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## AN ANALYSIS OF EARLY MATERNAL ATTACHMENT BEHAVIOR.

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This study is an analysis of the relationship of a number of variables to early maternal attachment behavior. Maternal responsive behavior was used as the measure of attachment. Observations were made in the delivery room, during a postpartum feeding and during a feeding four weeks following delivery. Forty primiparous mothers and newborns served as research subjects.

The results show a shift over time in the factors which are most highly related to attachment behavior. In the delivery room the fathers' responsive behavior is the most significant factor ( $p < .003$ ). During the postpartum feeding the mothers' behavior in the delivery room is the most significant factor ( $p < .001$ ). At four weeks postpartum the mothers' age is most highly related to her responsive behavior ( $p < .001$ ) and measures of social stability ( $p < .001$ ) have increased significance.

Observations of behavior which have a high degree of correlation in the hospital setting, do not have the same degree of significance in a home setting at four weeks. At this time other factors, age and social stability, have an increased degree of significance. How these factors may reflect a mother's social support system and relate to her attachment behavior is discussed.

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## THE BEHAVIOR OF NEWBORNS OF DIABETIC MOTHERS. Michael Fogman, Pat Cole, and Heidelise Als (Spon. by T.B. Brazelton). Harvard Medical School, Dept. of Peds, Boston.

Data from the NINDS Collaborative Study and others suggests that infants of diabetic mothers do more poorly than matched controls in specific development tests at age 4 years. This study assesses the behavior of these newborns of diabetic mothers (NDM's) in order to understand the genesis of these later problems and to design appropriate interventions.

Ten full-term NDM's delivered by elective Caesarian section were compared to ten healthy full-term newborns delivered by elective Caesarian section on the Brazelton Neonatal Behavioral Assessment scale administered on days 3 and 5. All NDM's were free of all anomalies, metabolic and respiratory problems and considered healthy by their pediatricians by day 3. Brazelton scale data were analyzed with an *a priori* established cluster and profile scheme. The NDM's did significantly more poorly than the control newborns in physiological responses to stress and on interactive processes (Repeated measures ANOVA,  $p < 0.05$ ,  $p < 0.001$ ). In particular, the NDM's were more tremulous, had more startles and showed more color changes with handling even though they were normoglycemic and normocalcemic. Furthermore, NDM's behaved differently than controls on those behaviors considered important elicitors of caregiving by parents: attractiveness, need for and use of stimulation, visual orientation, sustaining periods of alertness and molding to the examiner's body during cuddling. It is speculated that the behavioral difficulties demonstrated in these newborns may influence early interaction with caregivers, make bonding more difficult and set the stage for later problems.

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## DEVELOPMENTAL AND NEUROLOGIC OUTCOME OF INFANTS AFTER MECHANICAL VENTILATION. I.W. Zarafu and B. Caspi.

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44 infants born between Jan. 73-Dec. 74, on assisted ventilation were evaluated by the Bayley Scale and neurologic examination. 39 controls matched for Weight (WT), gestational age (GA.) in wks. and Corrected Age at Time of Testing (CATT) in mos. were also evaluated. Conventional criteria for respiratory failure were utilized for placing infants on mechanical ventilation.

Birth Wt. (gms.)	Ventilated			Control		
	No.	GA.	CATT	No.	GA.	CATT
500-1000	5	27	25	3	31	27
1001-1500	10	32	26	9	33	27
1501-2000	10	34	28	8	35	24
2001-2500	11	36	28	9	34	28
>2501	8	39	28	10	39	27

The mean duration on ventilator was 7.2 days.

Outcome: (in percent)	Mental		Motor	
	Vent.	Non Vent.	Vent.	Non Vent.
N	58	49	49	58
-1SD	21	36	34	15
-2SD	21	15	17	27

No statistically significant difference in outcome was found between ventilated and non ventilated infants. Thus ventilatory assistance per se does not place infants at higher risk for developmental outcome.

## CARDIOLOGY

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## NONINVASIVE ASSESSMENT OF SURGICAL SYSTEMIC-TO-PULMONARY ARTERY SHUNTS BY RANGE-GATED PULSED DOPPLER ECHOCARDIOGRAPHY (RGPD) Hugh D. Allen; David J. Sahn;

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The initial or continuing patency of systemic-to-pulmonary artery anastomoses is often difficult to establish clinically. A continuous murmur may or may not be present, especially immediately postoperatively, or it may be masked. Increase in PaO<sub>2</sub> may be helpful, but occasionally aortography is necessary to confirm patency. The purpose of this study was to use RGPD to identify the flow characteristics of systemic-pulmonary artery shunts. RGPD is a noninvasive bedside technique which allows evaluation of flow by placing a Doppler sample beam within an echocardiographically defined cavity. With the transducer placed in the suprasternal notch, the sample Doppler beam was placed within the right pulmonary artery (RPA). Flow characteristics were described by both a time interval histogram (TIH) and by an audible signal (AS). Thirty-eight children were studied by RGPD. Ten normal children had neither systolic nor diastolic RPA turbulence. Nineteen subjects with valvar pulmonic stenosis had RPA systolic turbulence by TIH and AS. Nine children (age 1 day-10 years) had Blalock-Taussig (4) or Waterston-Coolley (5) shunts. Seven were evaluated within 1 week postoperation. Shunt patency was confirmed by autopsy (2), catheterization (2) or by PaO<sub>2</sub> rise (5). Suprasternal RGPD showed RPA systolic and diastolic turbulent flow in 9 of 9 by TIH and AS; in 6, a shunt murmur was not audible at the time of RGPD. RGPD is a useful noninvasive bedside test which effectively confirms surgical shunt patency.

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## ECHOCARDIOGRAPHIC ASSESSMENT OF VALVAR AORTIC STENOSIS John L. Bass, Stanley Einzig, Chang Yee Hong, James H. Moller, University of Minnesota Medical School, Dept.

of Pediatrics. Accurate noninvasive evaluation of patients with valvar aortic stenosis (AS) would improve selection for catheterization. 29 children with AS, ages 2 to 16 years, were evaluated by cardiac catheterization and echocardiography. No patient had congestive heart failure or more than trace aortic insufficiency. Left ventricular to aortic pressure difference (LV-Ao) was estimated by:  $LV-Ao = 13 \times (\text{murmur score}) + RV6 (\text{mm.}) - 6 \times QV6 (\text{mm.}) - 9$ . Resting LV and Ao pressures were measured and aortic valve area (AVA/m<sup>2</sup>) was calculated. The systolic left ventricular posterior wall thickness (LVPW) and internal diameter (LVID) were measured on the echocardiograms without knowledge of catheterization findings. A predicted LV-Ao < 30 mmHg, estimated from murmurs and electrocardiogram, would have allowed us to avoid catheterization in only 4 of the 29 patients. Comparison of predicted and measured LV-Ao yielded an r value of 0.58. The LVPW/LVID ratio was compared to LV peak systolic pressure, measured LV-Ao and AVA/m<sup>2</sup>. Linear regression analysis yielded r values of 0.81, 0.84, and 0.74 respectively. The mean (range) and number of patients for LV-Ao and AVA/m<sup>2</sup> at different LVPW/LVID were:

LVPW/LVID	LV-Ao (mmHg)	AVA/m <sup>2</sup> (cm <sup>2</sup> /m <sup>2</sup> )
<0.55	30(17-42)N=10	0.83(0.60-1.1)N=9
0.56 to 0.69	47(37-80)N=8	0.68(0.53-0.85)N=7
>0.70	90(60-120)N=11	0.52(0.38-0.63)N=10

The 10 patients with LVPW/LVID < 0.55 had mild stenosis, not requiring catheterization.

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## LEFT VENTRICULAR (LV) AORTIC (Ao) RATIO: AN ADDITIONAL INDEX OF LEFT-RIGHT DUCTAL SHUNTING IN PRE-TERM INFANTS WITH PATENT DUCTUS ARTERIOSUS (PDA).

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Although several echo parameters have been useful for the assessment of preterm infants with PDA, none has been absolutely reliable. Fifty-three serial echo studies were obtained in 21 infants (780-1540 gm.). Left atrial (LAD) and ventricular (LVED) dimensions, LA/Ao, as well as the ratio of LVED to Ao internal diameter (LV/Ao) were measured in three groups of infants. Group I: Asymptomatic (5); Group II: Respiratory Distress Syndrome (RDS) (5); Group III: RDS and PDA (11).

The LV/Ao ratio for Group I ( $\bar{m}$  1.90, SD  $\pm$  .19) and Group II ( $\bar{m}$  2.03, SD  $\pm$  .26) differed only slightly. Values of Group I served as normal controls. However, the LV/Ao ( $\bar{m}$  2.53, SD  $\pm$  .39) of Group III was significantly greater ( $p < .005$ ) than in both groups (as was LA/Ao:  $\bar{m}$  1.30, SD  $\pm$  .25). The LV/Ao decreased significantly ( $p < .005$ ) in 7 infants requiring pharmacologic or surgical ductal closure. Two of these had normal LAD and LA/Ao, and LVED and LV/Ao was normal in one.

The LV/Ao ratio was found to be a useful parameter for the serial assessment of infants with PDA. Since all of the accepted echo indices appear to have limitations, the measurements of LV/Ao may be of supplemental value in the diagnosis and management of the PDA syndrome of prematurity.