37 DETERMINATION OF INTRACRANIAL SPACES IN CHILDREN WITH MACROCEPHALY.

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A new CT-method has been developed to determine the volumes of intracranial spaces. This technique was applied in sixty apparently normal children resulting in graphs showing the relationship between these intracranial volumes and age within the range birth to fifteen years. It was postulated that only those volumes which exceeded the mean for the particular age by more than twice the standard deviation were too large. Based on our acquired data it is possible to differentiate more precisely between megalencephaly (M), external ventricular obstructive hydrocephalus (EVOH) and communicating hydrocephalus (CO). When we compared the results of the new volume calculations with the length measurements 15 of 25 macrocephalic patients could retain the former diagnosis. In four of them, however the application of the new method resulted in a combination (*) of two diagnoses. We concluded that both methods were suitable for diagnosing communicating hydrocephalus. However, when assessing brainsubstance, a large discrepancy was found between length measurements and volume calculations.

TABLE. Comparison length measurements and volumecalculations.

length measurements	volume calculations
M (8)	M (3)*, EVOH (2)*, CO (1)*, N (3)
EVOH (3)	N (1)*, EVOH (1)*, CO (1)*, N (1)
CO (14)	M (3)***, CO (13)***, N (1)

N=normal, *=patient with two diagnoses.

38 STRUCTURAL ABNORMALITIES IN CEREBRAL VISUAL DISTURBANCES.

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Cerebral visual disturbances (c.v.d.). are caused by defective function of retrochiasmatic optic pathways (optic tract, lateral geniculate body, optic radiation, visual cortex). Morphological studies (computertomography-CT, magnetic resonance imaging-MRI) in patients suffering from c.v.d. due to perinatal hypoxic-ischemic brain injury reveal:I. at CT: a) pathological widening of posterior horns of lateral ventricles and irregularity of delineation of posterior horn walls, indicating loss of tissue of optic radiations; b) hypodensities of subcortical white matter of occipital poles, indicating white matter lesions and c) cortical lesions. II. at MRI: a) bilateral ischemic infarction of lateral geniculate bodies and b) demyelination of subcortical white matter of occipital poles.
These findings are compatible with the neuropathological sequelae of hypoxic-ischemic encephalopathy (neuronal necrosis, periventricular leukomalacia).
The consequences of the morphological abnormalities mentioned above to visual function can be demonstrated by functional studies (visual evoked potentials; VEP-mapping; optokinetic nystagmography; single photon emission computed tomography).

39 SIGNIFICANCE OF PRE-, PERI- AND POSTNATAL EVENTS FOR LANGUAGE, COGNITIVE AND NEUROLOGICAL DEVELOPMENT IN TERM AND PRETERM CHILDREN AGED 4-7 YEARS

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The significance of pre-, peri- and postnatal variables for the developmental outcome of 531 preterm and 128 term children at the age of 4-7 years is reported. Intelligence testing was carried out at the ages of 4,5 and 7 years (Snijders-Oomen nonverbal intelligence test, Wechsler preschool and primary scale of intelligence). Language development was assessed by the Illinois test of psycholinguistic abilities at age 5 and neurological development by Touwen's examination at age 4,5 and 6.

Our results demonstrate that language, nonverbal intelligence and neurological development are differently affected by pre-, peri- and postnatal events. Language development was strongly correlated with postnatal variables (e.g. socio-economic status), while perinatal variables (e.g. Prechtl's perinatal optimality score) had only a minor influence and prenatal variables (e.g. minor malformation score) were of no significance. Nonverbal intelligence showed essentially the same correlation matrix as language development, but was more affected by perinatal variables. Neurological development was not related to postnatal variables, but was significantly correlated to pre- and perinatal variables. Prematurity, and in particular intrauterine growth retardation, increased the influence of pre- and perinatal variables on the developmental outcome.

40 ULTRASOUND BRAIN-SCANS IN VERY PRETERM INFANTS AND OUTCOME AT 18 MONTHS AND 4 YEARS OF AGE.

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We have previously reported close associations between the results of ultrasound brain-scans in infants born at less than 33w gestation and their neurodevelopmental status at 18 months of age (Stewart AL et al, Arch Dis Child 1983; 58: 598-604). To find out whether this status had changed at 4 years, neurological examinations and tests of cognitive function were carried out (see table).

18 months Disorders	n	4 years None	Minor	Major	McCarthy cognitive index ± SD
None	85	71	11	3	100 ± 15
Minor	10	4	5	1	92 ± 18
Major	10	0	1	9	82 ± 12

p<0.002,df2,and trend

In general, neurodevelopmental status at 18 months was substantiated at 4 years. Disorders recognised at 4 years in previously unaffected infants included deficits of vision and of cognitive function, behavioural disorders and epilepsy. 4 infants no longer had minor disorders but as a group infants assigned this status at 18 months (usually because of abnormalities of tone and reflexes) scored worse on tests of cognitive function than infants considered to be normal at 18 months.

41 FOLLOW-UP AT FIVE YEARS OF AGE OF JAUNDICED PREMATURE INFANTS.

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Very few studies have reported data on the extent to which increased serum levels of bilirubin might be associated with long-term developmental impairment in premature infants. The aim of this investigation was to perform a follow-up at 5 years of age of 30 low-birth-weight infants (range birth weight: 670-1.890 g; range gestational age: 25-33 wKs) with a clinically significant hyperbilirubinemia (peak total serum bilirubin >11 mg/dl; mean ± S.D.: 15.5 ± 4.2 mg/dl) in the first four days of life. We evaluated the possible relationships between numerous risk factors, related or not to neonatal jaundice and the long-term neuromental outcome. The selected parameters were cross-tabulated and correlated, even combinated with the maximum serum bilirubin level, to the long-term outcome. Twentyfour (80%) of these children had normal neuromotor and mental development. Six subjects were affected by cerebral palsy and one had also a mild intellectual handicap. Only the concurrent presence of one or more diseases (χ^2:6.8125) and the number of exchange transfusions (χ^2:4.2500) significantly correlated to the presence of neurological sequelae at five years of age.
In conclusion we failed to reveal any significant relations between risk factors, such as the maximum serum bilirubin level or the length of time of bilirubin above 11 mg/dl and of phototherapy exposure, and neuromental outcome at 5 years of age in a group of premature infants.

42 Psychomotor development of children with intrauterine growth retardation in relation to neonatal neurological function. An 8-year follow-up.

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The prognostic value of neonatal neurological examinations was studied in 29 growth-retarded newborn infants and 18 normal infants using a modified Prechtl neurological examination and the Brazelton Neonatal Behavioural Assessment Scale (BNBAS) in the neonatal period. Infants with severe growth retardation (birthweight less than - 2 SD from the mean for gestational age) showed lower muscular tone, fewer optimal scores, poorer orientation capacity, inferior motor function, and less phsysiological stability than the controls ($p < 0.05$ for each of them). The growth-retarded infants showed poorer results in psychomotor development as assessed by Griffiths' test at 5, 10, 18 months and 5 years of age, lower intelligence (WISC) and poorer reading ability at 8 years of age. Hypotonus and low optimal scores assessed in the neonatal neurological examination correlated to poor results in the WISC and the reading test. No relationship was found between the results of the BNBAS and intelligence and reading ability at 8 years of age. Thus the BNBAS is of limited value as a prognostic instrument regarding psychomotor development.