INTERACTION OF INFLAMMATION AND HYPEROXIA IN NEONATAL WHITE MATTER DAMAGE

doi:10.1136/archdischild-2012-302724.0313

1F Brehmer, 1B Bendix, 2A van de Looij, 3M Sifring, 4S Sizonenko, 5C Maller, 6C Bührer, 7U Felderhoff-Müser, 8B Gerstner. 1Neonatology, Charité Universitätsmedizin Berlin, Berlin; 2Department of Pediatrics 1, Neonatology, University Hospital Essen, Essen, Germany; 3Department of Pediatrics, University of Geneva, Geneva; 4Laboratory of Functional and Metabolic Imaging, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland; 5Department of Anaesthesiology and Intensive Care Medicine, Charité Universitätsmedizin Berlin, Berlin, Germany; 6Physiology, University of Gothenburg, Gothenburg, Sweden; 7Paediatric Heart Center, University Hospital Giessen, Giessen, Germany

Intrauterine infection/inflammation are major causes of preterm birth. The dramatic rise of oxygen tissue tension compared to intrauterine 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.

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

U Schubert. Neonatology, Karolinska University Hospital, Karolinska Institutet, Stockholm, Sweden

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.

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

doi:10.1136/archdischild-2012-302724.0316

1RS Gill, 2TF Lee, 3C Sergi, 4C Joynt, 5DL Bigam, 6PY Cheung. 1Surgery; 2Pediatrics; 3Pathology and Laboratory Medicine, University of Alberta, Edmonton, AB, Canada

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