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RESPIRATORY PATTERNS DURING SLEEP IN INFANTS WITH UNEXPLAINED PROLONGED APNEA. J.E. Hodgman, T. Hoppenbrouwers, S.A. Geidel, A.A. Hadeed, M.B. Sterman and R.M. Harper. USC School of Medicine, Dept. of Pediatrics, LAC-USC Med. Ctr. and UCLA School of Medicine, Dept. of Anatomy, V.A. Sepulveda, Los Angeles.

Infants with unexplained apneic episodes (Near-Miss for Sudden Infant Death Syndrome (SIDS)), are presumably at increased risk of subsequently dying of SIDS. It has been proposed that these infants exhibit prolonged sleep apnea which contributes to the mechanism leading to death. The objective of this study was to document the incidence of apnea during sleep recordings in 16 Near-Miss infants and compare the findings with those obtained from age and sex matched controls. Polygraphic records of 4 sleep and 3 cardiopulmonary variables were obtained during a 12 hour overnight recording. Successive minutes were classified as quiet sleep, active sleep, waking or indeterminate states by trained observers using standard scoring criteria. Respiratory rate and variability were calculated by computer for each minute across the night and related to sleep state. Pauses in breathing ≥ 3 seconds were identified in both groups. There was a tendency for Near-Miss infants to breathe faster with fewer apnea than controls, but this finding was not statistically significant. Although one half of the Near-Miss infants had recurrent prolonged apneic spells, all survived and were normal at 2 years. The proposed relationship between SIDS and apnea is not confirmed by this study.

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FACTORS PREDISPOSING TO RLF-COMPLICATIONS OF PREGNANCY Lois Johnson, David B. Schaffer, Marta I. Blesa, Thomas R. Boggs, Univ. of Penna. Sch. of Medicine, Penna. Hospital, Dept. Pediatrics, Children's Hospital, Phila. Penna.

Little is known about the factors determining the variability in response of developing retinal vessels to oxidant stress which is seen in individual premature and (rarely) in term infants. RLF fails to occur in some infants in spite of much oxygen exposure. It can occur in the absence of oxygen treatment. That genetic factors are important is emphasized by an instance of RLF seen by the authors involving a term infant never treated with oxygen whose older sibling, identical in appearance and also born without complications at term, also had severe RLF.

Pregnancy complications which necessitate fetal adjustment to chronic low-grade hypoxia appear also to predispose to RLF as evidenced by the table below. Pregnancy complications included fetal growth retardation, moderate to severe toxemia, severe maternal diabetes or anemia, second or third trimester bleeding requiring treatment, heavy cigarette smoking, ruptured fetal membranes with amnionitis or exceeding 6 days.

77 Infants with Birth Weight < 1750 gm born Feb. '77 to Nov. '77

Preg. Complic. 11 $\pm$ RLF 11 $\mp$ No RLF Chi Sq = 4.62

No Preg. Complic. 11 $\pm$ RLF 51 $\mp$ No RLF p $< .05$

11 of 22 RLF infants received no oxygen in the nursery
7 of the 22 RLF infants as compared to 8 of the 51 No RLF infants were undergrown

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EXPERIMENTAL EFFECTS OF INTRALIPID ON PULMONARY GAS EXCHANGE IN A LUNG-DAMAGED MODEL. Richard Inwood, Paul Gora, and Carl E. Hunt, Northwestern University, Children's Memorial Hospital, Chicago, Illinois.

Intralipid (IL) infusion in healthy adults has resulted in decreased pulmonary diffusing capacity (DLCO) and arterial (a) PO_2 . To assess the pulmonary effects of IL, 0.4 gm/kg of IL was infused over 1 hour into 9 adult rabbits whose lungs had been damaged by a prior infusion of 0.15 cc/kg of oleic acid. Triglyceride (TG) levels were significantly elevated at 1 hour and remained significantly above baseline despite Heparin infusion of 200 units/kg at 2 hours, 1 hour after IL infusion.

HOURS (Mean $\pm$ S.E.M.)

	0	1	2	3	6
TG (mg%)	159 $\pm$ 30	950 $\pm$ 147*	780 $\pm$ 120*	500 $\pm$ 83*	565 $\pm$ 152*
PaO ₂ (mmHg)	64 $\pm$ 4	50 $\pm$ 3*	50 $\pm$ 4*	67 $\pm$ 6	75 $\pm$ 5
P(a-A)O ₂	43 $\pm$ 7	60 $\pm$ 5*	60 $\pm$ 6	45 $\pm$ 5	32 $\pm$ 4

*Compared to 0 hour p ≤ 0.05

There were no significant changes in pH, PaCO₂ or alveolar (A)-arterial CO₂ difference [P(A-a)CO₂]. The PaO₂ and P(a-A)O₂ were significantly worse at peak TG levels but then progressively improved to baseline level or better despite only partial TG recovery. Although the immediate changes suggest that IL should not be administered to patients with lung disease, the subsequent TG-unrelated recovery indicates that chronic IL administration does not impair gas exchange. In fact, by an entirely different and as yet unexplained mechanism, pulmonary gas exchange may even be enhanced with chronic IL infusion.

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MASK VENTILATION IN PREMATURE NEONATES IS ASSOCIATED WITH SEVERE RETARDATION. Eva A. Kalman, Karen E. Pape, Stanley A. Ashby, Pamela M. Fitzhardinge.

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Autopsy studies of infants with birthweights ≤ 1500 g have shown significantly more cerebellar and intraventricular hemorrhage in neonates dying after ventilation via a face mask compared with those ventilated via an endotracheal tube (ETT)¹. The intracranial hemorrhage (ICH) has been attributed to severe occipital compression and head molding from the velcro band attachment for the mask. The 99 survivors (birthweight ≤ 1500 g) who were ventilated during the same time period have been followed prospectively for two years to determine the incidence of central nervous system sequelae.

	N	ICH	C.P. Hydro	Ataxia	Bayley	Severe Retardation (Bayley < 50)
Mask	47	13	6	12	80.8 (± 21.6)	6
ETT	52	4	5	8	86.3 (± 14.4)	1
p	—	< 0.01	N.S.	N.S.	< 0.01	< 0.05

The differences in psychometric scoring were independent of birthweight or duration of ventilation. Five of the six severely retarded mask survivors had either cerebral palsy or hydrocephalus. All six had ICH as neonates. It is our conclusion, that the use of mask ventilation, compared to ETT ventilation, is associated with an unacceptably high incidence of severe retardation and that these defects are related to ICH.

1. Pape, K. et al. Pediatrics, 58:473, 1976.

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IMMATURE LUNG SYNDROME (ILS). Jack Jacob, Rebecca A. Knapp, T. Allen Merritt, Louis Gluck, David Edwards. Univ. of Calif., San Diego, Dept. of Pediatrics & Radiology, La Jolla, Ca.

Immature Lung Syndrome is seen in premature infants < 1500 gm without clinical RDS but with initial chest x-rays suggesting mild RDS (fine, faint granularity without air bronchograms or underexpansion of lung fields, Clin. Res. 24:174A, 1976). Seven infants with ILS (birth wt. 996 $\pm$ 174 gm) had tracheal aspirate phospholipid determinations on the first day of life compared with those from a group of premature infants < 1500 gm with RDS (birth wt. 1121 $\pm$ 345 gm).

Diagnosis	PC	SPH	PI	PS	PE	PGL	L/S	PI/PS
ILS, day 1, N=7	66.1	11.6	14.1	4.3	2.5	0.8	6.4	3.6
RDS, day 1, N=7	49.1	16.1	12.3	8.7	8.7	0	2.9	1.1
RDS, day 4-6, N=7	68.0	8.4	15.5	1.8	1.8	1.1	8.8	3.7

PC=lecithin; SPH=sphingomyelin; PI=phosphatidylinositol; PS=phosphatidylserine; PE=phosphatidylethanolamine; PGL=phosphatidylglycerol. Results expressed as %phospholipid phosphorus.

These show that infants with ILS have biochemical evidence of lung maturity similar to those recovering from RDS. Tracheal aspirates in infants with ILS on day 4-5 showed no changes compared to day 1. Patients with ILS had one or more factors implicated in accelerated lung maturation (2 toxemia, hypertension; 4 prolonged rupture of membranes 3-7 days; 1 dexamethasone prior to delivery). Five infants were SGA. ILS should be distinguished from RDS since these patients have characteristic biochemical as well as clinical findings. (Supported by HD-05292 & HD-04380).

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POLYDRUG VS. METHADONE USE IN PREGNANCY: STUDIES ON OFFSPRING. Stephen R. Kandall, Yun J. Lee, Karin Siljeström, Jamie Feldman, David C. Korts, (Spon. by Aaron R. Rausen).

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Twenty-one neonates of drug-dependent mothers were studied prospectively. Of 19 mothers on methadone (M), 13 were polydrug abusers (PD); 2 mothers were heroin-dependent. Mean birth weight was 2675 grams $\pm$ 580 (SD); mean gestational age was 38.0 weeks $\pm$ 2.7 (SD). Eighteen of 21 had birth weights appropriate for dates; 3 were small for dates. All lengths were between 10th and 90th percentile. Eighteen of 21 head circumferences were between the 10th and 90th percentile; 3 fell below the 10th percentile.

Mean maximal weight loss in the first postnatal week was 7.25% of body weight $\pm$ 3.67% (SD). From 7 to 30 days of age, 16 infants gained weight normally, 3 subnormally and 2 excessively. Weight gain corrected for caloric intake was inversely related to severity of withdrawal on day 14 (p $< .05$), but not on days 7 or 21.

Drug withdrawal was assessed twice daily by standardized score. Mean time of symptom onset was 13.5 hours $\pm$ 0.7 (SD). No difference in withdrawal severity was seen between the M and PD groups. No correlation was found between withdrawal severity and maternal M dosage late in pregnancy or at delivery. Term infants showed more severe withdrawal than preterm infants. Infants randomly treated for moderate to severe symptoms with paregoric or phenobarbital showed no difference in modification of withdrawal severity or treatment time required.