1457 MEAN AIRWAY PRESSURE (Paw) AND INTRACRANIAL PRESSURE (ICP) IN NEWBORN INFANTS. D.W. Fox, C.L. Paxson, Jr. Northeastern Ohio Universities College of Medicine, Youngstown, Ohio. (Spons. by Avroy A. Fanaroff)

Previous authors have shown that adverse changes in cerebral blood flow are reflected in changes in ICP. We sought to determine whether increased Paw required to ventilate newborns may alter ICP and predispose them to intraventricular hemorrhage.

14 ill infants were studied. All infants were ventilated with Bird ventilators and Paw was measured using the Bird mean Airway Pressure Monitor. ICP was measured using a Ladd ICP monitor with fiberoptic sensor secured over the anterior fontanel. Mean blood pressures were recorded via aortic catheters.

The study was commenced at institution of assisted ventilation. Most common beginning settings included PEEP 4, PIP 25, FIO2 100%. One hour later, stepwise changes were made in PEEP/ PIP to produce increments of 1-2 cm H_2O Paw pressure. Increases were made to achieve maximum settings of PEEP 12 and Paw 22. Resulting ICP varied only from 4-9 cm H_2O. No values approached the 18-20 cm H_2O value which is considered abnormal. Blood pressure did not change during the study.

PEEP	PIP	PAW	ICP
6	30	15	2
8	40	20	4
10	40	22	4

We conclude that in nonhypoxic infants with stable blood pressures occasional high mean airway pressures do not adversely affect ICP.

1458 FLUID RESUSCITATION FOR HYPOTENSION AND THE PRODUCTION OF PULMONARY EDEMA. R.V. Johnson, J.W. Dirksen and C.L. Paxson, Jr., NEO College of Medicine, Youngstown, Ohio. (Spons. by Avroy A. Fanaroff)

The choice of fluid replacement for treatment of neonatal hypotension remains controversial. Recent reports have suggested 10% albumin should not be used because it may cause intracranial hemorrhage or pulmonary edema. We have studied this problem further in 26 conscious lambs, 2-5 days old, acutely surgically prepared with femoral and aortic catheters. 25% of circulating blood volume was rapidly exsanguinated (Exs) (10 minutes). The animals were then randomly given no albumin or therapy (Tx) of 1 g/Kg of 5 or 10% albumin. Vital signs were continuously recorded. Acid-base status and hct were determined hourly. The arterial/alveolar PO2 ratio (PaO2/PAO2) was used as the clinical index of pulmonary edema.

Group	Mean Bp			PaO2/PAO2		
	Baseline	Exs	Tx	Baseline	Exs	Tx
No albumin	86	63	62	.91	.80	.91
5% albumin	85	68	81	.93	.89	.91
10% albumin	87	69	80	.92	.79	.79

Following therapy, the untreated animals remained hypotensive and 3 died. The animals given 10% albumin developed pulmonary edema as evidenced by the significant fall in PaO2/PAO2 ratio (p < .01).

We conclude that while albumin restores Bp in the hypotensive lamb it also produces significant pulmonary edema.

1459 MORE INTELLIGENCE IN THE NEWBORN ICU: A COMPUTER-ASSISTED MONITORING SYSTEM. Joyce L. Peabody, (Spon. by June P. Brady). Dept. of Peds.,Children's Hospital and Cardiovascular Research Institute, Univ. Ca., San Francisco.

Despite the age of computer technology, most of the data from continuous physiologic measurements in intensive care nurseries is still entered intermittently by hand into the charts. We have developed a computer-assisted bedside monitoring system which provides continuous recording, storage, and data analysis. Heart rate, respiratory rate, mean airway pressure, inspired oxygen, systemic arterial and venous pressure, skin surface PO_2 (P_SO_2), PCO_2, and intracranial pressure are sampled every second. The computer hardware allows continuous data from 4 infants for 80 hours on each disk. In addition, the range of acceptable values for each variable can be defined and the computer analyzes all events outside of these ranges, A and B in Fig. Analysis includes frequency, duration, severity (area under curve) of each event.

Pattern recognition of artifacts has allowed their elimination from analysis.

We have studied 37 patients for a total of 147 days.

Applications include on-line analysis of the effectivenesss of interventions. "Re-run" data has provided a review of the courses preceding cardiorespiratory arrest, intraventricular hemorrhage and pneumothorax. We conclude that this system allows previously impossible continuous on-line recording, storage, and analysis of multiple physiologic variables.
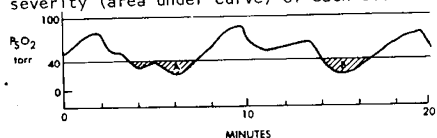
1460 ENERGY PARTITION OF PROTEIN SYNTHESIS IN RESTING ENERGY EXPENDITURE OF NEONATES ON TPN. P.Sauer, J.Van Aerde, J.Beesley, U.Canagarayar, J.Smith, D.Wesson, P Swyer, P.Pencharz. Depart. Paeds, Surg, Med Eng, Univ of Toronto, Res Inst, Hosp for Sick Child, Toronto, Canada.

To determine the influence of protein turnover on resting metabolic rate of post-surgical infants on TPN, the rate of protein synthesis (S), catabolism (C), net protein gain (PG) and resting energy expenditure (REE) were measured in 11 infants, birthweight 2340±172g(SEM), gestational age 37±0.9wk. Study weight was 2445± 204g on postnatal day 17±3. Energy intake was 89.1±3.4kcal/kg/d; protein intake was 3.2±0.2g/kg/d. S and C were calculated from the plateau of urinary ^{15}N enrichment reached during 72h of ^{15}N glycine infusion. Infusion was started at least 3 days after surgery. PG was calculated as net synthesis (S-C) while REE was measured by open circuit indirect calorimetry. Results are as shown.

	REE	PG	S	C	Weight Gain
	kcal/kg/d	g/kg/d	g/kg/d	g/kg/d	g/kg/d
x̄±SEM	44.4±1.8	1.81±0.12	9.89±0.6	8.10±0.6	11.7±1.48

There was a significant correlation between REE and PG (r=0.72, p<0.01). The slope indicated an expenditure of 11 kcal/g PG. An average of 5.5g protein was synthesized per g PG. The energy cost was 2.0kcal/g(S). The energy expenditure was 19.8 kcal to synthesize 9.89g protein. Since all energy produced during protein breakdown is released as heat we conclude that about 44.5% of resting energy expenditure can be accounted for as the energy cost of protein synthesis in post-surgery infants.

1461 THE EFFECT OF GESTATIONAL AGE, ACUTE ILLNESS AND TYPE OF FEEDINGS ON THYROID HORMONE (T4) LEVELS IN PREMATURE INFANTS. G.R. Pereira, L. Oberkotter, M.H. Paul, H. Ling, J.A. Lydon. (Spon. by W.W.Fox). Dept. of Peds., Univ. of Pa. Sch.of Med.; Dept. of Obstet. & Gyn., Albert Einstein Med. Ctr., Phila., PA.; & Penna. Dept. of Health, Bureau of Labs.

125 critically ill premature infants with depressed blood T4 levels during the first postnatal week (mean ± SEM 3.28 ± .13 mcg/dl) which normalized by 2-3 weeks of age (6.5 ± .34 mcg/dl) were included in the study. Initial blood T4 levels correlated positively with birthweight (r=0.51) and gestational age (r=0.49) and negatively with a clinical score which took into account the incidence of respiratory distress syndrome, sepsis, necrotizing enterocolitis, intraventricular hemorrhage, the length of hospitalization and the duration of mechanical ventilation (r= -0.51, p < 0.05). No significant correlations were seen between initial and repeated T4 levels and 1 and 5 minute Apgar scores. The effect of feedings on repeated T4 levels was studied on a subsample of infants who were free of acute illness and receiving 3 different feeding regimens: 100% of total calories as hyperalimentation (n=24), greater than 50% of total calories as formula (n=22), and greater than 50% of total calories as preterm human milk (n=7). T4 levels in these 3 groups were respectively 5.4 ± 0.8, 6.95 ± 0.6 and 9.4 ± 0.4 mcg/dl (p < 0.05). A positive correlation between intake of human milk varying from 10% to 100% and repeated T4 levels was also observed in 15 infants (r=0.64). This study demonstrates that the degree of prematurity, the presence of acute illness and the type of feeding can have an adverse effect on blood T4 levels and should be considered when assessing thyroid function in premature neonates. Our data suggests that thyroid hormone related components in preterm human milk contribute to the thyroid economy in premature infants.

1462 PREDICTION AT 8 HOURS OF AGE OF SURVIVAL IN INFANTS < 801 GRAMS. Joshua Zarfin, Mary Chipman, Johny Van Aerde, Max Perlman, Div. of Neonatology, Hosp. for Sick Children, Toronto, and Clinical Research Support Unit, Dept. of Preventive Medicine and Biostatistics, University of Toronto.

Increasing survival of outborn very low birthweight infants (VLBW) has raised questions about short- and long-term outcomes, and utilization of resources. Considering the possibility of limited resources, we have attempted to define parameters at 8 hours of age which are predictive of survival.

Data were collected on 81 vigorously treated infants of birthweight < 801 grams transferred to this unitin 1980-82. 35 infants survived (44%). All patients were ventilated in transit by our Transport Team, and were under our care by 8 hours of age. Obstetric parameters and Apgar scores were found to have no significant correlation with survival, but significant correlations were found with the presence of sustained spontaneous respirations, absence of marked skin bruising, temperature >36°C, FiO_2 < 0.5, systolic blood pressure >30 Torr, pH >7.25 and peak inspiratory pressure < 20 cm H_2O (p < 0.0004, < 0.002, < 0.001, < 0.0001, < 0.02, < 0.001, and < 0.003 respectively). The utility of birthweight and the last 5 variables as predictors of survival was examined using multiple logistic regression analysis. Only birthweight and pH made significant independent contributions to the prediction of survival. However use of all 6 variables together significantly improved prediction of survival.