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EARLY DIAGNOSIS & TREATMENT OF POSTHEMORRHAGIC HYDROCEPHALUS IN SMALL INFANTS. Raul Bejar, Sergio Saia, Hector James, Ronald W. Coen, Louis Gluck. Univ. of Calif. San Diego, Dept. of Pediatrics & Neurosurg. La Jolla, CA

Thirty-two survivors of major intraventricular & subependymal hemorrhages (IVH/SEH) (associated with ventricular enlargement) were followed with frequent ultrasound studies. Fifteen infants (BW 770g-1640g) had a slight ventricular enlargement. Eight resolved the enlargement completely 3-12 wks after IVH/SEH & 7 were discharged with mild ventricular dilatation. Four of these 7 infants had follow-up studies (4-12 months); 3 were abnormal (large unilateral & mild bilateral hydrocephalus). Seventeen patients (BW 800g-2480g) had progressive hydrocephalus. Fifteen were treated with repeated lumbar punctures (LP) resolving the hydrocephalus in 1 & arresting it in 3 cases (mean no. LP's 8, mean volume of CSF 46.5 ml). LP's failed in 11 cases (mean no. LP's 8, mean volume CSF 40 ml). These patients had ventriculoperitoneal shunts (VP) between 14-80 days of life (mean age 27 days). VP resolved the hydrocephalus completely in 6 cases (BW 900g-1440g) & partially in 5 (BW 800g-1470g) (4 had intracerebral hemorrhages). Seven infants had shunt complications (1 infection, 2 obstruction & 4 both). Two infants died. Ultrasound was very useful for the early diagnosis of progressive hydrocephalus & for evaluation of the therapy & complications. Infants without progressive hydrocephalus but with slight ventricular enlargement should be followed closely since they may develop significant abnormalities.

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ASSOCIATION OF EARLY AORTOGRAMS & PDA LIGATION WITH INTRAVENTRICULAR HEMORRHAGE (IVH). Raul Bejar, Howard Schneider, Lorenzo Osorno, David Edwards, Ronald Coen, Louis Gluck. Univ. of Cal., San Diego, Depts. Pediatrics & Radiology, La Jolla, California.

Thirty-three sick infants (<34 wk gest.) with RDS, PDA & subependymal hemorrhage (SEH) &/or minor IVH (without ventricular enlargement) were followed with frequent ultrasound brain studies to detect changes in IVH/SEH. Twenty-six had PDA ligation before 96 hours of life ("early") & 7 after 96 hrs ("late"). Sixteen of 23 infants increased their IVH/SEH after early ligation. No changes occurred in those ligated late.

Ligation	Early	Late	P	† IVH	No † IVH	P
N	26	7	-	16	10	-
GA (x̄)	29wk	28wk	NS	28.5wk	29wk	NS
BW (x̄)	1055gm	912gm	NS	1057gm	1052gm	NS
5' Appgar (x̄)	6.5	6.0	NS	5.7	7.4	0.02
Labor (No.)	22	7	NS	15	5	NS
Aortograms	19	2	0.05	15	4	0.005
† IVH	16	0	0.005	*all infants who died increased their hemorrhage size.		
Died	9*	0	NS			

Ligated infants who increased their IVH/SEH had aortograms more frequently than infants without IVH/SEH change. Both procedures might result in an acute increase in arterial blood pressure in infants lacking cerebral blood flow autoregulation. Early PDA ligation preceded by aortogram may be a risk factor for major IVH/SEH.

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EFFECTS OF A DOUBLE-WALLED INCUBATOR ON THE PARTITION OF BODY HEAT LOSS OF PREMATURE INFANTS. Edward F. Bell and Gladys R. Rios (sponsored by Allen Erenberg). University of Iowa, Department of Pediatrics, Iowa City, Iowa.

We measured metabolic heat production (M) and body heat loss (HL) of 8 AGA premature infants by indirect calorimetry in a double-walled incubator (Air-Shields) with (DW) and without (SW) the inner wall. The infants had birth weights of 1.47-1.89 kg; they were 6-19 days old. Each infant was studied in SW and DW on the same day with incubator servocontrolled to maintain abdominal skin temperature at 36.5°C. After thermal equilibration, oxygen consumption (VO₂), carbon dioxide production (VCO₂), and insensible water loss (IWL) were measured continuously for 1.5-2.5 hours in each incubator. Temperatures (T) were recorded every 15 min at 18 sites (4 body, 14 environmental). M and HL were calculated and HL partitioned into evaporation (E), radiation (R), and the sum (C) of convection and conduction. Air T was lower in the DW, 33.8 vs 34.8°C; mean wall T was higher in the DW, 32.3 vs 31.7°C. Operative environmental T was 32.9°C in both incubators. The means are shown below, VO₂ and VCO₂ in ml/(kg·min), IWL in ml/(kg·h), and M, HL, E, R, C in kcal/(kg·h): (*P<0.05, paired t)

	VO ₂	VCO ₂	IWL	M	HL	E	R	C
SW	7.95	7.33	1.31	2.36	2.37	0.76	1.10*	0.50*
DW	8.40	7.64	1.29	2.49	2.53	0.75	0.95	0.83

With SW and DW both servocontrolled to keep abdominal skin T constant, there were no significant differences in VO₂, IWL or total HL. The only difference was in the partition of heat loss, with DW reducing loss by R in exchange for increased loss by C.

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TRANSCUTANEOUS PCO₂ (TcPCO₂) MONITORING IN NEONATES. Robert Bennett, Frank Mannino, (Spon. by Louis Gluck) Univ. of Calif., San Diego, Dept. of Ped. La Jolla, CA

In 13 extremely ill neonates, 483 simultaneous TcPCO₂ (Roche heated TcPCO₂ monitors) and PaCO₂ studies were compared. Infants were <12 days old; wt. 2.2 ± 0.84 kg (1.4-4.0 kg); GA 34 ± 3.4 (28-40) wks; conditions included RDS, meconium aspiration, pulmonary atresia, diaphragmatic hernia, hypoplastic lungs, PFC. Indications for monitoring were mechanical ventilation and arterial catheter (usually umbilical).

Correlation data:		
Mean Difference	(TcPCO ₂ -PaCO ₂)	30.3 ± 9.09 (15.7-39.3)
Correlation (r)		0.87 (-0.20-0.99)
Paired T-value		73 (-59 -74)
Relationship	TcPCO ₂ =	1.55 x PaCO ₂ + 1.9
Patient variance significance		<0.0001

Values on each individual patient varied from the above described relationship but were easily derived, and did not relate to weight, gestational age or disease process. TcPCO₂ is independent from PaCO₂, but monitors PaCO₂ accurately.

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EVALUATION OF BRONCHOPULMONARY DYSPLASIA BY CARDIAC CATHETERIZATION W. Berman Jr., S. Yabek, T. Dillon, R. Burstein, J. Burstein, and S. Corlew. University of New Mexico School of Medicine, B.C.M.C., Dept. of Pediatrics, Albuquerque, New Mexico.

Six infants, 10 mos.-2yrs., were evaluated for bronchopulmonary dysplasia (BPD) by concurrent cardiac catheterization and echocardiography. Mean estimated gestational age=30wks; mean birth weight=1350gms. All infants required oxygen and diuretic therapy (mean F_iO₂ 28%). Measurements in room air included oxygen consumption (VO₂); oxygen capacity; oxygen saturations; pulmonary artery (PA) and wedge pressures; right ventricular dp/dt (RVdp/dt) and right sided systolic time intervals from a Millar catheter tracing; and derived pulmonary vascular resistance (PVR). Measurements were repeated in 40% and 88% oxygen. Ventricular function and systolic time intervals were measured concurrently by echocardiography. Pulmonary wedge angiograms were performed at the conclusion of study. Mean values in room air were mean PA pressure 32mmHg; RVdp/dt 515mmHg·sec⁻¹; RPEP/RVET 0.271; VO₂ 132 ml O₂·M⁻¹·min⁻¹; pulmonary flow index 3.4 L·min⁻¹·M⁻²·min⁻¹; PVR 6.7 units; PO₂ 55 torr, PCO₂ 41 torr, pH 7.37. 2 of 6 children responded to O₂ with a significant fall in PA pressure and PVR. The two children who responded had the highest mean PA pressures, PCO₂'s and PVR's of the group (means 46mmHg, 48 torr and 9.6 units). Echo measurements of RPEP/RVET correlated well with values from the Millar catheter, but neither measurement reflected PVR accurately. LV function studies and pulmonary wedge angiograms were normal. These studies suggest invasive studies may aid in management of children with BPD.

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ENHANCED GROWTH AND GASTROINTESTINAL FUNCTION IN PRE-MATURE INFANTS GIVEN NONNUTRITIVE SUCKING(NNS). Judy Bernbaum, Gilberto R. Pereira, John B. Watkins, George J. Peckham. Univ. of Pa. Sch. of Med., Children's Hosp. of Phila., Dept. of Peds., Phila., Pa.

The use of pacifiers(NNS) during gavage(NG) feeding may be important for the feeding of small premature infants. Thus, transition to total nipple(po) feeding, caloric intake, intestinal motility and wt.gain/wk. were studied in 20 stable, gavage fed AGA infants (birth wt.<1500gms). Infants were matched for birth wt., diet and gest. age and then randomized into 2 groups. One group only received a pacifier prior to and during NG feeding(NNS), the control group received no pacifier. All results are in (avg±SD). The NNS group required less time to complete their first nipple feeding (6.4±2.1 vs. 10.4±4.3 min/oz.(p<.05) and a shorter transition to total po feeding(10±2.7 vs. 16±6.8 days,p<.02). In NNS, intestinal transit time determined by Carmine red in stool was shorter (12.3±3.8 vs. 32.5±7.8 hrs.p<.01) and stools more frequent (2.8±0.6 vs. 1.9±0.4/day,p<.01). After 1 week, NNS infants demonstrated a greater % weight gain/wk. (10.6±2.5 vs. 6.8±1.8, p<.01) which persisted until discharge despite comparable daily caloric intake (115±4 vs. 117±5 cal/kg/day,NS). Conclusion: Nonnutritive sucking in premature infants shortens time for completion of initial, and transition to total, nipple feeding as well as gastrointestinal transit time. The finding of an increased weight gain in the NNS group suggests that its use may influence nutrient absorption or energy expenditure and thus, be an important factor to consider in feeding premature infants.