

NEUROLOGY

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EFFECTS OF ACUTE HYPERGLYCEMIA ON THE CNS OF NEONATAL PUPPIES. Billy S. Arant, Jr. and W.M. Gooch, III, (Spon. by John F. Griffith), Univ. Tenn. Ctr. Health Sciences, Dept. Peds., Memphis.

Acute osmolar gradients have been demonstrated to produce hemorrhage in the CNS of animals. Similar changes have been observed postmortem in brains of hyperglycemic premature infants. Studies were done in puppies at 1 day (n=5) and at 3-4 weeks of age (n=7) in which hyperglycemia was produced by IV administration of 25%(4ml/kg) or 10%(10ml/kg) glucose solutions. Similar results were noted between groups. Cerebrospinal fluid (CSF) osmolality (osm), pH and pressure were compared to simultaneous arterial blood samples. Brain water, Na and K were compared to normoglycemic controls. Plasma osm increased by 18.2±4.8mosm/l at 10 minutes (p<0.01). CSF pH decreased from control values of 7.37±0.06 to 7.28±0.07 at 30 minutes. CSF pressure increased in all animals within 30 minutes, and decreased thereafter. CSF became bloody in each puppy usually within 1 hour of glucose administration. Gross and histologic changes noted in the brains included intramedullary and intracerebellar vascular congestion and hemorrhage. Brain water was decreased by 3%, Na was increased by 25% and K was increased by 42% in the newborn puppies; changes in older puppies were less pronounced. It is concluded that current regimens used to treat hypoglycemia in neonates produce abrupt osmolar gradients which can result in intracranial bleeding. The lesser water and electrolyte changes noted in brains of older puppies suggest that the CNS of infants at birth may be more vulnerable to abrupt changes in extracellular fluid osm than older infants.

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RELATIONSHIP OF BLOOD LACTIC ACID LEVELS WITH THE SEVERITY AND PROGRESSION OF REYE SYNDROME (RS).

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Blood lactic acid levels were examined in 17 patients in the course of comprehensive metabolic studies of RS, and were found to have a striking correlation with severity (r=0.91). Severity was assessed on clinical grounds alone without reference to lactate measurements. Lactic acid levels were higher in severe than in moderate cases, at least at admission (p=.001) and at 24 hours (p=.04), and higher in moderate than mild cases at admission (p=.03). Mean lactate levels of each RS groups were elevated for at least 24 hours, and in severe cases still at 48 hours (p=.0001) when compared with recovery values. Two patients who died had the highest peak values (118 and 144 mg%) and their levels were still above 80 mg% at 24 hours; in one the lactate levels appropriately belied apparent brief clinical improvement. The lactate levels upon recovery were similar for the three groups (8.0 mg%; SD, 1.7).

Severity	Blood lactic acid, mg% ± S.E.M. (# patients)		
	Admission	24 hours	48 hours
Mild (6)	17.1±3.5 (6)	12.0±1.0 (2)	7.9 (1)
Moderate (5)	44.9±12.0 (5)	17.3±2.1 (5)	14.7±0.7 (2)
Severe (6)	105.1±6.4 (6)	62.3±18.6 (6)	29.5±7.4 (5)

These preliminary data suggest that the blood lactic acid level is a good index of RS severity and progression.

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VENTRICULITIS IN GROUP B STREPTOCOCCAL (GBS) MENINGITIS James P. Baker, Lee B. Chalhub, Penelope G. Shackelford, Washington Univ. Medical School, St. Louis Children's Hospital, Dept. of Pediatrics, St. Louis and Univ. of Arkansas, Arkansas Children's Hospital, Dept. of Pediatrics and Neurology, Little Rock.

Ventriculitis is a well known feature of gram negative meningitis but has not been documented as a serious complication of gram positive central nervous system infections. This report describes five patients with GBS meningitis and ventriculitis. In each case ventriculitis was shown either by ventricular cerebrospinal fluid (CSF) pleocytosis, positive GBS counter immunoelectrophoresis, or positive culture for GBS. The lumbar CSF was sterile with no pleocytosis in two of the five patients despite concomitant abnormal ventricular fluid. Computerized axial tomography was of great value diagnostically and in management of increasing head size in these patients. Four of the five infants presented after one month of age and all had marked hydrocephalus. Three of the five infants were initially thought to have uncomplicated hydrocephalus and only after diagnostic ventricular puncture was ventriculitis and/or meningitis suspected. All five patients had significant intellectual and motor neurological sequelae subsequent to their infection. Ventriculitis appears to be a common and significant complication of GBS meningitis. Ventriculitis caused by GBS may resemble uncomplicated hydrocephalus in its presentation, emphasizing the need to examine all CSF carefully before shunting procedures are pursued.

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SACCADIC EYE MOVEMENTS DURING VISUAL PURSUIT AND FIXATION IN HYPERACTIVE AND NORMAL BOYS

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20 normal and 14 hyperactive (HA) boys were tested on a visual pursuit task. They tracked a 1° dot that moved back and forth in the horizontal plane over 30° at a constant velocity. The number and mean amplitude of saccades made during pursuit were determined for 2 trials given 30 min. apart. Irregular pursuit occurred more frequently in HA's than in normals. HA's made more saccades, their average saccades were larger, and they looked away from the pursuit path more frequently than normals. Both HA's and normals made fewer saccades when they were tested repeatedly, but the differences between the groups were maintained. The mean size of saccades did not change across repeated trials. Significant differences between normal and HA's in number and amplitude of saccades during visual pursuit were maintained over a 3 year period. The children were also tested for ability to maintain fixation for periods of one minute. HA's broke fixation before normals, with younger HA's having more difficulty holding fixation than older HA's. Faulty attention to stimuli as well as hypermobility could have contributed to the differences between normals and HA's on both fixation and visual pursuit. The data show that examination of the oculomotor system can be useful tool for study of hyperactivity. It may also provide an objective technique for differentiating HA's and normals.

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FRONTAL VENTRICULAR SIZE OF THE BRAIN ON COMPUTERIZED AXIAL TOMOGRAPHY IN CHILDREN. Allen Bedrick & Robert Vannucci (Spon. by N. M. Nelson) Department of

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A total of 225 computed tomographic scans of children aged newborn to 15 years were reviewed. Of these, 177 were technically adequate to evaluate ventricular size as determined by the width of the frontal horns along a line drawn through the heads of the caudate nuclei (V) relative to the width of the cerebral hemispheres at the same level (H).

V/H (biventricular index) ranged from 0.063 to 0.99. Two populations were identified. One followed a normal Gaussian distribution with a mean of 0.114 ± 0.03 (S.D.); this population (90 cases) was considered radiographically normal. The other population (76 cases) was uniformly distributed from 0.190 to 0.99; in all instances these represented pathologically enlarged ventricles but with normal V/H. These included 3 patients with expanded subarachnoid spaces secondary to cerebral atrophy, communicating hydrocephalus, or subdural fluid collections; 5 patients with treated hydrocephalus; 2 patients with cortical hemispheric asymmetry; and 1 choreo-athetotic patient with enlarged frontal horns and basal ganglia atrophy. Age-specific categorization (0-1; 1-3; 3-5; 5-10; 10-15 years) revealed no significant differences in V/H among all age groups.

Thus, the biventricular index is a sensitive indicator of ventricular size and may aid in identification of patients with cerebral pathology which involves the ventricular system.

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DOUBLEBLIND PLACEBO CONTROLLED STUDY OF BEHAVIORAL AND COGNITIVE EFFECTS OF DAILY PHENOBARBITAL IN TODDLERS. Carol S. Camfield, Sheila Chaplin, Anna

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A randomized prospective doubleblind placebo controlled study of the efficacy of single daily dose of Phenobarbital (Ø) to prevent recurrent febrile seizures permitted objective assessment of behavioral and cognitive effects of Ø in toddlers. There were no significant differences in global I.Q. (Binet or Bayley Scales) between placebo (n=14) and Ø (n=24) groups after 8 to 12 mos. of medication. However, blood plasma level of Ø correlated negatively with Binet memory test scores, r = -.52, p < .01. Hyperactivity was not seen. The only behavioral changes noted were increased fussiness and sleep disturbance. 4/60 children were withdrawn from the study because of these unacceptable changes (3 Ø, 1 placebo). 4/26 children on Ø had consistent dose-related behavioral changes at 5mg/kg/d which disappeared at 2-3mg/kg/d with most serum levels remaining > 10mg%. Transient behavioral changes (< 4 wk.) were seen in 7/30 on placebo and 5/26 on Ø. After 12 mos. in study, most parents could not distinguish between drug and placebo. Only the parents of the 4 children with dose-related effects guessed Ø correctly. In conclusion, the behavioral effects of Ø are varied, including unacceptable, transient, and dose related. Effects of Ø on memory are of uncertain significance as the global I.Q. is unchanged.