

NATURAL HISTORY OF VENTRICULAR DILATION (VD) IN PRETERM BABIES. PROGNOSTIC SIGNIFICANCE.

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Adelina Pellicer, Fernando Cabañas, Alfredo García-Alix, Jesus Perez-Rodriguez, José Quero. (Spon. by Manuel Moya) Neonatal Unit, La Paz Hospital, Department of Pediatrics, Universidad Autónoma de Madrid.

VD has been related with poor prognosis in VLBW. Cerebral ultrasound were prospectively performed in 100 babies  $\leq$  1500g in order to evaluate the prognostic significance of VD and their associated findings. 77 babies were followed up until 18 months. Of the total, 24% developed VD, it not being differences in its incidence between patients with or without periventricular hemorrhage (PVH). In patients with PVH, VD developed earlier than in infants without PVH ( $p < 0.05$ ). However, there were no differences according to severity, location, head circumference growth or intracranial pressure. Lumbar taps were performed in 4 patients (all with PVH). VD was statistically associated with PVH grades III and IV ( $p = 0.015$ ); periventricular (PV) hyperdensity (moderate and severe) ( $p < 0.001$ ); and cystic periventricular leukomalacia (PVL) ( $p = 0.0023$ ). 61% of VD lasted  $> 6$  wk (persistent) and showed irregular margins in 62%. The latter were significantly related with cystic PVL ( $p = 0.017$ ). At follow up, VD was statistically associated with handicaps but specially the persistent VD with irregular margins. We conclude that VD is frequent in VLBW infants, many times independent from PVH and even in its mild forms, those with persistent VD with irregular margins suggest PV parenchymal lesion and reserved prognosis, as their association with echographic signs of PVL are demonstrated.

POST-HEMORRHAGIC HYDROCEPHALUS: NINE YEAR EXPERIENCE WITH THE USE OF AN INTRAVENOUS CATHETER FOR EXTERNAL VENTRICULAR DRAINAGE OF CSF

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Walter Allan, Douglas Dransfield, Peter Marro, Stephen Mott, spn. by Alistair Philip- Department of Pediatrics, Maine Medical Center, Portland, Maine, USA

Post-hemorrhagic hydrocephalus (PHH) is an acute sequel to large IVH in preterm infants. We have used standard criteria for the diagnosis and treatment of PHH over the past nine years. PHH is defined as an increase in head circumference of  $> 2$  cm/week with a confirming cranial ultrasound scan. Treatment consists of external ventricular drainage (EVD) using a standard intravenous catheter placed in the lateral ventricle through the anterior fontanelle and attached to a closed drainage system. EVD is attempted for 7 days, then removed. Recurrence of PHH is followed by repeated episodes of EVD until resolution or the infant reaches 2 kg mass, at which point a ventriculoperitoneal (VP) shunt is placed. 24 infants with PHH were seen over the period. During 70 episodes of EVD in this group only a single infection occurred. All episodes of EVD were associated with a decrease in ventricular size and head circumference. Of 21 infants who survived, 9 were discharged without a VP shunt. This method of treatment of PHH is safe and compares favorably with other methods of avoiding VP shunt.

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THE EFFECT OF HYPOXEMIA AND HYPOVOLEMIA ON RETINAL AND CHOROIDAL BLOOD FLOW IN THE NEWBORN PIGLET. J.-P. Odden, D. Bratli, C. Hall, T. Farstad, T. Stiris. Neonat. Res. Lab., Depts. Ped. Res. and Surg. Res., Rikshospitalet, University of Oslo, Oslo, Norway.

The effects of hypoxemia (HO, 10% O<sub>2</sub>) and hypovolemia (HV, bleeding 20-30%) alone, or both insults combined, on retinal (RBF) and choroidal blood flow (ChBF) were studied in 23 newborn piglets with the microsphere method. Surgery and experiments were performed under general anesthesia with 70% N<sub>2</sub>O. The piglets were ventilated paralyzed with pancuronium. RBF and ChBF were measured at baseline (B1), during HO or at baseline 2 (B12), 20 min after HO (20') or after HV, and 30 (30') and 60 min (60') after HO. Results were (ml/min/100g):

	B1	HO/B12	HV/20'	30'	60'
HO RBF	33±12	121±49*	39±10	38±13	34±10
ChBF	2620±1057	3348±1450	2695±811	2403±484	2060±571
HV RBF	36±13	33±14	38±8	43±10	39±8
ChBF	2316±847	1928±739	1363±674*	2103±862	1660±575
HO+ RBF	29±14	113±48*	36±15	38±21	34±13
HV ChBF	2658±1299	3717±1865*	1536±936*	2268±1285	1947±932

\*  $p < 0.05$  from B1  
RBF was significantly increased during HO, but was not affected by HV. ChBF was also increased during HO, but much less than RBF. HV significantly reduced ChBF. These different responses within the ocular vascular bed might have clinical significance.

RETINOPATHY OF PREMATURITY (ROP) AND CHANGES OF VENOUS OPHTHALMIC BLOOD FLOW VELOCITY (BFV)

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Lindner W, Lorenz B\*, Boergen KP\*, Wörle S, Riegel KP Department of Pediatrics and Dept. of Ophthalmology\*, University of Munich, F.R.G.

Retinal arterio-venous shunts are present in ROP stage 3+. Chorioidal changes are not detectable by ophthalmoscopy. To study hemodynamic changes occurring with ROP and cryotherapy (CTx), we made prospective Doppler studies of the mean BFV (area under the curve) in the superior ophthalmic vein (SOV) and the ophthalmic artery (OA) in 7 VLBW, GA 27 (25-29) wks, birthweight 760 (480-990)g (A). 9 infants with symmetric ROP 3+ (3 of group A), GA 27 (25-29) wks, were studied before (B) and after CTx (C). Controls without ROP: GA 29 (25-33) wks (D). Criteria for diagnosis of ROP and CTx were according to the CTx-ROP study (Pediatrics 81:697-706, 1988). (\*= $p < 0.05$ : A, C&D vs. B)

Results:	n	Age (d)	SOV* (cm/s)	OA (cm/s)
(median & range)				
A) before ROP	7	3(1-32)	4(2-11)	11(6-13)
B) ROP 3+	9	69(52-78)	14(7-22)	13(8-29)
C) post CTx	9	70(53-111)	6(2-14)	11(7-21)
D) Controls	10	38(4-108)	6(2-15)	11(6-18)

The increase of SOV-BFV preceded ophthalmoscopic retinal changes in group A ( $n=3$ ) by 14(13-38)d. Conclusion: SOV-BFV is increased in ROP 3+ and normalizes with CTx. Since the SOV drains the chorioid, our data may indicate, that chorioidal hemodynamic changes precede ophthalmoscopic retinal changes in ROP.

SKIN BLOOD FLOW OF PRETERMS IN APNEIC SPELLS

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Luca A. Ramenghi, Gianni Belcaro, Susanna Di Valerio, Giuseppe Sabatino (spn by Giampaolo Donzelli), Neonatal Care Unit, University of Chieti, I-66100 Chieti, Italy.

We studied with laser doppler flow the skin blood flow changes in 12 preterm newborns born at mean gestational age of 31.5 weeks (range 27-36 w) with a mean birth weight of 1470 (range 940-2350g). Respiratory distress syndrome was present in 7 newborns, intraventricular haemorrhage in 4 and periventricular leukomalacia in 2. All the measurements were performed on the forehead during apneic spells, in thermoneutral condition recording heart rate, respiratory frequency, arterial blood gases (PO<sub>2</sub> and PCO<sub>2</sub>) and arterial blood oxygen saturation (SaO<sub>2</sub>). The apneic spell is defined as the cessation of breathing for a minimum of 10 seconds in association with bradycardia. 45 apneic spells were analysed. A simultaneous decrease (at least 40%) of skin blood flow with the onset of apneic spell was observed in 83%, while in 17% there was a delayed (till 8 sec) time of onset. The more or less simultaneous decrease is probably length to a sympathetic increased activity (vasoconstrictive effect) with a redistribution of blood flow in favour of vital organs as in neonatal shock.

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CEREBRAL BLOOD FLOW VELOCITIES (CBFV), INTRAVENTRICULAR BLEEDS (IVH) & SURFACTANT (SURF) ADMINISTRATION Regina M Lohrer, Raul Bejar, Raul Bustos, John Golden, Thurman A Merritt. Dept of Pediatrics, University of California, San Diego. (spn. by Prof. Karl Riegel).

CBFV were studied in the internal carotid arteries with a pulsed Doppler in 23 infants (mean BW=1500 ± 144g) before & after SURF. The Mean (MFV), Mean systolic (SFV) & Mean Diastolic (DFV) time averaged CBFV were calculated. CBFV, blood pressures (BP), ABGs, & FiO<sub>2</sub> were measured before & after 10 minutes instillation of SURF. MFV increased after SURF in 11 infants & dropped in 12. Three infants developed reverse DFV. Before SURF, the 12 infants who drop the MFV had a lower pH than the other 11 infants ( $p = .04$ ). The 11 infants who increased the MFV had a drop in the pH ( $p = .045$ ) during SURF. Incidence of IVH was 30% (5 gr I-II & 2 gr III). Two infants enlarged previous IVH & 4 had new IVH. These 6 infants were in the group who dropped the MFV. The risk of IVH was higher in the 12 infants who dropped the MFV than in the 11 who increased the MFV ( $p = .02$ ). Before SURF, the 6 infants who bled had a lower pH ( $p = .05$ ), a lower BW ( $p = .05$ ) & a higher FiO<sub>2</sub> ( $p = .04$ ) than infants who did not bleed. Infants who bled had a higher % drop in the BP & in all the CBFV ( $p = .01$ , both). SURF is associated with profound changes in the CBFV depending on pre-existing clinical conditions. Infants who drop the MFV shortly after SURF have a higher risk for developing IVH or increasing previous IVH within 2 days after SURF.