Background and aims We tested the hypothesis that moderate permissive hypercapnia (PHC) results in less lung injury than mild hypercapnia (MHC) and therefore may reduce the concentration of proinflammatory cytokines and acid sphingomyelinase (ASMase) in tracheal aspirates.
Methods Preterm infants (birthweight 400–1000 g, gestational age 23 0/7–28 6/7 weeks) requiring mechanical ventilation within the first 24 h after birth, were randomised to receive either PHC ($PaCO_2$ target area starting with 55–65 mm Hg at day 1 to 65–75 mm Hg at day 7) or MHC ($PaCO_2$ target area starting with 40–50 mm Hg at day 1 to 50–60 mm Hg at day 7). Tracheal aspirates were collected and analysed for IL-1β, IL-6, IL-8, IL-10, MIP-1α, LTB_4, TGF-β_1, NPY, albumin, nitrate, ASMase and the secretory component for IgA. The primary endpoint BPD or death was determined at a postmenstrual age of 36 weeks ± 1 day.
Results 71 infants were enrolled, 35 received PHC and 36 MHC. Analyses of variance for the main effect of the $PaCO_2$ targets did not detect significant differences: IL-1β (p = 0,42), IL-6 (p = 0,44), IL-8 (p = 0,91), IL-10 (p = 0,87), MIP-1α (p = 0,34), LTB_4 (p = 0,87), TGF-β_1 (p = 0,26), NPY (p = 0,47), albumin (p = 0,63), nitrate (p = 0,73), ASMase (p = 0,25). BPD or death occured in 9 (26%) and in 10 (28%) of infants receiving PHC or MHC.
Conclusion PHC did not result in lower inflammatory activity than MHC in ventilated ELBWI.

PS-203 PRE- AND POST-NCPAP VENTILATION PLASMA CYTOKINE LEVELS IN PRETERM NEWBORN INFANTS WITH EARLY RESPIRATORY DISTRESS

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Introduction Mechanical ventilation (MV) induces expression of pro-inflammatory cytokines. Early nasal continuous positive airway pressure (nCPAP) seems to prevent ventilator-induced lung injury – and these effects have not been studied in humans.
Objective To evaluate plasma levels IL-1β, IL-6, IL-8, IL-10, and TNF-α immediately before the start of nCPAP and 2h later.
Methods Prospective cohort including preterm newborns with gestational age of 28–35 weeks admitted to a NICU for respiratory support. Newborns with malformations, congenital infections, sepsis, surfactant treatment, and receiving ventilatory support in the delivery room were excluded. Blood samples were collected right before and 2 h after the start of ventilation. Wilcoxon test was used for comparisons.
Results 23 preterm (mean weight 1850.65 ± 403g; GA 32,36 ± 1,74 weeks) were treated with nCPAP. A significant decrease in IL-6 levels was observed after 2 h of nCPAP. Of 15 newborns whose mothers received antenatal steroid, cytokine level was lower at the onset of nCPAP in all patients compared to those whose mothers didn't receive the treatment, but this effect was not sustained after 2 h.
Conclusion nCPAP was associated with minimal release of pro-inflammatory cytokines and seems to play a less harmful role, which was enhanced by the use of antenatal steroids. As MV usually promotes a significant inflammatory response, the use of nCPAP as initial protective respiratory strategy for preterm with moderate respiratory distress should be supported.

PS-204 THE UTILITY OF N-TERMINAL PRO-BRAIN NATRIURETIC PEPTIDE IN ASSESSMENT OF RESPIRATORY DISTRESS IN TERM NEONATES

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Background and aims The N-terminal pro-brain natriuretic peptide (NTpro-BNP) is used to differentiate congestive heart failure and lung disease in children and adults. The aim of our study was to determine its utility in the assessment of respiratory distress (RD) in term neonates. We sought to find out whether it can distinguish cardiac from pulmonary aetiology of respiratory distress in term neonates.
Methods The NT pro-BNP level was determined in 60 neonates admitted for RD. They were further divided in two subgroups: 37 with congenital heart disease (CHD) and 23 with pulmonary disease. The control group consisted of 30 neonates with no signs of RD. Findings of auscultation, chest radiography, Silverman score and echocardiography were recorded for each patient. Blood samples for determining NT pro-BNP levels were obtained on admission, when blood sampling was indicated for the clinical management of the newborn.
Results The RD group, regardless of aetiology, showed significantly higher levels of NT- pro BNP than the control group ($p < 0.001$). Neonates with more severe RD had significantly higher level of NT-pro BNP ($p = 0.002$). No significant difference was found between neonates with RD due to CHD and those with RD due to pulmonary disease.
Conclusions Term neonates with RD have significantly higher NT-pro BNP levels than healthy neonates. Higher level of NTpro-BNP indicates more severe RD. A single measurement of NT pro-BNP leve lcannot be used as the sole biomarker for distinguishing between cardiogenic and noncardiogenic aetiology of RD in term neonates.

PS-205 INHALED NITRIC OXIDE INCREASES URINARY NITRIC OXIDE METABOLITES AND CGMP IN PREMATURE INFANTS: RELATIONSHIP TO PULMONARY OUTCOME

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Background/aims Inhaled NO (iNO) has been tested for prevention of bronchopulmonary dysplasia in premature infants, however the role of cGMP is not known. We hypothesised that levels of NO metabolites (NOx) and cGMP in urine, as a non-invasive source for biospecimen collection, would reflect the dose of iNO and relate to pulmonary outcome.

Methods Studies were performed on 125 infants <29 weeks gestation who required mechanical ventilation at 7–14 days and received 24 days of iNO at 20–2 ppm. A control group of 19 infants did not receive iNO.
Results In NO-treated infants there was a significant dose-dependent increase of both urinary NOx and cGMP per creatinine (maximal 3.1- and 2-fold, respectively, at 10–20 ppm iNO) compared to off iNO. The ratio of cGMP to NOx, which may reflect efficiency of NO signalling via guanylate cyclase, was lower (mean 38%) at all doses of iNO compared to off NO. NOx and cGMP concentrations at both 2 ppm and off iNO were inversely related to severity of lung disease (Respiratory Severity Score) during the first month, and the NOx levels were lower in infants who died or developed BPD at term. NOx was higher in Caucasian compared to other infants at all iNO doses.
Conclusions Urinary NOx and cGMP are biomarkers of endogenous NO production and lung uptake of iNO, and levels at some doses reflect the severity of lung disease in infants. These results support a role of the NO-cGMP pathway in lung development and repair from injury.

PS-206 MATERNAL/NEONATAL VITAMIN D DEFICIENCY MAY BE A RISK FACTOR FOR DEVELOPMENT OF BRONCHOPULMONARY DYSPLASIA IN PRETERM INFANTS

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Background and aims Vitamin D seems to play an important role in the pathogenesis of respiratory system diseases. The aim of this study was to evaluate the possible association between both maternal and neonatal25-hydroxyvitamin-D (25-OHD) levels and the subsequent risk of bronchopulmonary dysplasia (BPD)development in preterm infants.
Methods Premature infants ≤32 gestational age and admitted to Neonatal Intensive Care Unit with a diagnosis of respiratory distress syndrome (RDS) between December 2012 and December2013 were included to this prospective study. Blood for neonatal and maternal vitamin D levels were obtained from all infants and their mothers at the time of hospital admission. The maternal and neonatal demographic features, maternal vitamin D usage, maternal head cover status, birth season and neonatal morbidities and mortality were all recorded.
Results A total of100 preterm infants were included and 31 of them developed BPD. The mean birthweight, gestational age, duration of ventilation and duration of oxygen supplementation were significantly higher in infants with BPD compared with those who did not develop BPD ($p < 0.05$). Both maternal (19 ± 2.2 vs 28.7 ± 7.6) and neonatal (7.1 ± 1.6 vs 14.8 ± 4.7) 25-OHD levels were significantly lower infants with BPD (both $p > 0.05$). All of the infants with BPD had a 25-OHD level <10ng/ml that represented severe vitamin D deficiency ($p < 0.05$).
Conclusions This study suggested for the first time that maternal/neonatal vitaminD deficiency might be associated with increased risk of BPD in preterm infants.

PS-207 PLASMA PRO-ENDOTHELIN-1 AS MARKER OF BRONCHOPULMONARY DYSPLASIA

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Background Endothelin-1 (ET-1) is a potent pulmonary vasoconstrictor, involved in lung injury and remodelling. ET-1 can be estimated by measuring its stable by-product, C-terminal pro-ET-1 (CT-proET-1), in plasma.
Aims To investigate CT-proET-1 values in very preterm infants (gestational age <32 weeks) from birth to postmenstrual age (PMA) of 36 weeks, and their relationship with lung injury and bronchopulmonary dysplasia (BPD).
Methods Prospective cross-sectional study of 391 CT-proET-1 measurements (fully automated immunoflorescent assay) from 267 very preterm infants. Measurements were performed at birth (n = 72 infants), on day of life (DOL) 2 (n = 89), on DOL 6 (n = 49), on DOL 28 (n = 106), and at PMA 36 (n = 75). Trial registration: ClinicalTrials.gov NCT01644981.
Results CT-proET-1 values were (median) 151 pmol/L (IQR 118–186) at birth, peaked on DOL 2 (319 pmol/L (235–382)), and declined thereafter to 214 pmol/L (148–293) on DOL 6, 184 pmol/L (149–233) on DOL 28, and 150 pmol/L (118–188) at PMA 36. Infants with BPD had higher CT-proET-1 values on DOL 2 ($p = 0.001$), DOL 6 ($p < 0.001$), and DOL 28 ($p = 0.007$), with no differences at birth and PMA 36 as compared to those without BPD. CT-proET-1 on DOL 6 was significantly correlated with days of mechanical ventilation, nasal CPAP, and oxygen requirement (Spearman's Rs 0.657, 0.713, 0.745, respectively, $p < 0.001$ each). Moderate correlations were found for the same parameters on DOL 2 and DOL 28 but not for birth and PMA 36.
Conclusions The levels and the pattern of CT-proET-1 increase during the first week of life might serve as an early marker of BPD.

PS-208 GENETIC PREDISPOSITION TO THE DEVELOPMENT OF BRONCHOPULMONARY DYSPLASIA IN INFANTS BORN PREMATURELY

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Background and aims Bronchopulmonary dysplasia (BPD) is an unfortunately common outcome following premature birth. Genetic factors influence BPD development but their role is part of a complex interaction with environmental factors. We postulated that alterations in the gene as well as imbalances in gene products may affect BPD development.
Methods The NIH human genome database was interrogated for previously identified gene polymorphisms that have been associated with neonatal respiratory conditions. Angiotensin converting enzyme (ACE) and surfactant proteins A-D gene candidates were selected based upon clinical plausibility for the study