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This Month's Review

Genetic Disease and Pregnancy

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term, vaginal delivery can be chosen. If, on the other hand, herpes virus is demonstrated in the cervix or vagina in the last 2 weeks of pregnancy, cesarean delivery should be planned. Chronic recurring genital herpes, although producing antibodies in the mother, provides no antibody protection to the newborn. One patient in a neighboring state with chronic recurring herpes with positive culture delivered vaginally. There were no clinical genital lesions present. The neonate died in 2 weeks of systemic herpes infection. If a patient

has active herpes lesions on the vulva, in the vagina, or cervix at or near term, elective cesarean section should be done to prevent contact of the fetus with the lower genital tract of the mother. Fifty per cent of infants delivered from patients with active genital herpes contract systemic herpes infection and die from it (A. J. Nakmias and others, *N. Engl. J. Med.* 289: 781, 1973). If the membranes are ruptured longer than 6 hours, ascending herpes infection negates the benefit of cesarean section.—Ed.)

Neurodevelopmental Screening at Five Years of Children Who Were at Risk Neonatally

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The extent to which neonatal risk factors are the cause of minor neurological disturbances later in life is not fully known. With the neurodevelopmental screening test devised by Bax and Whitmore (1973), it is possible to investigate 5-year-old children for a broad range of neu-

rodevelopmental skills in a relatively short time (about 15 to 20 minutes). The scores for abnormal test responses give a summary of neurodevelopmental status.

This study presents the results of a neurodevelopmental study of five-year-old Finnish children whom the au-

TABLE 1 Scoring of test items in neurodevelopmental screening test

Test items	Points	Test items	Points
Visual acuity	0-16	Articulation of single words	0-4
Squint (absent or present)	0-8	Articulation of sentences	0-4
Gross motor performance		Language skills	
Gait, even pace	0-16	Forms sentences on own initiative	0-16
Hopping on one foot	0-8	Repeats sentences	0-4
Fine motor performance		Speech comprehension	0-8
Patting hands	0-10	Perception	
Pencil grip	0-8	Drawing of a circle, square and triangle	0-10
Coordination and balance		Imitation of gestures, Bergès-Lezine 5-8	0-16
Heel-toe walking	0-8	Reed hearing test	0-8
Finger-nose pointing	0-16	Concentration	
Diadochokinesis	0-16	Attention span	0-4
Tongue tremor	0-8	Tongue impersistence	0-4
Involuntary movements when standing	0-8	Behaviour	
Upper motor neuron disturbances		Overactivity	0-4
Standing, asymmetry	0-6	Slowness	0-4
Facial asymmetry, function	0-4	Shyness	0-4
Reflexes: biceps, brachio-radialis, knee-jerk	0-18	Aggressiveness	0-8
Articulation		Guardedness	0-2
Consonant substitution	0-6		

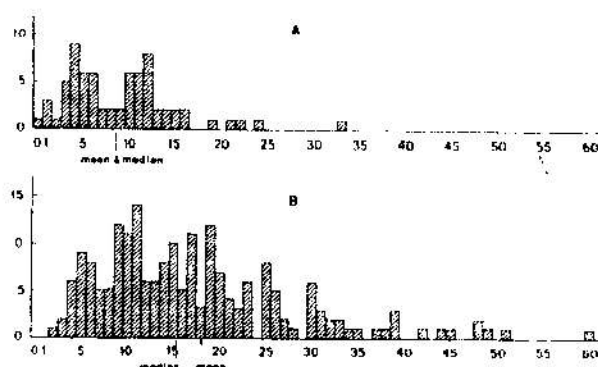


Fig. 1. Histogram of scores in controls (A) and risk children (B) examined in 1979.

thors have been following prospectively from birth and who had had certain high risk factors in the newborn period.

Between 1976 and 1979, 845 children, 4 years and 10 months to 5 years and 3 months of age, were given a neurodevelopmental examination. In the newborn period, they had had one or more of the following risk factors: birth weight of 2000 g or less; Apgar scores of 6 or less at 5 minutes or later; hyperbilirubinemia, at least two values of 340 mmol per liter or less; hypoglycemia, at least two values of 1.67 mmol per liter or less for full term and 1.21 mmol per liter or less for preterm; respi-

ratory difficulties needing continuous positive airway pressure or respirator care; neurological symptoms such as convulsions, marked hypotonia, rigidity, or prolonged feeding difficulties; septic infections; diabetic mothers. The control group consisted of 70 children of corresponding ages who had had no risk factors during pregnancy, delivery, or the neonatal period. Table 1 shows the points given for the various items in the examination.

The mean neurodevelopmental score for the group was 19.7 (17.7 for girls, 21.3 for boys). The mean score for the control group was 9.0 (7.5 for girls, 10.2 for boys). The difference between the scores for girls and boys was statistically significant in the study group ($P < 0.001$, t test, difference between means). In the control group, the difference was not significant.

When the children were divided into groups according to their neonatal risk factors, the highest scores occurred for children who had had neurological symptoms, birth weight of 2000 g or less, or many risk factors simultaneously. In most groups, the scores were higher for boys than for girls.

In all diagnostic groups, the scores were higher when the child had had many risk factors in the newborn period. For instance, if the child had had only neurological symptoms, the mean score was 23.0, but if there had been other risk factors also (e.g., low birth weight or hyperbilirubinemia), the score increased to 30.3.

(This study of neurological and intellectual development at the 5th year of life of children who were ill in the early neonatal period or who weighed less than 2000 grams at birth shows that the first weeks of an infant's life may bear a significant relationship to his performance at age 5. Those experiencing multiple problems as neonates tended to have greater handicaps at 5 years of age than those with a single problem. The Bax and Whitmore scoring system for recording neurointellectual handicaps was used (Lancet 2: 68, 1973). The control group of infants scored 9 as a mean while the infants in the study group scored 19.7 points. The higher the score on the test the greater the neurointellectual handicap of the child. In a study of the data presented, one can gain no specific prognostic information to apply to a week-old newborn concerning the long-term effects of prematurity and its complications. A low Apgar score or a stormy course in the nursery does not always mean life-long morbidity. For instance, 138 infants with Apgar

scores of less than 6 at 5 minutes or later were found to have a mean Bax and Whitmore score of 17.2 but with a standard deviation of plus or minus 11.7. This means that many of the 138 were functioning normally at age 5 years. The most serious complications in the nursery with long-term sequelae were seizures, tremors, hypertonus, and hypotonus. These 55 infants had a mean Bax and Whitmore score of 23. Even then the standard deviation from the mean was plus or minus 16.8, suggesting that some of the group developed normally. The practical point of this study is that newborn infants ill at birth or in the neonatal period should be followed carefully for years by a system like the Bax and Whitmore method so that defects in neurological, intellectual, and coordinative faculties can be detected early. Through early detection it will then be possible to establish treatment and rehabilitative programs which will help the child before entry into school.—Ed.)