

**1462** GROWTH RATES FOR INFANTS <1000 GRAMS. Joseph W. Werthammer & Michael F. Epstein. (Spon. by H.W. Tausch). Harvard Medical School, Children's Hospital Medical Center, Department of Pediatrics, Boston, MA.

For 30 years the Dancis grid has been the standard for growth in the premature infant. To determine if growth patterns have changed for the very small infant, new curves were constructed from the daily weights of 53 consecutive newborns weighing less than 1000g and surviving until discharge. Three measurements of growth were examined: 1. number of days to regain birth weight (days to B.WT.), 2. minimum weight as a percentage of birth weight (min. WT/B.WT.), and 3. weight on day 50 as a percentage of birth weight (WT. on D.50/B.WT.). These measures were compared to the Dancis curves for 750 and 1000g birth weights.

BIRTH WEIGHT	(n)	DAYS TO B.WT.	MIN.WT./B.WT.	WT. ON D.50/B.WT.
Dancis 750g		32	74%	128%
700-799g	(12)	18	88%	142%
800-899g	(17)	17	88%	162%
900-999g	(24)	17	90%	170%
Dancis 1000g		17	92%	170%

Infants born between 700-1000g in 1978-79 who survived must have differed greatly from those babies of similar birth weight described in 1948, e.g. of the 53 babies, 26 were on mechanical ventilation for at least two weeks. Despite these differences, the babies in this study grew at rates similar to the larger, more healthy babies described by the 1000g Dancis curve and approximating the rate of in utero growth after re-achieving birth weight.

**1463** THE RESPIRATORY EXCHANGE RATIO IN GROWING LOW BIRTH WEIGHT INFANTS. Robin K. Whyte, Henry S. Bayley, Carol Vlainic, John C. Sinclair, McMaster Univ. Dept. Peds. and Univ. Guelph, Nutrition Dept. Guelph, Ontario.

As part of an ongoing study of energy balance, 22 growing low birth weight infants were studied for three four hour periods during which minute by minute measurements of oxygen consumption and carbon dioxide production were made using a Kippdiaferometer calibrated with human expired gas. The three study periods were set one week apart so that each baby was studied over a two week interval. 16 babies were fed with formula (SIMILAC 70 kcals/100 gm) and 6 were fed with their own mother's expressed breast milk. Mean gestational age was 30 weeks (range 27 to 34 weeks) and mean birth weight 1.29 kg (range 0.98 kg to 1.7 kg). The age on entry to the study ranged from 5 to 29 days and average weight gain was 17 g/kg.day (range 12-22 g/kg.day).

In 65 study periods mean oxygen consumption was 7.0 (S.D. 1.5) mls/kg.min, mean carbon dioxide production was 8.1 (S.D. 1.1) mls/kg.min and mean respiratory exchange ratio was 1.20 (S.D. 0.27). The respiratory exchange ratio increased with postnatal age, due both to a decrease in oxygen consumption and an increase in carbon dioxide production. A steady-state respiratory exchange ratio above unity indicates that processes other than oxidative catabolism are contributing to gaseous exchange, such as the conversion of glucose to fat. Such processes must be taken into account when calculating a thermal equivalent for oxygen consumption.

**1464** COMPARISON OF 10% AND 20% SAFFLOWER OIL AS CALORIC SOURCES IN NEONATES MAINTAINED ON TOTAL PARENTERAL NUTRITION (TPN). Shirley A. Wilkerson, Paula G. Radmacher, David H. Adamkin, University of Louisville, University Hospital, Department of Pediatrics, Louisville, Kentucky.

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The clinical application of a concentrated safflower oil emulsion was evaluated in six neonates maintained exclusively on TPN for two weeks. The neonates received the standard 10% infusion for one week and the 20% emulsion the second week. Clinical and laboratory studies revealed no side effects other than those previously recognized. Differences in total fluid intake during the two study periods were not statistically significant. Growth data in relation to mean total caloric and fluid intake and percentage as fat are listed below.

Weight gain gm/kg/day	Total Calories Kcal/kg/day	% Calories Fat	Total Fluids cc/kg/day	% Fluids Fat	
Week 1	8.1	74.1	33.1	132.8	16.8
Week 2	15.0	94.5	29.3	128.5	12.9

Despite an overall increase in caloric intake during the second week of the study period, total fluid volume remained unchanged. The utilization of a 20% fat emulsion like a 20% dextrose solution enables one to increase calories without increasing fluid volume. There appears to be clinical application for a concentrated 20% fat emulsion in neonates whose fluid volumes must be restricted.

**1465** AGE AT ONSET FOR NECROTIZING ENTEROCOLITIS (NEC): EPIDEMIOLOGIC AND CLINICAL ANALYSIS. Rickey Wilson, William P. Kanto, Bryan J. McCarthy, Roger A. Feldman, Bureau of Epidemiology, CDC, and Department of Pediatrics, Emory University, Atlanta, Georgia.

We examined the epidemiologic features of age at onset of NEC and studied infants of <1500 grams (gm) birthweight (BW) with NEC for factors predictive of early (<10 days) and late (>10 days) onset. For 1977-1978 NEC cases in Georgia, we found that mean age at onset of NEC increased as BW decreased; the proportion of infants with late onset illness declined from 66% for BW <1000 gm to 0% for BW >2500 gm (p<.0001, linear trend). BW specific weekly attack rates (AR) and mean gestational age (GA) for each BW group were:

BW (gm)	Mean GA (wks)	Week (Rate is per 1000 at Risk)					
		1	2	3	4	5	6-8
1000	28.3	14.6	24.6	19.4	34.3	15.1	10.2/wk
1001-1500	30.4	19.4	11.5	5.8	6.0	3.1	0
1501-2500	34.1	2.6	1.1	0.1	0.1	0	0
2500+	38.5	0.1	0.02	0	0	0	0

The AR declined significantly at 35-36 wks equivalent GA for each BW group. Only 4 of 62 infants with BW >1500 gm had late onset illness compared to 45 of 86 weighing <1500 gm. For infants with NEC weighing <1500 gm, no significant differences were found in Apgar scores, use of antibiotics, feedings, presence of 19 maternal and 14 neonatal risk factors or in outcome of illness between those of early and late onset. Our data support a major role for gut immaturity as a determinant of the risk period for development of NEC.

**1466** MATERNAL REFERRAL VERSUS NEONATAL TRANSPORT TO A PERINATAL CENTER: A COMPARISON BETWEEN THE OUTCOME OF MATCHED MOTHERS AND THEIR INFANTS. Frederick H. Wirth, P. Lea Wilds, Donald Levy, Edward H. Karotkin (Spon. by F. Stanley Porter) Division of Perinatal Medicine, Eastern Virginia Medical School, Norfolk, Virginia.

To study the possible benefits of maternal referral over neonatal transport to a perinatal center, the clinical courses of 50 matched pairs of infants admitted to the intensive care nursery (ICN) were compared. The two groups of infants were matched for birth weight and gestational age. Then their mothers were matched for several maternal conditions: onset of labor prior to 37 weeks gestation, membrane rupture prior to labor, preeclampsia or eclampsia, and uterine bleeding. The infant groups were studied to compare their immediate postnatal clinical status in the delivery room, complications in the ICN, and death rates.

There was no difference between them for C-section rates, Apgar scores, nor the incidence of retrolental fibroplasia, bronchopulmonary dysplasia, intraventricular hemorrhage or necrotizing enterocolitis, nor the lengths of time mechanically ventilated and lengths of stay in the ICN. The infants delivered in the perinatal center after maternal referral had a significantly lower incidence of cold stress (axillary temp < 36.5°C) and neonatal death rate. The death rate of the postnatally transported infants was lower than the death rates of the similar infants remaining in the referring hospitals. We concluded that maternal referral to a perinatal center reduces neonatal mortality when the infant requires neonatal intensive care.

**1467** CREATINE KINASE BRAIN ISOENZYME CONCENTRATION CKBB IN CEREBROSPINAL FLUID(CSF) OF NEWBORNS

Gordon Worley, Brian Lipman, Ira H. Gewolb, Steven J. Gross, Charles R. Roe, Duke University School of Medicine & Yale University School of Medicine, Durham & New Haven.

Using a radioimmunoassay we measured [CKBB] in 130 CSF samples from 86 newborns. Infants with intraventricular hemorrhage (IVH) documented by computerized tomography (CT) had significantly higher [CKBB] in CSF than infants who had normal CT's or were not clinically suspected of having an IVH. [CKBB]'s are expressed in nanograms/ml.

IVH	N	Mean [CKBB]	SD
72 hrs. old, no IVH	18	31.2	+ 19.7
72 hrs. old, no IVH	9	4.7	+ 1.6
72 hrs. old, no IVH	59	6.8	+ 6.4

Patients with a definitely abnormal neurological exam prior to the LP had significantly higher [CKBB] in CSF than those with suspect or normal exams.

	N	Mean [CKBB]	SD
Normal	35	6.0	+ 3.0
Suspect	13	5.6	+ 1.6
Abnormal	8	13.1	+ 15.0

All 15 infants with [CKBB] >25 ng/ml had suffered a severe neurological insult. (13 had an IVH and 2 had severe asphyxia.) CSF [CKBB] is a metabolic indicator of brain damage and is significantly elevated in CSF from infants with IVH and abnormal neurological exams.