

1027 RELATIONSHIP BETWEEN INTESTINAL COLONIZATION WITH SPECIFIC BACTERIA AND THE DEVELOPMENT OF NECROTIZING ENTEROCOLITIS. Michael D. Stanley, Donald M. Null, Jr. and Robert A. deLemos (Spon. by Michael J. Sweeney). Wilford Hall USAF Medical Center, Dept of Pediatrics, San Antonio, TX.

The incidence of necrotizing enterocolitis (NEC) among infants in our intensive care nurseries dropped from 5.4 percent in 1973-5 to 2.8 percent in 1976. Only two cases occurred in the last nine months of 1976, the first time since 1972 that there had been as long as four weeks without appearance of a new case. This striking decrease was not related to any change in frequency of arterial cannulation or perinatal asphyxia; nor were there any significant alterations in nursery procedures. It did occur concurrent with the emergence of *Serratia marcescens* as the predominant hospital-acquired nursery flora.

	% INFANTS COLONIZED AT 2 WEEKS			
	1973	1974	1975	1976
E. coli	20.4	16.0	14.2	18.9
K pneumoniae	55.0	55.0	68.0	12.0
S marcescens	0.0	0.5	3.0	66.0

Among patients initially colonized with *Klebsiella* the likelihood of developing NEC was .172 as compared to .06 in those with other predominant organisms. At diagnosis *K pneumoniae* was isolated in 51 percent of patients with NEC in 1973-5 and 64 percent in 1976. *Serratia* was recovered from only four infants with NEC. This data supports the concept that intestinal colonization with specific bacteria is necessary for the development of NEC.

1028 EFFECT OF HCO₃⁻ THERAPY ON ACID-BASE HOMEOSTASIS IN NEWBORN DOGS WITH AND WITHOUT VENTILATORY RESTRICTION. J.J. Steichen, L.I. Kleiman, University of Cincinnati College of Medicine, Dept. of Pediatrics, Cincinnati, Ohio 45267

We have previously reported in 36 newborn dogs with mechanically fixed ventilation that when HCO₃⁻ is infused, PaCO₂ increases, pH is not affected and PaO₂ decreases significantly. In this study, HCO₃⁻ was infused in 71 spontaneously breathing newborn dogs 0 to 22 days of age. Group A dogs (n=39) were breathing against an air way resistance and large dead space resulting in respiratory and metabolic acidosis. Group B dogs (n=32) were normally ventilating. Each group was subdivided into three subgroups. Groups AI (n=11) & BI (n=9) received 2 meq/kg of HCO₃⁻ rapidly over 3 min, Groups AII (n=19) & BII (n=13) received the same dosage slowly over 3 hrs, and Groups AIII (n=9) & BIII (n=10) served as controls and received no treatment. Within 1-3 minutes following HCO₃⁻ Group BI raised their blood pH by .07±.006 units and the pH remained elevated for 90 min. The restricted Group AI had a smaller (p<.05) rise in pH (.04±.007 units) and this rise was dissipated in 30 min. PaCO₂ rose by 10±2 Torr in AI pups (p<.01) but not in BI dogs. Base excess rose similarly in both groups. Slow infusion of bicarbonate (subgroup II) had negligible effects on pH and PCO₂ in both groups of animals similar to that for the control experiments (subgroup III). Thus, when ventilation is restricted rapid infusion of bicarbonate does not increase pH as much as when ventilation is normal since the CO₂ produced by the dehydration of HCO₃⁻ cannot be eliminated. These results question the use and efficacy of rapid HCO₃⁻ infusion in infants whose ventilation is restricted.

1029 UPPER AIRWAY OBSTRUCTION DURING APNEIC SPELLS IN PRETERM INFANTS. Bradley T. Thach and Ann R. Stark (Spon. by Carl H. Smith). Washington Univ. and Harvard Med. Schools; St. Louis Children's Hospital., Boston Hosp. for Women; Depts. Pediatrics, St. Louis, Boston.

Apneic spells can result from respiratory muscle inactivity (central apnea) and also from obstruction to air flow (obstructive apnea). Manually flexing the neck of infants can result in a mixture of obstructive and central apnea (J. Pediat. 89:982). To study the effect of spontaneous neck flexion on apnea frequency and mechanism we recorded expiratory flow (nasal CO₂ probe, mouth closed) respiratory muscle activity (swings in esophageal pressure) and EKG in 8 preterm infants (4 with apnea of prematurity and 4 controls). Infants were observed for 1 hr. in a supine posture alternating with a posture predisposing to spontaneous neck flexion (infant seat elevated to 45°-75°). 42 spells defined as absent air flow ≥20 sec. or absent flow <20 sec. followed by heart rate ≤100/min, occurred in 6 infants including 10 spells in 2 controls. Spells were 2X as frequent sitting than supine and while sitting, 4X as frequent with the neck flexed than not. The mechanism of most spells was mixed regardless of posture. Thus, 35 of 42 spells consisted of obstructed breaths (respiratory muscle activity without flow) alternating with central apnea; in 14 of 35 obstruction preceded central apnea. Only 3 spells were central. Conclusion: airway patency is potentially a significant factor in the pathogenesis of apnea of prematurity. Spontaneous neck flexion predisposes to apneic spells possibly by increasing an inherent vulnerability to upper airway obstruction.

1030 CONGENITAL PLUMBISM, Albert E. Timpo, Jyoti S. Amin, Marie B. Casalino, Ayse M. Yuceoglu, New York Medical College, Metropolitan Hospital Center, New York City.

Congenital plumbism is a rare entity. Very few cases have been briefly reported to date. Lead crosses the placenta, often causing fetal malformations and/or abortion. The case in discussion is a full term infant with congenital plumbism born to an adolescent with lead intoxication (blood lead 90 ug%, amniotic fluid 0.09 mg/L). The mother received 3 days of chelation therapy with CaEDTA 8 days prior to delivery. The infant was normal at birth on examination. Cord blood lead was 60 ug% and FEPP was elevated (330 mg%). Peripheral blood level the day after birth was also high (72 ug%) and remained at that level for approximately 2 weeks. The infant was then treated with CaEDTA for 5 days. The blood lead level declined 9 days after therapy (45ug%), Hemogram was normal. Red cell studies revealed increased osmotic resistance suggesting membrane alteration. Urinalysis was normal. The infant was hypocalcemic (7.4 mg%) and had a moderate metabolic acidosis. X-ray studies of long bones revealed abnormal calcification with fraying of the epiphyses. At 2 months of age, neurological evaluation of the infant is normal, however, the effect of prolonged exposure to lead in utero on brain development and function can only be determined by long term follow-up.

1031 Metabolic Gas Exchange Measurement in the Premature S.Z. Turney. Div. of Thoracic Surg., University of Maryland School of Medicine, Baltimore, Maryland.

Accurate measurement of total body CO₂ production (VCO₂) and O₂ consumption (VO₂) in premature infants would make possible estimates of total caloric production to guide nutritional replacement and assess adequacy of food substrate utilization. A practical method for making these measurements in extubated, premature infants following patent ductus (PDA) ligation was developed: the infant is placed in a clear plastic bag sealed except for a gas inlet opposite the face and gas and lead/tubing exit at the foot; using a computerized mass spectrometer already in use for automated respiratory monitoring in the surgical unit, O₂ and CO₂ concentrations are sampled at the inlet and outlet; gas flow (0.5 - 1.0 l/min/kg) is measured by a timed Wright spirometer or Douglas Bag collection and corrected to STPD. VO₂, VCO₂, R_Q and caloric estimates are calculated. Daily serial measurements in a 1.15 and a 1.41 Kg. infant were made for 1 week after PDA ligation. VO₂ averaged 2.6 = 0.8 cc/min and caloric production 17 ± 4 and 22 ± 5 KCAL/day, both independent of actual caloric intake (range 24-100 KCAL/day) and below predicted levels. Insulin levels were normal. These low values suggest a depressed overall metabolic rate.

1032 EFFECT OF EXCHANGE TRANSFUSION (ET) ON BILIRUBIN (BR) BINDING. Timos N. Valaes and Marilyn Hyte. Dept. of Ped., Tufts-New England Medical Center Hosp., Boston, MA.

By adding BR to sera the BR titration point (BTRP) - the lowest BR concentration at which loosely-bound BR could be demonstrated by sephadex column-was determined in samples from 9 ET in preterm (Group I) and from 8 ET in term (Group II) infants. The BTRP expressed as BR/Albumin (Alb) molar ratio was not raised by the ET.

Group	Pre ET	BTRP as BR/Alb molar ratio		P Donor Bl.	Discard. Bl.
		Post ET			
I	0.58±0.19	0.57±0.10	NS	0.89±0.06	0.61±0.05
II	0.87±0.25	0.67±0.06	NS	0.90±0.12	0.68±0.15
P	<0.01	<0.025			

In every ET at the end the BTRP was below the expected level assuming that the donor Alb had retained its binding properties in the infant's circulation. The BTRP was also depressed from the expected level in the discarded blood, the depression being inversely related (r=0.604, p<0.03) to the amount of BR removed by the ET, the latter being 0.72±0.16mg per kg b.wt per mg/dl pre ET BR. These results indicate that interfering substances (and not intrinsic differences of the Alb molecule) are responsible for the decreased BR binding in newborn and particularly preterm infants. As several of our infants did not receive drugs or IV fluids, part, at least of the interference must be due to endogenous substances.