

† **1375** TRANSPLEURAL STIMULATION OF FUNCTIONAL AND MORPHOLOGIC FETAL (F) LUNG (L) MATURATION: CONCENTRATION DEPENDENT EFFECT OF THYROID HORMONES (TH): U. DEVASKAR, J. CHURCH, E. KHAFAYAN, V. CHECHANIL, F. SADIQ & S. DEVASKAR. (Spon. by WJ Keenan). Dept. of Peds., St. Louis Univ. School of Medicine, Cardinal Glennon Hospital, St. Louis, MO.

TH influence F L maturation. However, it is not known if in vivo administration of TH enhance functional F L maturation. T4 (150 or 250ug/kg) or vehicle were injected IM to the rabbit doe on d 25 & 26. Functional & morphologic F L maturation was assessed on d 27 by pressure(P)-volume curve & histology. F plasma free T4 & T3 were measured by RIA. All data $\bar{X} \pm \text{SEM}$ (*P < 0.05 vs con.) n=No. of does. UD=undetectable.

n	Free T4 (ng/ml)	T3 (-40c.m. P)	ml of air/gm %TLC retained during deflation	0	5	10	20	35
Con-7	.1±.05	.9±.1	1.07±.13	0	10±1.5	28±3	77±2	100
T4-150-3M	1.4±.5	*2±.8		0	15±3	30±4	82±3	100
T4-250-5M	.7±.2	*3±.5	1.24±.13	0	12±3	31±4	76±3	100
T3-75-5	UD	*2±.2	1.16±.3	0	16±1.4	30±5	79±3	100
T3-125-4	UD	*3±.4	1.26±.1	0	13±4	29±7	71±3	100
T3-175-7	UD	*4±.1	1.34±.2	*42±5	*50±5	*62±5	*91±2	100
T3-225-3	-	*4±.1	1.44±.4	*59±10	*66±10	*80±10	*96±4	100

F wt & mortality were similar in all groups. Morphologic maturation was enhanced in T3-175 or 225 group only. In the T3-175 ♂ & ♀ F had more mature L. **Conclusion:** Functional & morphologic acceleration of F L development from TH stimulation is concentration dependent & can be achieved transplacentally in ♂ & ♀ without affecting F growth or mortality.

1376 EARLY CLINICAL EXPERIENCE WITH PROXIMAL HIGH FREQUENCY JET VENTILATION (HFJV) IN NEWBORNS. Steven M. Donn, Joanne J. Nicks, Kenneth P. Bandy, University of Michigan Medical Center, Depts. of Pediatrics and Pediatric Respiratory Therapy, Ann Arbor.

Over a 10 month period 8 newborns (gestational ages 27-36 weeks, birthweights 770-3440 g and postnatal ages 2-16 d) were treated with HFJV for severe respiratory failure unresponsive to conventional mechanical ventilation (CMV). Diagnoses included tension pulmonary interstitial emphysema (PIE)-4, congenital diaphragmatic hernia (CDH)-2, and intractable pneumothoraces (PTX)-2.

The Sechrist 990 High Frequency Jet Ventilator, a pulse-generated, solenoid-driven respirator was used. This device delivers a volume of gas at a controlled FiO₂ and pressure to a jet located in the patient connector proximal to a standard single lumen endotracheal tube. The total volume of gas delivered to the lungs is comprised of the volume flowing through the jet and an additional volume entrained by the venturi effect. In most cases a Sechrist IV-100B was connected in tandem to provide low IMV CMV and improved humidification.

Though only 2 of the 8 survived (one CDH, one PTX), all infants displayed marked short-term benefits from HFJV. Mean airway pressures could be lowered considerably without adverse effects on ventilation or oxygenation and with improvement in hemodynamic parameters. Radiographic improvement in PIE was noted in all 4 patients; elective paralysis could be discontinued in 7 of 8. None of the non-survivors displayed evidence of necrotizing tracheobronchitis.

These preliminary results suggest short-term benefits of HFJV in severe respiratory failure. Further studies examining the use of HFJV earlier in the course of neonatal respiratory disease appear indicated.

† **1377** VARYING FEEDING CONTAINER RIGIDITY: EFFECT ON INTAKE AND VENTILATION IN PRETERM INFANTS. Shahnaz Duara, Linda Reifenberg, Eduardo Bancalari, University of Miami, Jackson Memorial Hospital Department of Pediatrics, Miami, FL.

Following observations that reducing milk container rigidity may help oral feedings, five preterm infants ($\bar{X} \pm \text{SEM}$ GA 33±1.2 wks, weight 1.7±0.1 kg, post-natal age 4.2±0.9 wks) were studied at sequential feeds with equal volumes of milk from two containers, rigid (R) and collapsible (C). Ventilation, sucking pressure, duration of feeding (DF) were measured.

	Baseline	R	C
V _E ml/min	603	344**	369**
V _T ml	13.2	7.9**	7.4**
T _i sec	0.57	0.40	0.33*
T _e sec	0.78	0.43**	0.32**
TcPO ₂ mmHg	62	62	50*
DF min		18.2	9.0**

*P<0.05, **P<0.01

No significant difference in ventilation during sucking was found between containers. Nipple sucking pressure was significantly greater with R (12.1±0.9 cmH₂O, P<0.001) Suck-pause sucking pattern was clearly seen only with R, where pause occupied 21.7±2.8% of total time. Pause ventilation was similar to baseline. No significant difference in total airway closure time was found between containers. Result suggest that reducing the oral load decreasing ingestion time without further impairment of ventilation, and maybe useful in aiding the oral feeding of preterm infants.

● **1378** CLINICAL TRIAL OF TRACHEAL INSTILLATION OF CALF LUNG LIPID (CLL) AT BIRTH TO PREVENT HYALINE MEMBRANE DISEASE (HMD). Edmund A. Egan, Melinda S. Kwong and Robert H. Notter, Depts. Pediatrics & Physiology, University at Buffalo, SUNY and Dept. of Pediatrics, University of Rochester.

A double blind clinical trial is in progress to determine if 100 mg of CLL instilled into the trachea of 24-28 weeks gestation infants who had no prenatal steroid treatment can prevent HMD. The trial has been conducted at Children's Hospital of Buffalo between 6-1-83 and 7-31-84. During the 14 months, 24 patients were enrolled in the trial, 24 were excluded because of prenatal steroid treatment. HMD was prospectively defined as death before 48 hours or an infant at 48 hours of age with x-ray criteria, on more than 20 breaths/min of artificial ventilation, mean airway pressure >7 torr, and FiO₂ >0.3. The CLL treated group had a 17% incidence of HMD and the saline control group 60% (p=.043 Fisher's exact test). The incidence of HMD was 25% in pre-natal steroid treated infants and 76% in those unenrolled who did not receive prenatal steroids. Among survivors CLL treated infants had a lower incidence of bronchopulmonary dysplasia than saline controls, 18% to 63% (p=.06 Fisher's exact test). The CLL treated group had fewer deaths, intraventricular hemorrhages, and air leaks, but these were not enough different to reach statistical significance with the present numbers. Patent ductus arteriosus incidence was the same in all groups. CLL instillation at birth appears to induce a major reduction in the incidence of HMD and in some or many of its related complications in extremely premature infants.

† **1379** SURFACTANT REPLACEMENT AND PATENCY OF THE DUCTUS ARTERIOSUS (DA) IN LAMBS. Edmund A. Egan, Melinda S. Kwong, Donald L. Shapiro, Robert H. Notter, Depts. Pediatrics & Physiology, Univ. at Buffalo, SUNY; Dept. of Pediatrics, University of Rochester.

Extracted calf lung lipids (CLL) instilled into 127-129 day gestation lambs at birth prevents respiratory failure; we sought to determine the early status of the DA in such animals. Lambs were delivered by hysterotomy, tracheotomized, and catheters placed in the main pulmonary artery (PA) 1 cm beyond the valve under fluoroscopy, the ascending aorta and descending aorta. CLL was instilled in 6 lambs, saline in 5, mechanical ventilation was started and umbilical cord severed. Blood gases and aortic PGE₂ levels were obtained hourly. DA status was determined by the PA to aorta pressure gradient, aorta-PA oxygen difference, and microsphere trapping in the lung after left ventricular injection. Only 1 of the 5 control animals survived to 6 hours, 4 showed some transient constriction of the DA, and one of the 4 functional closure for 2 hours. In the treated animals, all showed constriction of the DA, 3 were functionally closed for 6 hours, 2 were constricted, 1 had re-opened. DA status was not correlated with aortic PGE₂ levels, which declined during the experiment in all animals, nor with PaO₂. Prevention of respiratory failure by CLL instillation at birth is associated with constriction of the DA in the first 6 hours.

1380 REDUCED INCIDENCE OF HYPERBILIRUBINEMIA IN LOW BIRTHWEIGHT BABIES RECEIVING PHENOBARBITAL, Michael F. Epstein, Karl Kuban, Helen Skoutelli, Katherine Meltzer, Elizabeth Brown, K.S. Krishnamoorthy, Kathleen Sullivan, and Alan Leviton. Departments of Pediatrics and Neurology, Harvard Medical School, Boston, Massachusetts.

A clinical trial to evaluate phenobarbital (PB) prophylaxis of germinal matrix hemorrhage recruited 280 babies with birthweight <1,750g who were intubated and mechanically ventilated within 12 hours of birth, and who had a normal cranial ultrasound at that time. The 34 babies who died during the clinical trial are not included in these analyses.

Participants were randomly assigned to receive either placebo or IV PB (10 mg/kg at 12 hours, and 2.5 mg/kg every 12 hours X 9). Mean serum PB level of treated babies was 26.9 mcg/ml on day 5.

Hyperbilirubinemia (serum total bilirubin >10 mg% on d 5-7) occurred in 7% of 128 babies who received PB, and in 13.6% of 118 babies who received placebo. Exposure to phototherapy lights and use of exchange transfusion were based on decisions of physicians who were naive to the babies' drug assignment. Duration of phototherapy was similar in babies who received PB (5.7±2.6d) and those who received placebo (6.3±2.4d). The babies who received placebo were more than twice as likely than PB receivers to have an exchange transfusion (3.6% vs. 1.6%). We conclude that in LBW infants requiring ventilatory assistance, receipt of PB is associated with a lower incidence of hyperbilirubinemia. Whether the effect of PB is a direct one on hepatic function, is secondary to an effect on germinal matrix hemorrhage, or to a combination of these effects remains to be determined.