1447 COMPARATIVE METHODS OF EXTUBATION IN INFANTS. Eric J. Margolis, Eric J. Michael. (Spon. by Leonard J. Graziani) Thomas Jefferson Univ. Hosp., Dept. Pediatrics, Phila.

Atelectasis is a major cause of required reintubation in premature and sick newborns. Neonatal and anesthesia literature report up to 50% incidence of atelectasis in infants < 1.25kg., and 10%-25% in infants > 1.25 kg. Race, sex, time intubated and ventilator settings have not consistently predicted post-extubation atelectasis. Despite the lack of prospective studies comparing extubation methods, recommendations for bagging, suction and timing extubation with the respiratory cycle have been made. Our institution has undertaken a 12 month prospective study of all infants electively extubated in our Neonatal Intensive Care Nursery, excluding only infants with documented anomalies of the upper respiratory tract. Thus far 50 infants comprising 58 extubation episodes have been studied, randomly divided into 5 groups: 1.extubation on patients' inspiration 2.extubation on expiration 3.extubation on inspiration with suction 4.extubation on expiration with suction 5.extubation with manual bagging. Radiographs were obtained on all infants 3 hours postextubation. Atelectasis occuring > 3 hours post-extubation was felt to be unrelated to the method of extubation. The population was representative of a Level 3 ICN: 16(28%) infants were < 1.25 kg; 21(36%) infants were ≤ 30wks; 22(38%) were intubated ≥ 1 week; 34(59%) had HMD, 12(21%) had pneumonia/sepsis, and 12(21%) misc. (TTN, MAS asphyxia, etc.). Post-extubation atelectasis occurred in 5(9%): 2 in group 2 and 1 in groups 3,4,and 5. Preliminary results show a uniformly low incidence of postextubation atelectasis in our ICN, but do not suggest an optimal method of extubation.

●1448 GROWTH UNDER RADIANT WARMER (RW). Keith H. Marks, Elizabeth E. Nardis, Malik A. Momin. Penn St Coll of Med, M.S. Hershey Med Ctr, Dept of Peds, Hershey, PA

Based on the hypothesis that the thermal demands of an open RW as distinct from convection incubator (CI), may be responsible for a reduction in the metabolizable energy a premature infant has available for growth, we evaluated the relation between environment, metabolism and growth of 13 LBW infants on a given level of food intake. During the 9 day metabolic balance, infants (wt. 1319±149g, age 25±12d, concep age 34±3wk, m±SD) were randomized to RW (servocontrolled to maintain T_{abd}=36.5°C) and CI (T_{inc} within thermoneutral zone) each serving as his own control. Energy utilization and substrate oxidation rates ($\dot{V}O_2$, $\dot{V}CO_2$, indirect calorimetry), protein utilization (urine N), protein degradation (urine 3-methylhistidine) and sympathomedullary response (cathecholamines) were measured. Metabolic rate (MR) was 10% higher for infants under RW (2.42±.42 vs 2.19±.28kcal/kg/hr, m±SD, p=.05 vs CI). The significant reduction (p=.03) in nonprotein RQ for infants in CI (0.99 vs 1.07) indicates ↑ lipogenesis under RW. Protein utilization accounted for ∿3.5% of energy expended in both conditions. Urine 3MH, epinephrine, norepinephrine, volume and SG did not differ significantly from control conditions. Increments of weight, length, head circumference, midarm muscle circumference, dynamic skin fold thickness and body temperatures were similar. Under RW: 1) rate of energy utilization increases and is associated with shift to lipogenesis, 2) growth is not compromised acutely although methods of assessment may be too insensitive, 3) ↑ MR is not mediated by catecholamine response to cold stress but rather by other environmental and/or behavioral causes.

●1449 RELIABILITY OF TWO-DIMENSIONAL, PULSED DOPPLER MEASUREMENTS OF BRAIN BLOOD FLOW AND CARDIAC OUTPUT Christopher Martin, Thomas Hansen, Jan Goddard-Finegold and Adrian LeBlanc. Baylor College of Medicine, Depts. of Pediatics and Medicine, Houston.

To determine the reliability of 2-dimensional, pulsed Doppler (2D-PD) ultrasonography as a bedside technique for measuring changes in brain blood flow and cardiac output we used a 2D-PD mechanical sector scanner to measure: ascending aortic diameter and flow velocity and peak and trough frequency shifts (f) in a basal cerebral artery (BCA) through an artificial fontanel in 6 newborn lambs during hemorrhage (25cc/kg) and dopamine infusion (5 and 20 μg/kg/min). We calculated cardiac output, BCA pulsatility index (PI) and BCA mean frequency and compared measurements by linear regression analysis to cardiac output and brain blood flow determined by the radioactive microsphere technique. Summary of results: (N = 24 determinations)

	Regression line	r	p
BCA Peak f	y = 1.9x + 1.0	0.54	<0.01
BCA Trough f	y = 0.9x + 0.7	0.46	<0.05
BCA Mean f	y = 1.3x + 0.7	0.53	<0.01
BCA PI	y = 0.01x + 0.5	0.06	>0.50
Cardiac output	y = 0.6x + 183	0.48	<0.01

Peak, trough and mean frequency measurements from a basal cerebral artery and 2D-PD measurements of cardiac output paralleled changes in brain blood flow and cardiac output determined with microspheres. Pulsatility index did not. We conclude that 2D-PD can be used to quantitate changes in brain blood flow and cardiac output.

=1450 PRESERVATION OF BRAIN BLOOD FLOW AUTOREGULATION AND OXYGEN DELIVERY DURING HEMORRHAGE AND DOPAMINE INFUSION. Christopher Martin, Thomas Hansen, Jan Goddard-Finegold and Adrian LeBlanc. Baylor College of Medicine, Depts. of Pediatrics and Medicine, Houston.

Although sick infants who may suffer brain injury are treated with many drugs (e.g., dopamine) which affect the systemic circulation, their effects on the cerebral circulation are not well understood. To study the effect of hemorrhagic hypotension and dopamine infusion on the cerebral circulation, we measured aortic pressure (MAP), hematocrit (Hct) and calculated brain oxygen delivery (BOD) in 9 lambs that were < 1 wk old during a control period (CON); hemorrhage of 25cc/kg (HEM); dopamine [5μg/kg/min] (DOPA 5); dopamine [20μg/kg/min](DOPA 20). Cardiac output (CO) and brain blood flow (BBF) were measured using microspheres. Summary of results: $\bar{X}\pm s_{\bar{x}}$, * different than control, p<0.05

	MAP torr	Hct %	CO cc/min/kg	BBF cc/min/g	BOD cc/min/100g
CON	80±2	30±1	359±15	1.00±.10	0.13±.01
HEM	69±3*	24±1*	256±28*	1.14±.15	0.11±.01
DOPA 5	77±3	23±1*	317±26	1.36±.10	0.13±.01
DOPA 20	86±4	22±1*	365±34	1.35±.16	0.12±.02

Despite a fall in aortic pressure, hematocrit and cardiac output during hemorrhage, brain blood flow and oxygen delivery were preserved. During dopamine infusion aortic pressure and cardiac output returned to baseline and brain blood flow and oxygen delivery remained unchanged. We conclude that brain oxygen delivery and autoregulation of blood flow in the newborn lamb are not impaired by this degree of hemorrhage or dopamine infusion.

1451 A COMPARISON OF DIFFERENT METHODS OF BLOOD GLUCOSE DETERMINATION IN THE NICU. Gilbert I. Martin, Joel A. Streng, Howard M. Speil, Ralph J. Bertolin, Robert S. Neuenschwander, William R. Ireland, Barton R. Wald, Gilbert I. Furman. (Sponsored by P.Y.K. Wu). Queen of the Valley Hospital, West Covina, California.

Careful monitoring of blood glucose levels in an especially high risk neonatal population is essential to the critical care of the newborn. It is often necessary to determine a blood glucose value expediently to provide immediate therapy. This study compares the laboratory blood glucose value with the Dextrostix and four commercially available glucose meters.

Blood glucose values were determined on 111 heel stick samples from neonates in the NICU. Each sample was evaluated by the following methods: Laboratory (Beckman-Astra); Dextrostix (Ames Co.) Glucometer, Accucheck; Glucocheck and Glucoscan. Correlation coefficients and regression equations were obtained for reach meter-laboratory relationship and the Dextrostix-laboratory relationship. All of the r values obtained were significant at the .01 level. The values were: Dextrostix-.60; Glucometer-.72; Accucheck-.80; Glucocheck-.73; Glucoscan-.67. The Accucheck and Glucocheck were correlated with the laboratory glucose value over the entire range. The Glucoscan and Glucometer showed best correlation at lower glucose values. The Dextrostix gave the poorest indication of the true laboratory value.

Since the ability to determine an instantaneous glucose value using a commercially available meter is readily available, it seems prudent for nursery staff to utilize the Accucheck or Glucocheck meter for bedside clinical determination of blood glucose

=1452 COMBINED EFFECT OF HYPOXIC HYPOXIA (HH) AND HYPERCAPNIA ON CEREBRAL BLOOD FLOW (CBF) IN LAMBS. Jody Massik, Mark L. Hudak, Raymond Koehler, Richard J. Traystman, M. Douglas Jones, Jr. Johns Hopkins Hospital, Departments of Anesthesiology/Critical Care Medicine and Pediatrics, Baltimore, MD 21205.

CBF increases during both HH and hypercapnia. It is not clear, however, whether there is an interaction between these stimuli, so that the magnitude of the CBF response to HH is influenced by the prevailing PCO_2, or whether they are independent. We examined this question in 7 anaesthetized, paralyzed, artificially ventilated lambs. Catheters were placed in the femoral artery for blood pressure monitoring, in the left ventricle for radioactive microsphere (MS) injection, in the brachiocephalic artery for withdrawal of the MS reference sample, and in the superior sagittal sinus for the withdrawal of cerebral venous blood. The animal was exposed to three levels of HH (Range PO_2 79-18 mmHg) at a preset PCO_2 of 22 ± 0.4 (±SEM) mmHg. PCO_2 was then increased to 60 ± .8 mmHg and the protocol repeated. Arterial and cerebral venous blood was obtained for blood gas and oxygen content measurements at control PO_2 and at each of 3 levels of hypoxia. MS CBF measurements were made at control PO_2 and the lowest PO_2. The slope of the CBF response and the slope of the $CBF/CMRO_2$ (CBF ÷ cerebral O_2 consumption) response to hypoxia were compared in each animal at each PCO_2. The slopes increased at high PCO_2, but not significantly. We conclude, therefore, that the effects of PCO_2 and HH on CBF are independent.