.

CONCLUSION: A decline in AC centiles, and worsening brain sparing as assessed by MCA PI are independent predictors of greater likelihood of meconium tinged amniotic fluid, oligohydramnios, CS for non-reassuring fetal testing, low umbilical artery pH, or 5-minute Apgar score <7.

267 **INTRAVENTRICULAR HEMORRHAGE AND PERIVENTRICULAR LEUCOMALACIA: TWO SIDES OF THE SAME COIN?** VALENTINA DORIA¹, LUISA PATANE¹, PATRIZIA VERGANI¹, ANNA LOCATELLI¹, MARTA RATTI¹, MANUELA CORNO², GIUSEPPE PATERLINI², ALESSANDRO GHIDINI³; ¹University of Milano-Bicocca, Obstetrics and Gynecology, Monza; ²University of Milano-Bicocca, Neonatology, Monza; ³Georgetown University, Obstetrics and Gynecology, Washington, DC

OBJECTIVE: To evaluate whether intraventricular hemorrhage (IVH) and periventricular leukomalacia (PVL) are characterized by different risk factors or are two sides of the same coin.

STUDY DESIGN: From a database of 293 consecutive singleton neonates born after preterm membrane rupture (PROM), spontaneous preterm labor (PTL) or induced preterm delivery at 24.0-32.6 weeks from 1/1993 to 12/2000, we selected those who developed IVH (n = 27) or PVL (n = 16), and compared their obstetric variables with those of neonates who did not develop either neurological outcome (control group, n = 250). Excluded were stillbirths and congenital anomalies. Statistical analysis was performed with Fisher's exact test and Student t-test with a $P < .05$ considered significant.

RESULTS: Neonates with IVH or PVL were significantly more likely to be born after PTL ($P = .006$), chorioamnionitis ($P = .02$), antibiotic therapy ($P = .04$), and at a lower gestational age ($P = .008$) than controls. They did not differ in birthweight, mode of delivery, umbilical artery pH, or rate of 5-minute Apgar score <7. The rates of respiratory distress syndrome ($P = .03$), sepsis ($P = .005$), bronchodysplasia ($P = .005$), necrotizing enterocolitis ($P = .01$), and retinopathy ($P = .007$) were significantly lower among controls, who also had higher rates of survival ($P = .01$) and normal neurological outcome ($P = .001$). Neonates with IVH did not differ from those with PVL in any obstetric or neonatal variable, with the exception of a lower umbilical artery pH ($P = .05$) and shorter latency between PROM and delivery ($P = .009$) in those with IVH.

CONCLUSION: Among premature infants born at <33 weeks, intrauterine infection is an important causative mechanism for both IVH and PVL. IVH and PVL share common risk factors, and can be considered two different manifestations of the same noxa.

268 **FETOMATERNAL HEMORRHAGE IN FETAL BRAIN INJURY** CORTNEY KIRKENDALL¹, MARISA ROMO¹, JEFFREY PHELAN¹, ¹Childbirth Injury Prevention Foundation, Pasadena, CA

OBJECTIVE: Fetomaternal hemorrhage (FMH) is a frequent observation in pregnancies complicated by intrapartum fetal demise, but little is known about its occurrence among brain injured neonates. The purpose is to describe 18 brain damaged infants who underwent testing for FMH.

STUDY DESIGN: Evidence of FMH was taken from the medical records. The intrapartum fetal heart rate (FHR) patterns were read by one reviewer (JPP) and categorized as follows: NR-persistent nonreactive; R-initially reactive on admission. Anemia was defined as a hematocrit <40%.

RESULTS: Of 423 infants, 18 (4%) patients underwent FMH testing. Of these, 10 (56%) had a positive test with an estimated fetal blood loss of 63 ± 83 cc, 1-240 cc. The incidence of anemia was as follows: (+)test-9/10 (90%); (-)test-4/8 (50%). The birth to first CBC interval for all neonates was 2.2 ± 5.0 hrs, 0.4-22 hrs. For those with a (+) and (-) test, the FHR patterns were as follows: NR-6/10 (60%) and NR-5/8 (63%). Decreased FM on admission was described in 2(11%) patients. Of the 4 anemic infants with a (-) FMH test, the FHR patterns were R-3 (75%) and an abruption was documented in all 3.

CONCLUSION: When screened, FMH was a frequent observation among brain injured neonates. Anemic infants had a NR pattern [9/13 (69%)] or a R pattern with an abruption [3/5 (60%)]. Despite a small population, these findings suggest that testing for FMH prior to delivery in term pregnancies with a persistent nonreactive FHR pattern or signs of abruption would appear to be beneficial in explaining the events surrounding an adverse fetal outcome.