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IS LOW CEREBRAL BLOOD FLOW (CBF) IN PREMATURE INFANTS COMPATIBLE WITH NORMAL NEURODEVELOPMENTAL OUTCOME?

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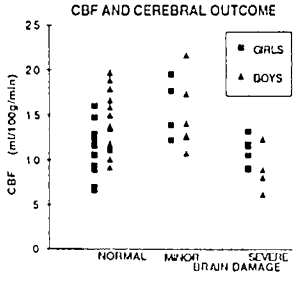
During an ongoing study on CBF in the first 72 hours of life we tried to see if a critical low CBF value is associated with brain damage assessed either by autopsy or by Bayley's test at 18 months. CBF was measured in fifty-six premature infants (GA: 26-33 weeks) with the i.v.Xe-133 method. Infants with minor brain damage (Bayley MDI 75-90) showed higher CBF values (mean CBF 15.0; SD 3.3) than infants with severe brain damage (Bayley MDI <75or cystic leucomalacia in autopsy n=5) (mean CBF 9.9; SD 2.2; t test p<0.001). Children with a normal outcome at 18 months (Bayley MDI >90) showed CBF values ranging from 6,6 to 19,7 ml/100g/min. (mean CBF: 12.8 SD 3.4) Girls with normal outcome tend to have lower CBF values than boys (t test p=0.046).



Conclusion: Infants with CBF as low as 6.6 ml/100g/min can have a normal Bayley's test at 18 months.

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EFFECT OF HYPOXIC-ISCHEMIC (H-I) BRAIN DAMAGE ON GLUTAMATE RELEASE AND D1 MARKERS IN THE NEWBORN PIGLET

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Glutamate is an important excitatory aminoacid neurotransmitter that mediates neuronal death. Dopamine has also ben implicated as an endogenous substance in the pathogenesis of H-I brain damage. We studied the effects of perinatal H-I insult 1-24 hours after recirculation on glutamate release and dopamine (D1) binding sites in piglet brain (4-7d) (HPLC and (^{3}H)SCH23390 respectively). Transient cerebral ischemia was induced by bilateral carotid occlusion, hypoxia by 8 % oxygen, 92 % nitrogen for 10 min. 6 piglets served as normal-control (N-C) 6 as sham-operated (S-O) ; and 6 as (H-I). Experimental injury result in a significant increase in glutamic acid and glutamine in two vulnerable areas : striatum (stri) and hyppocampus (hip). There was no significant alteration in D1 receptors.

		N-C	S-O	H-I	
Glutamine (fmol/mg)	stri	4 (0.2)	4.3 (0.3)	5.5 (0.1)	**
	hip	2.5 (0.2)	2.7 (0.2)	3.8 (0.2)	*
(^{3}H)SCH23390 (NCi/mg)	stri	22.8 (4.5)	24.6 (2.7)	23.5 (3.4)	NS
	hip	5.6 (2.3)	8.8 (3)	9.9 (3.9)	

Mean (SD) ; ** p < 0.001 VS N-C, S-O ; * p < 0.05

The results suggest that transient cerebral H-I can cause an important release of glutamat, at an early stage of recirculation, and that Dopamine D1 transmission is not responsible for the evolution of H-I brain damage. The reduction in D1 receptors reproted 7-21d after H-I insult are rather a reflection of cell loss induced by the injury.

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CEREBRAL OXYGENATION AND CEREBRAL BLOOD VOLUME DURING AMINOPHYLLINE TREATMENT IN PREMATURE NEWBORNS: QUANTITATIVE MEASUREMENT BY NEAR INFRARED SPECTROSCOPY.

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Aminophylline is commonly used for treatment of apnea and to permit weaning from ventilation in preterm newborns. Previous reports have indicated that it may cause cerebral vasoconstriction and reduction in cerebral blood flow (CBF) and cerebral blood volume (CBV). It is not known whether such reduction in CBF/CBV results in significant reduction in cerebral oxygenation. The purpose of this study was to evaluate the effect of aminophylline therapy on CBV and cerebral oxygenation using near infrared spectroscopy (NIRS Hamamatsu 500).

Aminophylline (6.5 mg/kg) was given intravenously prior to weaning from the ventilator to 19 stable preterm infants (mean g.a.: 32 wks) with hyaline membrane disease. CBV, Hb diff (HbO_2-Hb), deoxyhemoglobin (Hb) and cytochrome oxidase (CtO_2) were measured using NIRS before and after aminophylline infusion. Continuous recordings of mean arterial pressure (MAP), $tcpCO_2$ and $tcpO_2$ were correlated with NIRS data.

Time	HbD*(umol*cm)(Median)	CtO_2(umol*cm)(Median)	CBV(ml/100g)(mean)
Before Aminophylline	-133.7	-0.9	5.1
During Aminophylline	-120.7	1.2	-
After Aminophylline	- 12.9	3.3	2.9
P (Wilcoxon signed rank test)	NS	NS	< 0.05

There was a marked fall in CBV after aminophylline infusion in 15 newborns with no significant reduction in $tcpCO_2$. Despite reduction in CBV, cerebral oxygenation (HbD,CtO_2) improved in stable preterm newborns.

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URINARY INDICES OF RENAL DYSFUNCTION IN NEONATAL ASPHYXIA

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N-acetyl-glucosaminidase (NAG) & Beta-2-microglobulin (B2M) were measured in urine of term newborns to assess effects of asphyxia on renal tubular function. NAG is an enzyme found in proximal tubular cells. Its urinary concentration reflects tubule cell breakdown. B2M is produced by the liver, filtered at the glomerulus & reabsorbed by proximal tubular cells. Urine B2M levels reflect tubular dysfunction. 32 neonates made up the study group with an equal number of controls. Study babies fulfilled a diagnosis of Posthypoxic Encephalopathy according to the system of Sarnat. NAG & B2M were assayed at 24-48 hours of life & at 4-6 days. There was significant difference (P<0.05) between control & study subjects for both analytes in both measurement periods.

	NAG 24-48 hours	NAG 4-6 days
Study Group Mean	13.577 IU/mM Cr*	12.571 IU/mM Cr
Control Mean	2.076 IU/mM Cr	2.671 IU/mM Cr
	B2M 24-48 hours	B2M 4-6 days
Study Group Mean	8.124 mg/L+	11.698 mg/L
Control Mean	1.630 mg/L	1.818 mg/L

* International units / millimole creatinine, + Milligrams per Litre

Both NAG & B2M appear to be sensitive indices of renal tubular dysfunction in asphyxiated neonates. NAG levels were high immediately & fell slightly toward the end of the first week of life, whereas B2M though significantly elevated at 24-48 hours, continued to rise. Control (Normal) values are consistent between days 1 & 6. Babies will be further assessed at 4-6 weeks.

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EEG RESPONSE TO ANTICONVULSANT IN NEONATAL CLINICAL SEIZURES.

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The purpose of this study is to better define seizure activity and to make anticonvulsant therapy optimal. During a period of 4.5 years, 57 infants with clinical evident seizures underwent continuous EEG monitoring (C.F.M., Device Instrument, Ltd, London). C.F.M. tracing showed seizure activity in 31 (54.4 %), and none in 26 (45.6 %). 20 of the 31 subjects with C.F.M. documented activity and 20 of those 26 without, had already begun anti-convulsant therapy at the beginning of C.F.M. monitoring. The efficacy of the anti-convulsant drugs was evaluated in 31 infants having both clinical and C.F.M. documented seizure activity. 20 infants began C.F.M. monitoring after, and 11 before beginning anti-convulsant therapy. Phenobarbital, the drug of first choise, was efficacious in 4 out of the 27 cases, but useless in 16 of the 27. The best responce was obteined with lidocaine, efficacious in 14 out of 20 patients treated. In conclusion, 45.6 % of the clinical seizures have no C.F.M. equivalent. In the large part of the cases, commonly used anti-convulsant drugs did not eliminate the seizure activity found on C.F.M. The persistent electrical seizures are considered to be damaging. Continuous neurophysiological monitoring is a very usefull means for evaluating the efficacy of anticonvulsant therapy.

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BLOOD FLOW VELOCITY (BFV) IN THE STRIATE ARTERIES OF BASAL GANGLIA (SABG) WITH HYPERECHOGENICITIES IN THEIR WALL. A COLOUR DOPPLER FLOW IMAGING STUDY (CDI).

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Hyperechogenicities were demonstrated to be allocated along SABG in 35 babies by CDI. The etiology and pathogenesis of this finding remains unclear. We speculated that this pathology may cause pathological BFV. Thus, the aim of the study was to investigate whether the BFV in the involved arteries was altered. Peak systolic flow velocity (PSFV), end diastolic flow velocity (EDFV), temporal mean flow velocity (TMFV), Pulsatility Index of Gosling (PI) and Resistance Index of Pourcelot (RI) were determined. Patients were stable and free of any of the conditions that are known to alter the BFV. 20 healthy neonates formed the control group. The results were:

	PSFV	EDFV	TMFV	PI	RI
Cases	13.6±3.3	5.8±1.4	9.8±2.5	0.81±0.1	0.56±0.002
Controls	12.5±2.3	5.4±0.8	8.8±1.5	0.79±0.1	0.56±0.004

FV in cm/sec. Mean±SD. p values were not significant

Conclusion: PI and RI were low in both groups suggesting a decrease in pulsatile flow in these arteries. This type of lesion does not appear to alter the regional blood flow at least in stable conditions.