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CHONIC HYPOXIA DID NOT AFFECT PULMONARY VASCULAR REACTIVITY IN CHICKEN EMBRYOS PRONE TO PULMONARY HYPERTENSION

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Background Among chickens, meat producing broiler strains are highly prone to develop severe pulmonary hypertension (PH) associated with endothelial dysfunction. However, pulmonary endothelial function appears to be unaffected during prenatal life.

Objective To test the hypothesis that exposure to chronic prenatal hypoxia induces endothelial impairment and accelerates the development of PH in chickens prone to the disease.

Methods Fertilized eggs from two genetic lines of broiler chickens differing in susceptibility to PH (high sensitivity: HS, low sensitivity: LS) were incubated under normoxic or hypoxic (15% O2) conditions from day 6 to day 19 of a 21-d incubation period. On day 19 isolated intrapulmonary artery segments were mounted in a myograph for isometric tension recording. The contractile responses induced by KCl as well as the relaxations induced by acethylcholine (ACh), the nitric oxide donor sodium nitroprusside (SNP), and the adenylate cyclase activator forskolin were tested.

Results Hypoxia produced a reduction in the weight of the HS (31.1 ± 0.6 g vs 27.3 ± 0.6 g, P<0,001) and the LS (32.1± 0.6 vs 28.6 ± 0.9 P<0,001) embryos. KCl-induced contraction was unaffected by hypoxia in both groups. Endothelium-dependent (induced by ACh) and -independent (induced by SNP and forskolin) relaxations were also unaffected by hypoxia in both groups. ACh-induced relaxation was reduced by the NO synthase inhibitor L-NAME (10 mM) and abolished by the soluble guanylyl cyclase inhibitor ODQ (10 microM). L-NAME induced inhibition of ACh-induced relaxation was less marked in normoxic embryos of the HS group than in the other three groups.

Conclusions Chronic hypoxia during incubation reduced embryonic growth but did not influence vascular reactivity in chicken embryos prone to postnatal pulmonary hypertension.

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INTESTINAL PERMEABILITY AND MECHANICAL VENTILATION IN PRETERM INFANTS

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INTRODUCTION. EFFECTS OF MECHANICAL VENTILATION ON INTESTINAL PERMEABILITY HAVE NOT YET BEEN STUDIED IN PRETERM INFANTS. WE HYPOTHESIZE THAT MECHANICAL VENTILATION INCREASES INTESTINAL PERMEABILITY, AND REDUCES THE NATURAL DECLINE OF INTESTINAL PERMEABILITY IN THE FIRST WEEK OF LIFE.

METHODS. INTESTINAL PERMEABILITY WAS MEASURED BY THE SUGAR ABSORPTION TEST, IN WHICH URINARY EXCRETION OF LACTULOSE (L) AND MANNITOL (M) IS MEASURED AFTER ORAL INGESTION. THE SUGAR ABSORPTION TEST WAS PERFORMED AT 2 TIMEPOINTS (<48 H AFTER BIRTH AND AT DAY 5–8) IN 3 GROUPS: I INFANTS NOT VENTILATED AT ALL (N=7); II INFANTS VENTILATED AT TIMEPOINT 1 BUT NOT AT TIMEPOINT 2 (N=24); III INFANTS VENTILATED AT BOTH TIMEPOINTS (N=12).

RESULTS. BOTH MEAN (+/-SD) GESTATIONAL AGE AND BIRTHWEIGHT WERE HIGHER IN GROUP I (31.6+/-1.6WKS, 1477+/-428G) AND II (31+/-2.5WKS, 1709+/-542G) THAN IN GROUP III (28.3+/-1.4 WKS, 1070+/-359G) (P<0.05). THE MEAN (+/-SD) L/M RATIO 1 WAS HIGHER IIN GROUP I (0.667+/-0.356) THAN IN GROUP II (0,360+/-0.349) (P<0.005) BUT NOT HIGHER THAN IN GROUP III (0.482+/-0.309) (P=0.26). THE L/M RATIO 2 WAS NOT DIFFERENT IN THE 3 GROUPS (0.187+/-0.086, 0.244+/-0.172, 0.187+/-0.181 RESPECTIVELY). CORRECTED FOR THE DIFFERENCES IN L/M RATIO 1, THE DECREASE OF L/M RATIO WAS NOT DIFFERENT IN THE 3 GROUPS.

CONCLUSIONS. IN CONTRAST TO OUR HYPOTHESIS, WE DID NOT FIND A HIGHER INTESTINAL PERMEABILITY IN MECHANICAL VENTILATED INFANTS COMPARED TO NON-VENTILATED INFANTS, MEASURED <48 H AFTER BIRTH. FURTHERMORE, WE DID NOT FIND A SMALLER DECREASE IN INTESTINAL PERMEABILITY IN THE FIRST WEEK OF LIFE IN VENTILATED INFANTS COMPARED TO NON-VENTILATED INFANTS. FURTHER STUDIES ARE NEEDED TO ELUCIDATE THE EFFECT OF MECHANICAL VENTILATION ON INTESTINAL PERMEABILITY IN PRETERM INFANTS.

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FOLLOW UP AFTER AABR NEONATAL HEARING SCREENING IN NICU GRADUATES.

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Introduction From 1999–2002 a nationwide two step Automated Auditory Brainstem Respons(AABR) hearing screening program has been introduced in Dutch NICUs including monitoring until the first diagnostic result. Follow up data of NICU graduates with established bilateral hearing loss (HL) (prevalence 1,9%) become gradually available.

Goal To explore the severity and type of bilateral HL as wel as the prognostic value of the first diagnostic BERA.

Methods NICU graduates with bilateral HL from one NICU (Zwolle) were included. Severity of HL was established as mild (20–39dB), moderate (40–59dB), severe (60–90 dB) or profound (>90dB). Type of HL was conductive, perceptive, combined, or auditory neuropathy. Improvement of > 20 dB between the first BERA and observation audiometry at > 2 years at follow up was considered as clinically relevant.

Results Severity of HL after first diagnostic BERA of 37 newborns with bilateral HL was 6 mild, 7 moderate, 18 severe and 6 profound. 9/37 HL (24%) was due to auditory neuropathy, 3/37 pure conductive, 21/37 perceptive and 4/37 combined hearing losses. At > 2 years follow up information was available in 25 children. 3/25 (12%) had a clinically relevant improvement.

Conclusion Hearing loss in NICU graduates is mostly severe to profound and perceptive. A remarkably high percentage of newborns had auditory neuropathy. The prognostic value of the first diagnostic BERA turned out to be high at follow up.

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A REFERENCE CURVE FOR RELATIVE WEIGHT LOSS FOR BREAST-FED INFANTS TO DETECT HYPERNATRAEMIC DEHYDRATION

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BACKGROUND/AIMS: To construct a reference growth chart for breast-fed infants between postnatal day 2 and 11 and to assess its validity in detecting infants with hypernatraemic dehydration. The participants are 1,544 healthy (exclusively) breast-fed infants with 3,075 measurements born during 2002 in three primary care midwife practices in the Netherlands and 83 cases of breast-fed infants with hypernatraemic dehydration obtained by a search of the literature.

METHODS: Outcome measure was relative weight loss (weight loss compared to birth weight in %). A reference chart for relative weight loss was obtained by the LMS method, in which centiles are estimated by the Box-Cox power (L-curve), the median (M-curve) and the coefficient of variation (S-curve).

RESULTS: The 0.6 centile (= -2.5 SDS) is -11.1% (2 days), -11.9% (3 days), -11.8% (4 days), -11.3% (5 days), -11.0% (6 days), -10.6% (7 days), -10.2% (8 days), -9.8% (9 days), -9.6% (10 days) and -9.5% (11 days). This centile is used as a test to detect children at risk of hypernatraemic dehydration. The test is considered positive if a breast-fed child's relative weight loss decreases below -2.5 SDS and negative if it stays above. Sensitivity (percentage of infants with hypernatraemic dehydration with a positive test) is 86%. Specificity is by definition 99.4%. Positive predictive value is 9.3%, assuming a prevalence of 7.1 per 10,000 breast-fed infants. Cases with a negative test have a mean plasma sodium concentration of 153 mmol/l and cases with a positive test have a mean sodium concentration of 163 mmol/l.

CONCLUSIONS: A growth chart for relative weight loss for breast-fed infants in the first days after birth can be helpful to detect infants at risk of hypernatraemic dehydration.

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EARLY INTERVENTIONS INVOLVING PARENTS MAY IMPROVE NEURODEVELOPMENTAL OUTCOMES OF PREMATURE INFANTS: A SYSTEMATIC REVIEW

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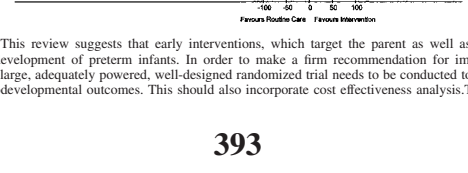
Background and Aims: Premature infants are at risk for later neurodevelopmental impairments. In an attempt to decrease these impairments, numerous early intervention programs target child development. These programs involve either teaching parents skills and/or involving parents in aspects of care for their infant. We conducted a systematic review to determine whether such early interventions improve neurodevelopmental outcomes of premature infants.

Methods: MEDLINE, CINAHL and Cochrane Controlled Central Registry from 1966 to 2004 were searched. We included randomized controlled trials of premature infants (< 37 weeks gestation) that conducted an intervention in the first year of life and involved the parent, as compared to routine care. The primary outcome measure was Bayley neurodevelopmental outcome at 12 and 24 months corrected age. Two independent reviewers extracted data. Meta-analyses were performed using weighted mean difference (random effects model) with 95% confidence intervals.

Results: 57 articles met the inclusion criteria. Of these articles, only 9 studies assessed Bayley at 12 months and 6 studies assessed Bayley at 24 months. These studies used a variety of interventions including parental education, home visits by professionals to assist/teach parents, or individualized developmental care (NIDCAP) involving parents. Meta-analysis of Bayley MDI performed at 12 months found a mean change of 8.20 [n= 1027, CI 2.81–13.58, p=0.003]. At 24 months a mean change of 7.91 [n=859, CI 3.28–12.53, p=0.0008] was found. Similar results were found for analyses that excluded NIDCAP studies (n=2). Figure: Bayley MDI at 24 months

Figure: Bayley MDI at 24 months



Conclusion: This review suggests that early interventions, which target the parent as well as the infant, may improve neurodevelopment of preterm infants. In order to make a firm recommendation for implementing early interventions, a large, adequately powered, well-designed randomized trial needs to be conducted to assess short and long-term neurodevelopmental outcomes. This should also incorporate cost effectiveness analysis.T

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RISK FACTORS FOR NECROTIZING ENTEROCOLITIS IN VERY LOW BIRTH WEIGHT INFANTS

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Objective: To investigate the risk factors for necrotizing enterocolitis (NEC) among very low birth weight infants who were followed in our NICU. Material and Methods: 205 very low birth weight infants who were followed up in our unit during January 2000-December 2004 were retrospectively evaluated with respect to risk factors leading to NEC.

Results: 70 infants were diagnosed as having necrotizing enterocolitis (Stage I-III). Comparison of these 70 infants with 135 NEC negative infants revealed that in NEC positive group, gestational age, birth weight, 1st and 5th minute Apgar scores were statistically lower (p<0.001, p<0.01, p<0.01 and p<0.01 respectively), whereas chorioamnionitis and maternal smoking were significantly higher (p=0.02 and p=0.002, respectively). Respiratory distress syndrome type 1, apnea and sepsis were also more common in NEC positive group (p<0.001, p<0.01 and p<0.01, respectively). In NEC positive group, surfactant replacement therapy, ibuprofen, theophyllin, postnatal steroid and inotropic drug treatment were more frequently used (p<0.001, p<0.001, p<0.001, p=0.002 and p<0.01 respectively). In NEC positive infants commencement of enteral feeding and full enteral feeding time were later (p<0.001 and p<0.001 respectively) and they were less fed with breast milk (p<0.001). Length of stay at the hospital and mortality ratio were also higher among NEC positive infants (p<0.001 and p<0.001 respectively). In the logistic regression analysis the statistically significant factors associated with NEC stage I-III were low gestational age [OR -0.2 (%95 CI 0.6–0.88) (p=0.003)], low 1st minute Apgar score [OR -0.3 (%95 CI 0.67–0.98) (p=0.03)], and dobutamine administration [OR 1.9 %95 CI 1.32–35.62 (p=0.033)].

Conclusion: In this study, among several risk factors low gestational age and associated presence of potential immature gastrointestinal system, hypoxia and presence of circulation impairment requiring dobutamine administration seems to be the most important risk factors leading to NEC.