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BONE MINERAL CONTENT AND LINEAR GROWTH IN INFANTS TREATED WITH DEXAMETHASONE FOR BRONCHOPULMONARY DYSPLASIA

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Introduction Prolonged therapeutic use of adrenal glucocorticoids reduces bone mineral content (BMC) and retards linear growth in children. This study aimed to assess these effects in infants with bronchopulmonary dysplasia (BPD) treated with dexamethasone.
Methods 15 treated infants (group A, median [range] gestation 27 [26-29] weeks, were compared with 15 other infants with BPD (group B, median [range] gestation 27.5[25-31]). BMC of the radius was measured using dual energy Xray absorptiometry, and forearm length (FAL) using a vernier caliper. Treated infants were measured weekly when possible for the 4 weeks before, during and 4 weeks after treatment and controls at equivalent postnatal age. Median (range) age of starting dexamethasone was 30 (15-55) days, stopping 65 (42-88) days.
Results Pretreatment median (range) values were: for BMC (mg/mm) A: 1.51(0.98-3.18), B: 1.65(1.27-1.88) and for FAL (mm) A: 50.9(40.6-68.3), B: 49.6(42.0-67.1). Subsequent values were expressed as a change from immediate pretreatment values (dBMC and dFAL). Groups were compared using the Mann Whitney U test. BMC and FAL increased overall during the treatment period. There was no difference in dBMC between groups at any stage. There was an increasing difference in dFAL between groups. Median values (range) immediately following treatment (dBMC in mg/mm and dFAL in mm) were:

	Group A	Group B	P (difference)
dBMC	+1.22 (1.02-1.69)	+1.26 (1.12-1.44)	.696
dFAL	+7.54 (0.6-17.6)	+11.6 (5.4-24.5)	.019

Conclusion Dexamethasone has no measurable immediate effect on bone mineral accretion in infants with BPD but there is a trend to slowing of linear forearm growth.

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Arterial & venous cerebral blood flow velocity (CBFV) in newborn infants during continuous positive airway pressure breathing (CPAP) & following hypoxic-ischemic encephalopathy(HIE)

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Mean arterial and venous CBFV (cm/sec) were measured simultaneously by transcranial Doppler Velocimetry of the Anterior Cerebral Artery and Internal Cerebral Vein in 3 groups of newborn infants of various Gestational Ages(GA,w), Birth Weights(BW,g) and Post-Natal Ages(PNA,d): Group 1, 53 normal infants, GA 26-41w, BW 950-3890 g, PNA 1-60d; Group 2, 27 infants with RDS treated with different levels of CPAP, GA 26-34w, BW 830-3130g, PNA 1-30d; Group 3, 18 infants with HIE, GA 32-42w, BW 1180-3750g, PNA 1-3d, diagnosis of HIE was based on the following criteria: need for vigorous resuscitation at birth; severe acidosis (BD 12 and pH 7.20) within one hour of age; clinical evidence of Grade 2 or 3 HIE by Sarnat classification (*) In infants of Group 1, mean arterial and venous CBFV were GA and PNA dependent, ie they increased significantly ($p<0.05$) with both GA and PNA. In infants of Group 2, mean venous CBFV (but not arterial CBFV) decreased significantly ($p<0.01$) with increasing CPAP by approximately 1 cm/sec per cm H_2O CPAP increment. In infants of Group 3, mean arterial and venous CBFV were considered "abnormal" when higher or lower than 2 SD from the average normal values obtained in infants of Group 1. By these criteria, 6 infants with both "abnormal" arterial and venous CBFV all had a severe outcome, i.e. 4 died and 2 had severe neurological abnormalities at follow-up; none of the 12 infants with both "normal" (7) or just one "abnormal" (5) CBFV either died or became severely handicapped. The present study provides normal reference values of arterial and venous CBFV in the newborn; it suggests that monitoring of mean venous CBFV in infants with RDS could provide useful information on the possible interference of excessive CPAP on the cerebral circulation; finally, it suggests that the simultaneous evaluation of both arterial and venous CBFV is a better indicator of severe outcome in infants with HIE than the measurement of arterial CBFV alone (*) Sarnat H B and Sarnat N S Arch Neurol 1976;33:696-705

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RETINAL AND CHOROIDAL BLOOD FLOW DURING HYPOXEMIA AND REOXYGENATION WITH 21% AND 100% O_2 IN THE NEWBORN PIGLET.

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The effects of hypoxemia (HO, 8% O_2) followed by resuscitation with 21% or 100% O_2 on retinal (RBF) and choroidal blood flow (ChBF) were studied in 19 newborn piglets with the microsphere method. When base excess reached - 20 mmol/L or systolic blood pressure fell below 30 mmHg, the piglets were randomly resuscitated with either 21% O_2 (n=10) or 100% O_2 (n=9) for 25 min followed by 21% O_2 in both groups. RBF and ChBF were measured at baseline (Bl), at the end of HO, and 5 min, 20 min and 60 min of reoxygenation. Flow values were (ml/min/100g, mean±SD):

		Bl	HO	5 min	20 min	60 min
RBF	21%	38±11	34±23	150±73*	89±28*	56±23
	100%	44±18	43±26	189±83*	81±40*	56±19
ChBF	21%	2272±1000	1046±723*	3584±2272#	2304±1059	1724±970*
	100%	1914±823	1110±698*	3287±1571*	2107±966	1622±743

* p< 0.05 from Bl, # p= 0.06 from Bl.

HO significantly decreased ChDF, but not RBF. RBF significantly increased during 5 and 20 min of reoxygenation, while in ChBF this increase was only seen at 5 min of reoxgenation.

Conclusion: We could not demonstrate any significant differences in RBF or ChBF between two groups of hypoxemic newborn piglets reoxygenated with 21% or 100% O_2.

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BRAIN LACTATE INCREASES WITH IMMATURITY OF HEALTHY NEONATES

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Glucose is the predominant cerebral fuel energy under physiologic conditions although other substrates may support the cerebral metabolism. The present study was undertaken to determine 1) whether lactate is present in the immature human brain, and if so 2) whether concentrations of lactate differ between infants who are light-for-gestational-age (LGA) or appropriate-for-gestational-age (AGA). Twenty-one stable and healthy infants with normal brains were investigated. All received milk enterally, and they had normal blood glucose levels. The gestational age averaged 36 completed weeks (range 28-41), and mean birth weight was 2350 g (range 855-4100). Proton NMR spectra from corpus striatum were obtained while the infants were sleeping quietly. Lactate was present in 8 preterm LGA and 3 preterm AGA infants, and the concentration was inversely related to the post-menstrual age (P=0.0043). Thus, lactate could not be demonstrated in infants with a post-menstrual age above 40 weeks. The lactate concentration was identical among LGA and AGA infants (P=0.15). Apparently, the immature brain consumes lactate, and the preferential substrate utilisation changes gradually with increasing age.

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Morphine and Stress Hormone Levels in Ventilated Newborns

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In a previously reported uncontrolled study we have shown that morphine reduces stress hormone levels in ventilated preterm babies. We now report a randomised double blind placebo controlled trial.

41 preterm babies who qualified for Curosurf (A/a ratio < 0.22) were enrolled in the study. 20 received 5% dextrose infusion (group P) whilst 21 received morphine (100 ugs/kg/hr x 2 hrs then 25 ugs/kg/hr infusion) in 5% dextrose (group M). Plasma catecholamine levels were measured on entry and after 24 hours. Blood pressure was documented on entry and after 6 hours. The two groups showed no differences with respect to method of delivery, Apgar scores, birth weight, gestation and catecholamine levels on enrolment. Group M showed a small but significant (P=0.01) reduction in adrenaline levels ([median (range) change -0.4 nmols/L (-34.7 to +0.06)], compared with group P [median (range) change +0.2 (-13.5 to +19.0)]. There were no significant changes in noradrenaline levels. Group M treated babies showed a slight reduction (median: -4 mmHg) in blood pressure. There were no differences between the groups for the incidence of intraventricular haemorrhage, patent ductus arteriosus, pneumothorax, the number of ventilator days and death.

We conclude that morphine reduces adrenaline levels in ventilated preterm babies and appears to have no significant adverse effects.

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SCHOOLPERFORMANCE IN VERY PRETERM CHILDREN
A report from the Collaborative Project On Preterm and Small for gestational age (POPS) infants in the Netherlands

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A virtually complete birthcohort of infants <32 weeks and/or <1500 g (n=1338) was followed-up until 9 years of age. In 88% of survivors (n=813) data on schoolperformance were available.

	total	mainstream	mainstream remedial teaching	grade retention	special education
all	813	324 (40)	120 (15)	213 (26)	155 (19)
non-handicapped	708	319 (61)	115 (16)	192 (27)	71 (10)

Of the children in mainstream education 38% had remedial teaching (27% at appropriate level, 60% below level). The need for remedial teaching was not different for children who were not handicapped at 5 years of age. Logistic regression for non-handicapped children with any schoolfailure as dependent factor showed significantly higher OR's for SGA (1.8) boy's (1.9) low or middle SES (5.4 and 2.1) mild or severe developmental delay (5 years) (1.7 and 13.0) and low schoolresults at 5 years (3.6). When special education was the dependent factor higher OR's were found for boy's (2.0) twins (1.9) low and middle SES (7.1 and 3.0) severe mental delay (10.1) mild speech delay (3.3) high inattention and hyperactivityscore (2.9) and low schoolresults at 5 years (2.8). Perinatal factors (gestational age, birthweight and neonatal illness) were not significant.