

1417 RN BABYSITTING FOR INTENSIVE CARE NURSERY GRADUATES (ICN-G): A PROGRAM TO REDUCE CARETAKER FATIGUE.

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Parental stress related to birth and hospitalization of a sick infant is well documented. This stress, rarely abolished by the infant's discharge may, in fact, intensify as parents assume primary caretaker's role. To allow parents some relief and time to themselves, we established an ICN-RN Babysitting Service (RN-BS) for families of infants who had required > 7 wks hospitalization. All RN-BS are CPR certified and oriented to home care of ICN-G through a session reviewing home monitoring (HM) home oxygen (H-O₂), special needs of ICN-G and routine babysitting practices. Payment is \$2/hr by the family, supplemented by \$8/hr by our Hospital Auxiliary.

Twenty-one percent or 13/63 families eligible for RN-BS requested the service 29 times over a 7 mo. period; 5 families were multi-users. Two jobs were cancelled due to infant hospitalizations. Characteristics of users vs non-users were: 61 vs. 43 da. mean length of stay, 46% vs 30% HM, 15% vs 0% H-O₂, 30% vs 14% firstborn, 92% vs 42% Caucasian, and 92% vs 38% with private insurance. The mean job time was 6.6 hrs (2.5-15 hrs). Parental outings provided time for social events and time with older siblings.

We assessed families' reactions to RN-BS through a questionnaire; 54% users and 24% non-users responded. 58% non-users left their infant with a trusted individual; 86% family member, and 14% routine babysitter. In contrast, 71% of users would not have gone out if RN-BS were not available; all users felt more comfortable leaving baby with RN than other individuals. All respondents (users and non-users) recommended RN-BS for families of ICN-G. All feel it important (mean 4.7, on scale of 1-5, 5 most important) for parents to have time to themselves in the first months after their infant's discharge.

1418 EFFECT OF AIRWAY CITRIC ACID (CA) AND SALINE (S) UPON VENTILATION AND BLOOD GASES IN NEWBORN LAMBS.

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Aspiration is common and often complicates recovery from ventilator therapy in the neonate. The object of this study was to examine the upper airway sites which determine the respiratory responses to an irritant challenge. Twelve lambs were studied awake at a mean postnatal age of 26 days and with a mean weight of 6.7kg. Via a tracheostomy (Ty) and system of balloons, it was possible to instill selectively 1 ml of S, or CA, onto firstly only the mid-tracheal area (MT), secondly only the laryngeal area (LA) and thirdly only the lower tracheal area (LT). During the studies spontaneous breathing occurred via an endotracheal tube placed in the Ty. Minute ventilation (\dot{V}_E), recorded as changes from baseline, was measured at 30 seconds (s), 1 and 2 minutes (m), after the challenge. Arterial blood gas changes were measured at 30s and 2m. Significant increases in \dot{V}_E resulted only when either S or CA were given into the LT. The mean CA increase at 30s was significantly greater than the S one (587 v 78 ml/kg/min). A lesser difference persisted at 1 and 2 m. After LT S PaO₂ fell at 30s (-8mmHg) and at 2 m (-9mmHg). At 30s and 2m LT CA resulted in a rise in pH (0.08; 0.02), a fall in PaCO₂ (-7mmHg; -4mmHg) and no changes in BE. At 30s an. 2m LA CA caused a fall in PaO₂ (-14mmHg; -10mmHg) while LT CA caused a rise in PaO₂ at 30s (16mmHg) and a fall at 2m (-3mmHg). The response to an irritant challenge in the airway consistently resulted in increased ventilation only when the lower tracheal site was stimulated but delayed hypoxemia occurred. The laryngeal site \dot{V}_E response was inconsistent but associated with significant hypoxemia. The mid-tracheal site response was minimal.

1419 A PROTEIN INHIBITOR OF SURFACTANT IN THE AIRWAY SUC-TION SAMPLES OF RDS INFANTS.

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RDS is precipitated by a surfactant deficiency. However, once ventilation has been initiated a complex pathophysiologic sequence of factors seems to influence disease severity. The lungs of the premature with surfactant deficiency are abnormally permeable to protein, and a specific protein from the vascular space of preterm lambs can enter the air spaces and disrupt surfactant function. We have previously demonstrated the presence of a similar inhibitor protein in the airways of infants with RDS. We have now developed a radioimmunoassay for the inhibitor from the human. We collected daily airway samples (AS) by deep suctioning from infants with RDS and from infants without RDS who were being ventilated for other reasons. Blood gas and respiratory assistance variables were recorded with collection of each AS. We then measured the amount of inhibitor by radioimmunoassay and the amount of phosphatidylcholine (PC), and expressed the results as the ratio of inhibitor to PC. Soon after intubation for RDS, the ratio was 6.4±0.5; the ratio decreased to 1.1±0.5 by 2 to 4 days before extubation and to 0.6±0.1 on the day of extubation. The ratio of inhibitor to PC was only 0.25±0.03 in samples from infants without RDS. The ventilatory pressures required to normalize Pco₂ values correlated well with corresponding inhibitor to PC ratios from infants with RDS (r=0.85). This study documents a relationship between the severity of RDS and the ratio of inhibitor to PC in airway samples.

1420 PULMONARY SURFACTANT (PS): WHAT PROPERTIES ARE IMPORTANT?

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PS can lower surface tension (ST) to <10 dynes/cm (d/c). This is believed to be essential for normal lung function. We tested a detergent, Tween 20 (T), which cannot lower ST to less than 25 d/c, for its effect on the respiratory failure due to respiratory distress syndrome (RDS) in lambs (L) at 120-124 days gestation. L were delivered by cesarean section and each received one of three solutions intratracheally prior to the 1st breath: 1) 0.45% saline (saline); 2) 5% T in 0.45% saline; or 3) PS in 0.45% saline. Each L was mechanically ventilated using 100% O₂. Only the peak inspiratory pressure (PIP) was adjusted in an attempt to maintain a normal arterial pCO₂. Values given are mean ± SEM at 30 min of age. N = 5 to 7 in each group.

	PIP (cmH ₂ O)	pH	pCO ₂ (mmHg)	pO ₂ (mmHg)	ST ⁺ (dynes/cm)
Saline	32±0.7	7.06±0.04	76±11	71±31 (85±28)*	28.7±1.3
Tween	27±1.3	7.32±0.02	34.5±1.1	180±27 (256±23)*	26.7±2.3
NS	24±1.2	7.29±0.03	34.2±2.5	235±35 (320±32)*	6.8±2.3

*Max pO₂ reached; †Minimum ST on alveolar wash (AW)

Gas exchange in L given T was much better than in L given saline and at a lower PIP. It approached that in L given PS. This occurred while the AW ST of L given T was the same as the AW ST of L given saline. Thus the ability of PS to lower ST to <10 d/c is less critical than previously believed.

1421 DOES BREAST MILK-TAURINE PROTECT AGAINST RETINOPATHY OF PREMATURITY (ROP).

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Taurine (T) is essential to normal retinal function. It is present in high concentrations in human milk but virtually absent in infant formulas and parenteral feedings. Its concentration in the retina increases until about 2 months post a term birth. Deficiency results in retinal abnormalities. T appears to regulate membrane excitability, promote homeostasis and protect membranes against oxidant damage along with Zn and vitamin E. We therefore reviewed the records of 385 infants (216≤1500g BW, 169>1500<2000g BW, 1979-1981) to see if partial breast feeding (versus no breast feeding) influenced ROP. Mean serum E±SD during retinal vascular immaturity and mean ml blood received per kg BW (a marker for degree of illness) were similar between groups.

	≤ 1500g Birth Weight		> 1500g Birth Weight	
	Breast	Bottle	Breast	Bottle
ROP	14	95	0	15
No ROP	25	82	36	118

± Serum E 0.92±0.33 0.93±0.33 0.87±0.30 0.87±0.32
 ml blood/kg 147±224 173±237 42±64 28±45

Incidence of ROP was significantly decreased in infants who received breast milk (p<0.05, BW≤1500g; p<0.05, BW>1500g). The data suggest a protective effect of breast milk in ROP which may be related to improved taurine nutrition. Controlled clinical trials would appear to be in order.

1422 THE EFFECT OF PERIODIC BREATHING ON TRANSCUTANEOUS OXYGEN.

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Periodic breathing (P.B.) is observed in between 30-95% of premature infants during sleep and is thought to be normal. Xanthines are effective in reducing P.B. The efficacy of theophylline (T) on transcutaneous oxygen (TcO₂) in the treatment of P.B. has not been studied. To study the physiologic effect of P.B. we have evaluated 10 premature infants before and after xanthine. Premature infants with 20-40% P.B. identified by 12 hours impedance pneumogram were prospectively evaluated at 33-35 weeks post conception. All infants were free of medications, respiratory support and lung disease. Heart rate, respiratory rate, TcO₂ and extraocular movements (EOM) were monitored continuously for 4 hours. TcO₂ measurements were analyzed in the same infant during the 4 hours of study following - 1) a continuous episode of P.B. of 7-10 minutes duration in the absence of apnea, 2) after 10 minutes of spontaneous regular respirations during quiet sleep, 3) after 10 minutes of P.B. decreased to 0.9 - 8%.

Periodic breathing	TcPO ₂ mean ± SE in mm of Mg.		Regular breathing with theophylline
	Regular breathing	10 minutes	
7-10 minutes			10 minutes
n=10			n=10
43.2 ± 3.5	62.7 ± 6.5	% Δ 41.7 ± 4.3	66.05 ± 4.1
			% Δ 55.06 ± 5.1

TcO₂ is significantly lower (P<.001) in premature infants with continuous P.B. for 7-10 minutes as compared with spontaneous as well as theophylline induced regular breathing. Is excessive P.B. harmful for some premature infants?