1681 BONE DISEASE INDUCED BY ANTICONVULSANTS AND TREATMENT WITH 1,25-DIHYDROXYVITAMIN-D. PA Hunt, ML Wu-Chan, NJ Handel, CT Chang, M Gomez, JCM Chan, Southside VA Training Center and Medical College of Virginia, Richmond, VA.

In order to evaluate the bone disease induced by the anticonvulsants, dilantin and phenobarbitol, we reviewed the medical records of all institutionalized oligophrenic children. Out of the 339 who required anticonvulsants, 56 were found to have serum alkaline phosphatase elevated above two standard deviations of normal. Radiological evidence of bone disease in those with elevated alkaline phosphatase was common (58 percent) and manifested primarily as osteoporosis.

Anticonvulsants impair calcium homeostasis directly, but also via stimulation of hepatic microsomal enzymes to hydroxylase vitamin D and metabolites. To achieve rapid healing of the bone disease, we elected to use 1,25-dihydroxyvitamin-D at 0.25-1.00 mcg per day, with the following results:

Follow-up in months	1-6	7-12	13-34
	n=52	n=43	n=36
Serum alkaline phosphatase	↓22.9%	↓24.1%	↓34.3%
Hypercalcemia (>11 mg/dl)	6/312	6/258	1/54
	patient-mo.	patient-mo.	patient-mo.

No hyperphosphatemia (>6 mg/dl) was encountered.

Our data suggest that the dystrophic process is reversed in 27.1 (SEM 3.6)% of cases as judged by decreases in serum alkaline phosphatase and less so as determined by radiological examinations. The complication of hypercalcemia was one episode per 48 patient-months of treatment.

1682 COGNITIVE DEFICITS INDPENDENT OF BEHAVIORAL DIFFICULTIES IN CHILDREN WITH EPILEPSY AND ATTENTION DEFICIT DISORDER (ADD). Robert O. Kinney, Bennett A. Shaywitz, and Sally E. Shaywitz. Yale Sch.Med. Depts. Ped. & Child Stdy Ctr.

Cognitive and behavioral disturbances in children with epilepsy present a significant clinical problem in pediatric neurology. We examined sixteen children (10 boys, 6 girls, 10.2 years old) with epilepsy and ADD (E-ADD) and compared them to 84 non-epileptic children (69 boys, 15 girls, 10.0 years old) with ADD. Such a strategy is designed to circumvent the issue of attentional problems by including ADD as an independent variable. Groups were comparable on parent and teacher completed behavioral scales reflecting inattention, hyperactivity, poor impulse control, emotional lability, aggressive and socialized conduct disorders; similarly groups did not differ on language attainment or dexterity. Significant differences emerged on individualized intelligence (WISC-R) and achievement tests (Woodcock-Johnson). Thus, E-ADD compared to non-epileptic ADD children exhibited lower scores on FSIQ (92.4 vs 102), PIQ (88.2 vs 102), Picture Completion (7.92 vs 11.0), Picture Arrangement (9.00 vs 11.3), Block Design (7.54 vs 10.3) and Knowledge (87.1 vs 97.9). Such findings suggest that the cognitive difficulties in children with epilepsy occur independent of the attentional and behavioral problems. Furthermore, they emphasize the additive effect of epilepsy and ADD on reductions in IQ.

†1683 SERUM CARNITINE IN REYE'S SYNDROME(RS): SEQUENTIAL ANALYSES DURING ACUTE AND RECOVERY PHASES AND CORRELATION WITH OUTCOME. Lester L. Lansky, George Hug, Paul S. Levy, Evelyn A. Landrigan, and Mary H. Ryan. Dept. of Neurol. and Pediat., and Epi.-Bio., Univ. of Ill. Coll. of Med. Chgo., IL and Dept. of Pediat.,Child. Hosp. Med. Ctr., Cinc.,OH.

Previous reports have documented normal values for serum carnitine in children with RS. We have performed sequential analyses of serum carnitine in 14 children with RS. Eight were in stage III, five in stage IV, and one in stage II coma, (NIH Cons. Dev. Conf.,1981). The series was subdivided into three groups. A)survival without neurologic sequelae; B)survival with sequelae; C)died. Results: compared to controls, Mean±S.E. Comparison of inter-group means: A vs. B, p<.05; A vs. C,p<.05; B vs. C, NS.

		Serum Carnitine (nmol/ml)			
Group:	n	Total carnitine	Short Chain acylcarnitine	Peak NH_3 (μgm./dl.)	p
Control	(45)	51.5± 2.62	15.4± 1.36	50-100(range)	
A	(9)	56.1± 11.45	20.7± 3.10	421.1± 95.96	NS
B	(3)	113.8± 40.4	61.7± 34.35	1143.3±609.1	<.05
C	(2)	128.5±107.9	121.3±115.3	882.2±388.6	<.05

Elevation of serum carnitine persisted for 44-48 hours in three patients with stage III or IV RS. Sequential monitoring of serum values may be helpful in predicting patient outcome. The wide variation in serum carnitine levels in children with RS may reflect varying degrees of severity of hepatocyte injury.

=1684 CEREBRAL BLOOD FLOW (CBF) CHANGES WITH LACTIC ACID (LA) INFUSIONS ARE INDEPENDENT OF pH. Abbot Laptook, Janet Peterson and A. Michael Porter (spon. by C.R. Rosenfeld). Southwestern Med. Sch., Dept. of Ped., Dallas, TX.

LA infusions have been used to examine the effects of metabolic acidemia on CBF, but LA may alter other variables important for CBF regulation. To compare effects of LA with differing pH but similar changes in blood gases, osmolality and infused volume, 14 acutely instrumented, spontaneously breathing piglets were studied by infusing LA with either 4M NaCl (LA1, n=7) or buffered with 5.5M NaOH (LA2,n=7). Blood flow (microspheres), pH, blood gases, and plasma osmolality and LA concentration were measured after a 30 min control (C),a 30 min LA infusion (I), and 15 (I+15min) and 90min (I+90min) after infusion completion. At C, pH was 7.49±.01 ($\bar{X}$±SE) for LA1 and 7.48±.01 for LA2. Different values of pH* occurred for LA1 and LA2 at I, I+15 and I+90min; 7.09±.03, 7.35±.02, 7.46±.02 versus 7.58±.03, 7.61±.01, 7.57±.03, respectively. $PaCO_2$ was similar between LA1 and LA2 during the study. In both LA1 and LA2 osmolality rose 15% during I and persisted throughout the study. Hyperlactatemia occurred with LA1 and LA2 and was greatest during I, and gradually decreased to baseline at I±90min. For LA1 piglets, CBF (ml/min·100g) rose from 136±15 to 202±26* with I and remained elevated at 209±25 and 217±28 at I+15 and I+90 min. Similarly for LA2 piglets, CBF rose from 129±25 to 206±31* with I and was 173±17 and 169±21 at I+15 and I+90min. Therefore, lactic acid infusions increase CBF, but metabolic acidemia is not responsible for the observed changes. (*p<.01)

1685 BRAIN OXIDATIVE METABOLISM IN A SEVERELY ASPHYXIATED NEWBORN. Barry Lawson, Ronnie Guillet, Donald P. Younkin, Eileen Donlon, Britton Chance, and Maria Delivoria-Papadopoulos. Univ. of PA. Sch. of Med., Depts. of Pediatrics, Physiology, Biochemistry and Biophysics, Phila., PA.

Sequential in-vivo measurements of phosphorus-containing compounds by 31-P nuclear magnetic resonance (NMR) were obtained in a 2360 g, 36 wk gestation, meconium-stained infant born by vacuum extraction following 2 hrs of maternal fever and fetal tachycardia. Apgars were 1 at 1 min and 3 at 5 min. The infant was intubated, suctioned, ventilated, and given bicarbonate. Initial arterial blood gas was pH=7.16, PO_2=43.6, PCO_2=30, HCO_3=10. Seizures noted at < 24 hrs were treated with phenobarbital. Cultures and cranial ultrasound were normal. EEG showed depressed, disorganized electrical activity but no epileptiform focus. The neurologic exam was remarkable for hypertonia, irritability, decreased activity, and posturing. NMR spectra obtained on 7 occasions between days 3-24 showed a sustained phosphocreatine/inorganic phosphate (PCr/Pi) < 1.0, due primarily to an abnormally high Pi, was markedly lower than PCr/Pi in normal infants (mean 1.07, range .76 - 1.49). PCr/Pi, a measure of phosphoenergetic reserve, was consistently 0.5 in the left hemisphere and increased from 0.5 to 0.9 over the 21 days of observation in the right. At day 23, the left hemisphere showed ½ the ATP of the right. These levels cause activation of glycolysis, acidosis, and further deterioration of the energy state and consequent cell disintegration. These data suggest there was an increased breakdown of ATP and PCr to inorganic phosphate, as previously seen in areas of prenecrotic brain tissue in experimental animal models, and are much lower than those found in any surviving normal infants or animal models.

1686 SPINAL CORD COMPRESSION (SCC) IN CHILDREN WITH SYSTEMIC CANCER. D.W. Lewis, R.J. Packer, I.W. Rak, B. Raney, and J. Belasco. Divisions of Neurology, Pediatrics, and Oncology, Children's Hospital of Phila., Phila., PA

SCC is a neurologic emergency requiring immediate diagnosis and intervention. Over a 40-month period, 21 of 643 newly-diagnosed patients under age 18 with systemic cancer developed SCC; occurring in 12 of 102 (11%) with sarcoma; 5 of 82 (6%) with neuroblastoma and 3 of 94 (3%) with lymphoma. SCC occurred at presentation of illness in 6 children and symptoms were present for a median of 2 weeks (range 5 days to 4 weeks) before diagnosis. In the remaining 14 patients, SCC occurred a median of 13 months after initial diagnosis. Symptoms of SCC included back pain in 17 (80%), weakness in 14 (67%), sphincter dysfunction in 12 (57%) and sensory abnormalities in 3 (14%). Because of delayed diagnosis, 9 children were paraplegic and 10 had complete loss of sphincter control at diagnosis. Plain radiographs of the spine were abnormal in 7 of 20 patients with SCC. During this time period, 4 other children with cancer had cord dysfunction symptoms (2 transverse myelographies, 1 stroke, 1 plexopathy); myelography differentiating these from SCC. Treatment included high-dose corticosteroids followed by surgery and/or radiotherapy. Post-treatment, 8 of 14 nonambulatory patients became ambulatory and 5 of 10 incontinent patients regained sphincter control. We conclude that SCC is relatively frequent in children with cancer (especially with solid tumors) and is often misdiagnosed early in the illness. Any child with cancer suffering back pain is suspect for SCC and plain x-rays are inadequate to rule out SCC. Recommendations concerning evaluation and management of children with possible SCC will be presented.