

BEHAVIORAL SCIENCE

25

AUDITORY AND VISUAL PRETERM DEVELOPMENT OF EXTREMELY PREMATURE INFANTS, Marilee C. Allen, M.D. and Arnold J. Capute, M.D., Johns Hopkins School of Medicine, Department of Pediatrics, and The John F. Kennedy Institute, Baltimore, Maryland.

Early auditory and visual responses were assessed in 47 premature infants with BW below 1300 gms born at Johns Hopkins Hospital in 1983. These extremely premature infants (67% were at or below 28 wks gestation) were assessed weekly, from 1 week until discharge, using a bell, light and optokinetic drum.

All premature infants, from 25 wks postconceptional age (PCA) and beyond, had some response to the bell and light. The majority (>80%) habituated to the bell and light at their initial exam one week of age.

Optokinetic nystagmus (OKN) could be elicited as early as 30 wks PCA, and improved with increasing postconceptional age. Definite OKN was present in the majority of premature infants by 36 wks PCA, and was universally present by 40 wks PCA. No premature infant (even those at term) blinked in response to a visual threatening gesture.

Alerting to the bell, blinking to light and habituation may be useful in assessing sensory abilities of the extremely premature infant below 30 wks PCA, whereas optokinetic nystagmus to the OKN drum is a more practical and objective measure of visual abilities of premature infants closer to term.

26

IQ DIFFERENCES BETWEEN CYANOTIC AND ACYANOTIC CHILDREN WITH CONGENITAL HEART DISORDERS: FACT OR ARTIFACT? D.M. Aram, B.L. Ekelman, M.W. Levinsohn, G. Ben-Shachar (Spon. by J. Liebman), CWRU, Dept. Ped., Cleveland.

Previous studies have reported lower IQ's for cyanotic versus acyanotic children with congenital heart disorders, a finding attributed to the degree of hypoxemia present. Several important variables have not been examined consistently including: neurologic disorders; definitive surgery; degree of sickness; age at testing; sex; and social class. The present study examined the relationship of these variables to obtained IQ measures for 82 consecutively admitted children exclusive of children with abnormal neurological examinations (MWL) or having received definitive corrective surgery. Consistent with earlier reports, IQ's for the acyanotic children ( $M=112.8$ ;  $SD=14.52$ ) were significantly higher ( $t=2.60$ ;  $p<.01$ ) than for the cyanotic group ( $M=103.50$ ;  $SD=15.81$ ). While sex, race and social class were not significantly different between the 28 cyanotic and the 54 acyanotic children, the cyanotic children were significantly sicker ( $\chi^2=9.12$ ;  $p<.01$ ) and younger ( $t=4.10$ ;  $p<.001$ ). However, when young versus old children and the degree of sickness within cyanotic or acyanotic groups were compared, no significant differences were found. These findings demonstrate that IQ differences between cyanotic and acyanotic children persist when the effect of neurological abnormalities and definitive surgery are removed and remain despite the severity of sickness or child's age at testing.

27

INFANTS WITH BIRTHWEIGHTS LESS THAN 1000 GRAMS: THE FIRST THREE YEARS. J. Bernbaum, M. Hoffman-Williamson, A. Daft. (Spon. by W.W. Fox) Dept. of Peds., Univ. of Pa. Sch. of Med., & Children's Hosp. of Phila., Phila., PA.

As the survival of infants born weighing <1000 grams has become more assured, pediatricians are now faced with questions related to the quality of these infants' lives. Our purpose is to describe a population of 34 very low birthweight infants (BW <1000 gms) transferred to Children's Hosp. of Phila. NICU between 6/80 and 4/83. 9 of these infants weighed <750 gms at birth. 94 infants weighing 1000-1750 grams with similar neonatal conditions served as a comparison group. The survival rate of the 2 groups was 53% and 83%, respectively. The mean BW & GA of the groups was  $821 \pm 168$  gms vs  $1376 \pm 218$  gms and  $28 \pm 2$  wks vs  $31 \pm 2$  wks. Serial assessments of neurologic and intellectual development were performed using a modified Amiel-Tison & Bayley Scale Assessment or Reynell-Zinkin Scales (visually handicapped infants). Developmental status was defined as normal if scores were within 1SD, mild-mod delayed if between -1 & -2 SD and severely delayed if <-2SD. Results are based on the most recent evaluation (mean age 25 months). Comparing <1kg to >1kg infants revealed a 9% vs 1% rate of visual impairment ( $p<.05$ ) and 6% vs 4% as having cerebral palsy (NS). The table reveals no significant differences in developmental status between groups.

	Normal	Mild-Mod Delay	Severe Delay
<1kg	71%	13%	16%
>1kg	72%	20%	6%

Conclusions: Although there is an initially high mortality rate, those <1kg infants who do survive may experience more visual impairment due to RLF but are similar to larger BW infants in developmental and neuromuscular status in their toddler years.

28

GIRLS WITH ATTENTION DEFICIT DISORDER (ADD): A SILENT MINORITY? Cynthia A. Berry, Sally E. Shaywitz and Bennett A. Shaywitz, Yale Sch. Med. Depts Ped & Child Study Ctr.

Girls with attention deficit disorder (ADD) have been poorly characterized, poorly understood and as a result, infrequently identified. Utilizing the Yale Childrens Inventory (YCI) and WISC-R, we examined historical, behavioral and cognitive characteristics of 72 boys and 22 girls with ADD with hyperactivity (ADHD), 30 boys and 10 girls with ADD without hyperactivity (ADDNOH) and a matched control group of 62 boys and 32 girls. Cognitive deficits were more common among ADHD girls than boys as indicated by significantly poorer performance on the YCI Academic ( $p<.01$ ) and Language ( $p<.01$ ) scales, lower Verbal IQ (92 vs 104,  $p<.01$ ) and more frequent referral for speech and language problems ( $p<.05$ ). Girls were more likely to be rejected by other children ( $p<.05$ ) while ADHD boys were more likely to be involved in fights ( $p<.05$ ) and lose control ( $p<.06$ ). In contrast to ADDNOH boys, ADDNOH girls were significantly older at referral, exhibited a negative affect ( $p<.05$ ), were rejected by other children ( $p<.01$ ), easily led ( $p<.05$ ), had few or no friends ( $p<.01$ ) and tended to associate with children who had "problems" ( $p<.01$ ). These data suggest that ADD girls may represent an underidentified and underserved group of children who are at significant risk for long-term academic, social and emotional difficulties.

29

SCHOOL AGE ASSESSMENTS FOLLOWING NEONATAL POLYCYTHEMIA. V. Black, B. W. Camp, C. Swanson, D. String, L. O. Lubchenco, Wayne State U., U. of Colorado Health Sciences Center, Depts. of Pediatrics, Detroit & Denver.

We report a longitudinal study of children who had neonatal hyperviscosity (HV). The original cohort consisted of 111 HV infants prospectively identified at birth and matched with 110 control infants who had low peripheral hematocrits. Criteria for matching included birthweight, gestational age and Apgar scores. Neonatal, intrapartum and two year evaluations were coded. HV subjects were more frequently meconium stained, ( $p<0.005$ ) and had more neonatal hypoglycemia ( $p<0.005$ ) than did controls. Four children had died prior to follow-up. At two years of age HV children had more neurologic diagnoses ( $p<0.005$ ) and motor delays ( $p<0.005$ ). School age assessments for the same groups were made at a mean of 7 years. Evaluations included Slosson IQ, Wide Range Achievement Test (WRAT) for Arithmetic, Reading and Spelling, a scored neurologic examination (PANESS), Beery Visual Motor Test, reflex testing and timed fine motor skills. Forty-seven HV and 39 controls have been evaluated to date. There were no significant differences between the two groups in IQ, Beery, PANESS or WRAT scores. Two children had abnormal reflexes. Beery tests revealed more than a 6 month delay in 18 control (46%) and 29 HV subjects (53%), NS. When 2 and 7 year outcomes were compared only 2 of the 20 subjects who had abnormalities on the earlier follow-up now had no delays. More than one delay was present in 15 of 22 children with abnormal outcome at 2. Ten of 36 who were normal at 2 now had more than one low score ( $p<0.01$ ). CONCLUSIONS: 1. Neurologic handicaps and motor delays at two are associated with lower achievement scores at 7. 2. The children with HV examined in this study did not differ from weight-matched control infants from a similar medically-indigent population. School performance and behavior for these subjects are now being evaluated.

30

HEAD CIRCUMFERENCE AT 8 MONTHS PREDICTS 3 YEAR IQ IN VERY LOW BIRTHWEIGHT (VLBW) INFANTS. N. Breslau, M. Hack, Depts of Psychiatry & Peds, CWRU, Cleve, OH

VLBW (<1.5gm) contributes disproportionately to developmental handicap and growth failure. To evaluate the role of postnatal brain growth on 3 yr IQ, 139 appropriate for gestational age VLBW born in 1977-78 were studied at 40 wks(term), 8,20 and 33 months corrected age. Growth parameters [weight(Wt), height and head circumference(HC)] were measured at each age, neurologic status at 20 mos and Stanford Binet IQ at 33 mos. Four(3%) VLBW had a subnormal HC (<-2SD) at birth, 30(22%) at 40 wks, 19(14%) at 8 mos and 12(9%) persisted at 33 mos of life.

Multiple regression analysis revealed that 8 mos HC is the best growth predictor of 3 yr IQ. Increases in HC above -2SD after 8 mos had no effect on 3 yr IQ. Path Analysis was performed with 4 exogenous variables (race, socioeconomic status (SES), neonatal risk and neurologic impairment), 2 intermediate variables (8 mos Wt, 8 mos HC) and one dependent variable (3 yr IQ). The model explained 43% of the variance in 3 yr IQ. Eight mos Wt did not affect 3 yr IQ, whereas 8 mos HC had a direct effect on 3 yr IQ, controlling for all other variables in the model. Neonatal risk did not directly affect 3 yr IQ but had an indirect effect via HC. Neurologic impairment had direct and indirect (via HC) effects; race and SES had direct effects on IQ but no effects on 8 mos growth (Wt or HC).

Thus normal achievement of brain growth as measured by 8 mos HC is an important predictor of 3 yr IQ among VLBW, even when medical and socio-demographic variables are controlled. Early attention to this important parameter is mandatory.