

and L-cysteine in medulla were determined by UPLC-MS/MS. Malondialdehyde (MDA) in medulla was determined by HPLC.

Results Reduced glutathione (GSH) was significantly reduced in the brainstem of rat pups submitted to chronic intermittent hypoxic episodes associated with reduction in GSH/GSSG ratio. GSH precursors, -glutamyl-cysteine and L-cysteine were also significantly lower in the brainstem of intermittent hypoxia group.

313 INTERACTION OF INFLAMMATION AND HYPEROXIA IN NEONATAL WHITE MATTER DAMAGE

doi:10.1136/archdischild-2012-302724.0313

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Intrauterine infection/inflammation are major causes of preterm birth. The dramatic rise of oxygen tissue tension compared to intra-uterine conditions amounts to relative hyperoxia in preterm infants. Both, infection/inflammation and hyperoxia have been shown to be involved in brain injury of preterm infants. Hypothesizing an additive or synergistic effect, we investigated the influence of a systemic lipopolysaccharide (LPS) application on hyperoxia-induced white matter damage (WMD) in newborn rats.

Three-day-old Wistar rat pups received 0.25 mg/kg LPS i.p. and were subjected to 80% oxygen on P6 for 24 hrs. WMD was assessed by immunohistochemistry, western blot and diffusion tensor magnetic resonance imaging. In addition, LPS and hyperoxia were studied in an in vitro co-culture system of primary rat oligodendrocytes and microglia cells. Both noxious stimuli, hyperoxia and LPS, induced a significant increase in apoptotic cell death as revealed by elevation of cleaved caspase-3 and TUNEL-positive cells. Furthermore, both hyperoxia and LPS caused hypomyelination, as revealed by western blot, immunohistochemistry and altered WM microstructure on MRI. However, the combination of hyperoxia and LPS did neither increase nor decrease cell death and hypomyelination in vivo. In contrast, LPS pre-incubation reduced oligodendrocyte susceptibility towards hyperoxia in vitro.

Our data suggest that inflammation and hyperoxia strongly attenuate oligodendrocyte maturation by apoptotic and non-apoptotic pathways. If both insults are combined, second phase releases of protective cytokines can partially prevent oligodendrocyte cell death. The knowledge of interactions between inflammation and hyperoxia might offer new therapeutic opportunities to prevent WMD in preterm infants.

314 HYPEROXIA CHANGES THE BALANCE OF THE THIOREDOXIN/PEROXIREDOXIN SYSTEM IN THE NEONATAL RAT BRAIN

doi:10.1136/archdischild-2012-302724.0314

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Background and Aim As demonstrated previously, oxygen contributes to the pathogenesis of neonatal brain damage and leading to neurocognitive impairment of prematurely born infants in later life.

Reactive oxygen species (ROS) and intrinsic antioxidant defense systems play an important role in both physiological cell signaling processes and many pathological conditions, including neurodegenerative disorders and oxygen-toxicity. Beside the glutathione-system several other redox-modulating proteins are known to be involved in redox-homeostases. The aim of this study was to evaluate potential alterations within the thioredoxin/peroxiredoxin system after exposures to nonphysiologic high oxygen levels in the developing rat brain.

Methods Six-days old Wistar rats were exposed to 80% oxygen for 6, 12, 24 or 48 hours and littermates kept in room air served as controls (n=6–8). Brains (excluding cerebellum) were evaluated after perfusion with PBS and dissection of both hemispheres for RNA and protein analyses.

Results We demonstrate that elevated oxygen concentrations change the balance of the ROS-dependent thioredoxin/peroxiredoxin system. Oxygen-toxicity significantly induced upregulation of peroxiredoxins in infant rat brain. In parallel, hyperoxia reduced the level of DJ-1, a hydroperoxide-responsive protein.

Discussion These findings are highly relevant from a clinical aspect because oxygen administration to neonates is often inevitable, and we recommend that every effort should be made in neonatal medicine to limit exposure of these immature babies to high oxygen concentrations. These results may also contribute to receive optimal therapeutical approaches to ameliorate oxygen toxicity.

315 AORTIC AND CAROTID INTIMA-MEDIA THICKENING IN APPROPRIATE-FOR-GESTATIONAL AGE PRETERM NEWBORNS WITH ADEQUATE BUT LOW BIRTH WEIGHT

doi:10.1136/archdischild-2012-302724.0315

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Purpose Assessment of intima-media thickness (IMT) of the aorta and carotid artery in appropriate for gestational age (AGA) infants during the first 6 months of life after very preterm birth.

Methods Longitudinal ultrasound assessment including 21 very preterm and 29 infants born at term (all AGA) during a six-months period corresponding to the third trimester of pregnancy and the first 3 months after term, measuring aortic and carotid IMT by an angle-corrected M-Mode, and assessment of blood pressure at final follow-up.

Results No differences in aortic or carotid IMT or blood pressure measurements were found between the two groups. However, in relation to vessel lumen diameter, IMT is significantly higher in both arteries in infants born preterm (p=0.003 for aorta and p=0.001 for carotid artery).

Conclusion In relation to vessel diameter, infants born preterm show thickening of the intima-media in the great arteries. It remains to be established whether this relative intima-media thickening persists into childhood and may be a risk marker for future cardiovascular disease among subjects born preterm.

316 EARLY VERSUS DELAYED CYCLOSPORINE TREATMENT IN CARDIAC RECOVERY AND INTESTINAL INJURY DURING RESUSCITATION OF ASPHYXIATED NEWBORN PIGLETS

doi:10.1136/archdischild-2012-302724.0316

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Background Recently, we have demonstrated that treating asphyxiated newborn piglets with intravenous cyclosporine immediately following resuscitation can improve cardiac function. However, immediate treatment may not be feasible for a large portion of newborns delivered in peripheral/rural hospitals. Therefore, our