† 1411 INDOMETHACIN (I) ASSOCIATED SEPSIS IN VERY LOW BIRTH WEIGHT INFANTS. Victor C. Herson, Peter J. Krause, Leonard I. Eisenfeld, Eufronio G. Maderazo, (Spon. J.R. Raye), University of CT and Hartford Hospital, CT. I inhibits adult neutrophil (PMN) function yet sepsis complicating I therapy in neonates with PDA has not been reported. We studied the risk of sepsis in infants treated with oral I and the effects of I on PMN chemotaxis (C), adherence (A), and killing (K). Neonates treated with I were compared to those with PDA managed expectantly or surgically.

	I	LIGATION	EXPECTANT	TOTAL non I
	n=31	n=12	n=15	n=27
B.W. (Kg) (Mean±SD)	1.07±.43	0.89±.20	1.23±.37	1.08±.35
G.A. (Wks) (Mean±SD)	28.5±2.5	26.9±1.6	29.9±2.5	28.6±2.6
RDS	25/31	10/12	11/15	21/27
Antibiotics[1]	11/31	12/12	7/15	19/27
Sepsis[2]	7/31	0/12	1/15	1/27

1. I vs. total non-I $p<0.01$; 2. I vs. total non-I $p<0.05$

Overall, the occurrence of sepsis in infants with or without concurrent antibiotics did not differ (3/30 vs. 5/28: NS). All 7 episodes of sepsis in the I group occurred within one week of therapy. Patients in the I group developing sepsis were less mature (26.0±1.5 wks vs. 29.0±2.6 wks: $p<.05$), had more GI complications (3/7 vs. 1/24: $p<.05$), and were less likely to survive (3/7 vs. 23/24:$p<.01$). Concurrent antibiotics did not differ (2/7 vs. 9/24: NS). No differences were observed in PMN C and A measured before and after I in 9 neonates. No effect on C, A, or K was noted when PMN's from cord blood were incubated with I. VLBW infants treated with oral I may be at risk of sepsis shortly after therapy. The mechanism does not appear to involve PMN inhibition. GI mucosal injury from oral I may be a factor.

1412 THE EFFECT OF CARDIAC DECELERATION ON OXYGENATION IN HEALTHY PRETERM INFANTS. Joan E. Hodgman, Mina Shirazi, Toke Hoppenbrouwers, Luis Cabal, and Manuel Durand. Univ. of So. Calif. Sch. of Med., Los Angeles County-USC Med. Ctr., Dept. of Pediatrics, Los Angeles, CA.

In spite of the frequency with which acute deceleration in heart rate (HRD) occurs in the healthy preterm infant, its significance is poorly understood. We monitored R-to-R heart rate, impedance respiration, transcutaneous O_2 ($P_{tc}O_2$) and CO_2 ($P_{tc}CO_2$) and behavioral state for 3 hours in 13 healthy AGA infants between 32-35 weeks gestation at 7 days of age. Duration and peak drop were measured for all HRD below 100 bpm. Mean and lowest values for $P_{tc}O_2$ and $P_{tc}CO_2$ levels were determined during and for 10 seconds preceding and following the HRD. Sleep state and breathing pattern were identified for each. Nine infants had 1-7 HRD during the monitoring period. The mean drop from the base line was 48.6% with a range of 30-64. The mean duration was 22.35 seconds with a range of 8-66. The $P_{tc}O_2$ decreased from a mean low of 61 mmHg before to 56 during the episode with a partial recovery to 57 in the 10 seconds afterwards. $P_{tc}CO_2$ levels showed a small rise during the episodes. Blood gases remained within normal limits even in the most prolonged HRD. Drops occurred during wakefulness and sleep whether breathing was regular or periodic. Only one was associated with apnea > than 10 seconds and one third occurred with shorter pauses. Short breathing pauses with HRD appear benign. Criteria for identifying those outside normal limits with pathological consequences need to be developed. The cardiac decelerations studied here are normal in the healthy preterm infant, indicating intact parasympathetic nervous system reflexes.

1413 PHYSIOLOGIC FOLLOW UP OF PRETERM INFANTS WITH APNEA. Toke Hoppenbrouwers, Joan Hodgman, Kazuko Arakawa, Luis Cabal and Manuel Durand, Dept. of Pediatrics, Univ. of So. Calif. Sch. of Med., LAC/USC Med. Ctr., L.A., CA.

Otherwise healthy preterm infants may continue to exhibit prolonged apnea beyond the first week of life, a condition some consider leading to an increased risk for SIDS. To elucidate the significance of these apnea, we studied 17 AGA infants between 32-36 weeks post conceptual age. Eight of these (A) exhibited 2 or more central apnea ≥20 sec. during an 8 hour period after the first week of life.

Polygraphic records were obtained between 6-10 pm at 40 weeks, 1 month and 3 months adjusted age, from which Quiet Sleep (QS) and Active Sleep (AS) were derived. Minute by minute values for heart rate (HR), respiratory rate (RR), transcutaneous 02 (Ptc02) and C02 (PtcC02) were determined during AS and QS with a computer. Representative results at 40 wks are presented as mean and (sd).

	HR		RR		Ptc02		PtcC02	
	AS	QS	AS	QS	AS	QS	AS	QS
N	152.8	150.8	52.8	43.7	62.5	62.9	59.5	61.3
	(8.5)	(8.9)	(7.4)	(10.9)	(8.0)	(10.9)	(4.5)	(5.8)
A	153.3	150.5	47.0	38.8	61.9	61.9	54.1	55.4
	(5.4)	(6.7)	(4.5)	(3.7)	(5.7)	(5.7)	(4.5)	(6.2)

Apneic preterms were not different from non-apneic infants (N) at this or either of the other follow up ages. While preterm infants are statistically at increased risk for SIDS, these data do not warrant singling out the apneic preterm as at greater risk for abnormal autonomic sequelae.

1414 EARLY AND LATE APNEA IN VERY LOW BIRTHWEIGHT (VLBW) INFANTS. D Holmes, S Suchy, C E Hunt, and J R Hageman, Dept of Peds, Northwestern U, Chicago, IL.

Apnea is a major cause of morbidity in VLBW infants (<1500 g BW), both in the NICU and after discharge. To determine the incidence of unexplained apnea (Apnea of Prematurity, AOP) and to assess the relationship between a history of AOP and the presence of respiratory pattern abnormalities at NICU discharge, we reviewed the records of 147 VLBW infants admitted to our 3 NICUs in 7/82 through 6/83. Mean BW(±SD) was 1130±220 g and gestational age was 29.8±2 wks. Symptomatic apnea, defined as > 1 episode of >20 sec duration or, if less, associated with bradycardia or color change, occurred in 104/147 (71%) of this VLBW group. Eighty-four (81%) of these patients had unexplained apnea or AOP. The incidence of AOP was greater in the <1250 g BW group (72% vs 44%, $p<.01$) and did not progressively increase with decreasing BW or GA, <1250 g or <32 wks. Predischarge pneumograms were obtained in 104/147 infants off Theophylline therapy at a mean postnatal age of 60±28 days. Results of longest apnea(sec), periodic breathing episodes/100 min and apena density(A6/D%) in the AOP infants were compared with non-AOP infants and a group of normal term infants' pneumograms done at 1 month of age. The only significant abnormality noted was an increase in longest apnea in the AOP group compared to the non-AOP group (11±6 sec vs 8±3 sec, $p<.05$), and compared to the term infants as well (11±6 sec vs 7.6±3 sec, $p<.01$).

In summary, apnea was unexplained in 81% of VLBW infants, but a history of AOP does not predict which infants will have respiratory pattern abnormalities at NICU discharge.

† 1415 AN ASSOCIATION BETWEEN CUMULATIVE HYPOXEMIA AND PROGRESSION OF INTRACRANIAL HEMORRHAGE (ICH) IN INFANTS <1500 GRAMS. Jeffrey D. Horbar, Roger F. Soll, Timothy L. McAuliffe, Jerold F. Lucey, Univ. of Vermont College of Medicine, Department of Pediatrics, Burlington, VT.

The relationship between hypoxemia and ICH was studied in 25 infants weighing <1500 grams. Twenty-three infants required assisted ventilation. $tcpO_2$ data was monitored continuously for 3 days and stored using the Oxygram, a microprocessor based $tcpO_2$ data system. The number of events with a $tcpO_2$ <40 torr and the total time with $tcpO_2$ <40 torr were determined. Cranial ultrasounds were done after birth and daily for 3 days. ICH was graded on the scale 0 to 4.

Infants had a mean of 15.75 events with a $tcpO_2$ <40 torr each day. These events had a mean cumulative daily duration of 48.4 mins. The number of hypoxemic events and the cumulative duration of these events over the 3 days were not different in the 14 infants with ICH and the 11 without ICH.

Progression in ICH grade was noted in 12 infants. For the total study group there was a significant association between the cumulative time spent with a $tcpO_2$ <40 torr and the degree of progression in severity of ICH ($r=0.54$, $p=0.01$). ICH progression was not associated with either the number of events with low $tcpO_2$, pneumothorax, or hypotension.

We conclude that infants weighing <1500 grams experience multiple episodes of low $tcpO_2$, and that the cumulative duration of these episodes correlates with increases in ICH severity.

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●1416 VISCOSITY REGULATES CEREBRAL BLOOD FLOW INDEPENDENTLY OF ARTERIAL OXYGEN CONTENT. Mark L. Hudak, Raymond C. Koehler, Adam A. Rosenberg, Richard J. Traystman, and M. Douglas Jones, Jr. The Johns Hopkins Hospital, Departments of Pediatrics and Anesthesiology/Critical Care Medicine, Baltimore, MD 21205.

Cerebral blood flow (CBF) falls as hematocrit (Hct) rises. Investigators have differed on the relative importance of the increases in arterial oxygen content (CaO_2) and blood viscosity (η) in mediating the fall in CBF. In a previous abstract (Pediatr. Res. 18:377A, 1984) we reported preliminary work in newborn lambs and concluded that the increase in η as Hct rose from 20% to 40% accounted for 45% of the decrease in CBF. Subsequent studies have confirmed this finding. In 18 lambs we performed an isovolemic exchange transfusion with pure methemoglobin containing adult sheep red cells and raised Hct (19.8±0.3 vs 39.0±0.5%; $\bar{X}$±SEM) and η (2.6±0.1 vs 4.3±0.2 centipoise: shear rate=230/sec) with minimal increase in CaO_2 (9.3±0.2 vs 10.2±0.2 vol%). Other variables known to influence CBF ($PaCO_2$, pH, P50, mean arterial blood pressure) did not change. Similarly, cerebral O_2 consumption ($CMRO_2$) was constant. The fall in CBF (microsphere technique: 141±8 vs 103±5 ml/100g/min) must be attributed to the increase in η alone. On the basis of 18 lambs we calculate that the increase in η accounts for 64% of the decrease in CBF as Hct rises from 20% to 40%. The effect of η varied widely among animals, but correlated closely ($r = -0.81$) with the baseline cerebral fractional O_2 extraction $E = [CMRO_2/(CBF \times CaO_2)]$. Animals with the most luxuriant oxygen supply ($CBF \times CaO_2$) relative to demand ($CMRO_2$) had the greater decrements in CBF.