Background and aims Nasal high frequency oscillation ventilation (nHFOV) is a non-invasive ventilation mode that applies an oscillatory pressure waveform to the airways using a nasal interface. NHFOV has been shown to facilitate carbon dioxide expiration, but there are little data about its use in neonates. Therefore, the aim of this survey was to collect data about nHFOV use in neonatal intensive care units (NICUs).
Methods From June 2013 to February 2014, we conducted a prospective survey in Austria, Switzerland, Germany, the Netherlands and Sweden. A 26-item questionnaire was sent to NICUs who provide the highest level of care. We asked for indications to start nHFOV, equipment used, nHFOV settings and observed side effects.
Results Of all contacted NICUs, 172/186 (92%) participated. Among those responding, 30/172 (17%) used nHFOV, most frequently in premature infants O_2, the maximum pressure 10[7–18] cm H_2O, and pressure before switching to nCPAP 7,5[5–15] cm H_2O. The typical nHFOV frequency was 10[6–13] Hz. Abdominal distension (11/30), highly viscous secretions (7/30) and upper airway obstruction due to such secretions (8/30) were the most common nHFOV side effects.
Conclusion Based on individual experience, a number of European NICUs use nHFOV. There are substantial differences in nHFOV equipment, indications and settings. New clinical studies are needed to further investigate the risks and benefits of nHFOV in neonates.

PS-175 THE VALUE OF SONOGRAPHY IN DIAGNOSING PAEDIATRIC NECROTIZING PNEUMONIA

[1]SH Lai, [2]SL Liao, [1]KS Wong. *[1]Pediatrics, Chang Gung Memorial Hospital, Taoyuan County, Taiwan; [2]Pediatrics, Chang Gung Memorial Hospital, Keelung City, Taiwan*

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Background Lung ultrasonography (LUS) is advocated as a tool in diagnosis of paediatric community-acquired pneumonia (CAP). Necrotizing pneumonia, a complication of paediatric CAP, is usually diagnosed by using chest computed tomography (CT). The aim of our study was to evaluate the value of LUS in diagnosis and outcome prediction of paediatric necrotizing pneumonia.
Materials and methods Children, being underwent LUS and diagnosed with CAP, were enrolled. The image findings of enrollers, who receiving chest CT within 5 days, were then analysed for the agreement between LUS and CT. Predictors of clinical outcome were further investigated using the characteristics of LUS.
Results Among children (n = 236) with CAP and undergoing LUS, 96 children also received chest CT within 5 days. High agreement between decreased-to-poor perfusion in LUS and moderate-to massive necrosis in CT was disclosed (k = 0.668). Children, presenting decreased-to-poor perfusion and hypoechoic spaces in LUS, were highly risky for pneumatocele formation (odds ratio 10.11; 95% CI, 2. 95–34.64) and rescue surgical lung resection (odds ratio 8.28; 95% CI, 1. 86–36.93). Longer hospital stay can be predicted if decreased-to-poor perfusion and moderate-to-massive pleural effusion were found in LUS (odds ratio 3.08, 95% CI, 1. 15–8.29).
Conclusion LUS offers substantial concordance with chest CT in diagnosis of paediatric CAP with necrotizing change. Some characteristics of LUS, such as impaired perfusion and hypoechoic spaces, provide good prediction of poor clinical outcome. It should be routinely used in the clinical care of paediatric CAP.

PS-176 DEVELOPMENT OF LUNG FUNCTION AND RESPIRATORY MORBIDITY DURING INFANCY IN RELATION TO SEVERITY OF BPD

[1]W Zetterquist, [2]A Modin, [3]Y Bånkestad, [3]E Henckel, [2]L Lagerstrand, [3]K Bohlin. *[1]Pediatrics, Karolinska Institutet, Stockholm, Sweden; [2]Clinical Physiology, Karolinska Institutet, Stockholm, Sweden; [3]CLINTEC, Karolinska Institutet, Stockholm, Sweden*

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Background Development of lung function over time in relation to BPD severity, clinical symptoms, and neonatal risk factors have not been studied in detail.
Aim To compare outcomes of infant spirometry in preterm children with variable severity of BPD (levels 1–3) and correlate these to neonatal characteristics and airway symptoms during first 2 years of life.
Methods Neonatal data and clinical records from 53 preterm children (weeks 23–30) with BPD (mild, moderate, and severe) were compared with results of two follow-up infant spirometries (at 3 and 18 months corrected age). Respiratory function was assessed during sedation with tidal forced expirations for VmaxFRC according to standardised procedures.
Results Mean values of VmaxFRC z-score showed impaired lung function for all stages of BPD both at 3 and 18 months. Vmax FRC was significantly lower (p = 0,017) among children with moderate-severe BPD compared to mild BPD at the second follow-up. There was a significant correlation between VmaxFRC and birth weight (p = 0,004), but not to gestational age or to any specific neonatal complication. In the follow-up, 60% of the children experienced recurrent symptoms of airway obstruction, evaluated as regular use of inhaled corticosteroids or montelukast, and this incidence was significantly higher among the moderate and severe group (p = 0,007).
Conclusion Severity of BPD, in parallel to birth weight, correlates to impairment of lung function during first years of life and patient's need for anti-inflammatory treatment of the airways. Lung function testing is a useful tool for identifying the BPD patients with special needs for follow-up.

PS-177 PULMONARY ULTRASOUND – APPLICATIONS IN NEONATOLOGY

A Toma, I Cuzino, A Cozinov, R Olteanu. *Neonatology, Life Memorial Hospital, Bucharest, Romania*

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Aim Evaluation of the correlation between the pulmonary ultrasound findings and the severity of the respiratory distress, the need for mechanical ventilation and the respiratory outcome of the case.
Material and methods Pulmonary ultrasounds were performed in 50 neonates (mean gestational age 38.4weeks; mean birth weight 3100g (±450g). The first ultrasound was performed at 3 h of life; the second at 24 h The ultrasound appearance was clasified: white lung (type 1); transition lung (type 2); normal (type 3). There were noted: the appearance and severity of the respiratory distress, the need for mechanical ventilation, the evolution of the pulmonary ultrasound and of the patient.
Results The pulmonary ultrasound appearance of white lung (type 1) was present in 6 cases, 4 of them needed mechanical ventilation, 2 needed CPAP. Type 2 appearance was present in 44 patients at the first ultrasound and in 15 at the second

examination, being replaced by type 3 appearance in 29 patients at 24 h of age. In the case of the 4 patients that were ventilated, the type 1 appearance evoluated at type 2 after 48 h of ventilation and at type 3 by 72 h. They were extubated successfully at a mean age of 75 h.

Conclusions Type 1 pulmonary ultrasound appearance correlated with the presence of the respiratory distress and the need for mechanical ventilation. The pulmonary ultrasound apeearance improved with the favourable evolution of the patient and the normal ultrasound anticipated the extubation. Pulmonary ultrasound could be used as an aid in the evaluation of the respiratory distress of the term and near term neonates.

PS-178 EVOLUTION OF PULMONARY FUNCTION IN PRETERM INFANTS: A PROSPECTIVE BIRTH COHORT

[1]SL Liao, [2]SH Lai, [2]TC Yao, [1]MH Tsai, [1]MC Hua, [2]KW Yeh, [2]J Huang. *[1]Pediatrics, Chang Gung Memorial Hospital, Keelung City, Taiwan; [2]Pediatrics, Chang Gung Memorial Hospital, Taoyuan County, Taiwan*

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Background With advanced pre- and post-natal care, the survival rate of extreme preterm infants has increased significantly. As a result, the incidence of respiratory morbidity and complications has also risen and should require further apprehension during follow up of these premature infants as they grow. Due to the lack of facility and normal reference values for lung function tests in the infant population, data for preterm infants in Taiwan are virtually non-existent. In this study, we investigated respiratory function in preterm and term infants until the age of 18 months. The evolution of longitudinal pulmonary function changes were also investigated.

Materials and methods During the period of October of 2012 to September of 2013, infants with informed consent were enrolled in our birth cohort study. After sedation, respiratory function tests were performed by using JAEGER MasterScreen Paediatric, which obtained measurements for the tidal breathing, passive respiratory mechanism, and forced tidal expiration. Tests were measured in preterm infants at corrected ages of 6, 12, and 18 months and term infants at similar age points.

Results Respiratory function exams were performed in 56 term and 20 preterm infants. Several parameters of the tidal breathing were found to be significantly different between term and preterm infants in the same chorological age. Increased airway resistance and reduced lung compliance were observed in the preterm babies when compared to term infants. Values of maximal expiratory flow at functional residual capacity in preterm infants were also significantly lower than those of term infants.

Discussion Premature babies are known to pose a higher risk for pulmonary developmental anomaly. As shown in our study, most preterm infants demonstrated poor performance in several respiratory function exams despite appearing clinically asymptomatic. With the newly developed technique for measuring forced expiratory flows from raised lung volumes in young infants, it is now possible to better understand the natural history and pathophysiology of young infants who were born prematurely. Additionally, the use of pulmonary function test as a clinical diagnostic tool for diseases such as bronchopulmonary dysplasia will be highly predictive and serves as the primary outcome measures.

PS-179 IS THE COMPUTERISED WHEEZE DETECTION RELIABLE DURING THE FIRST MONTHS OF LIFE?

[1]L Puder, [1]HS Fischer, [1]S Wilitzki, [2]J Usemann, [1]G Schmalisch. *[1]Department of Neonatology, Charité University Medical Center, Berlin, Germany; [2]Department of Pediatric Pneumology and Immunology, Charité University Medical Center, Berlin, Germany*

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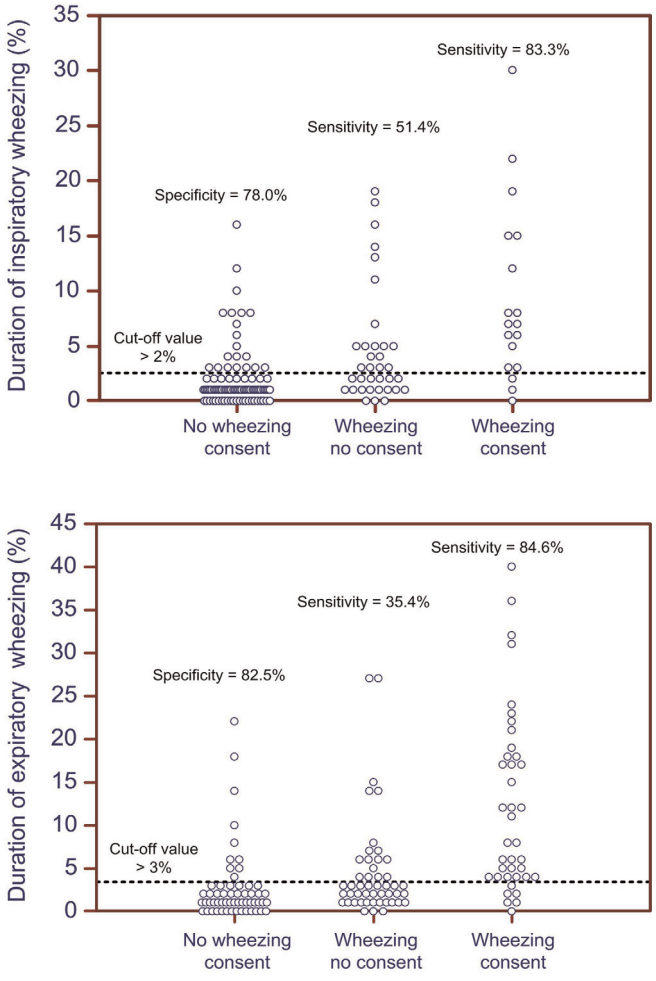
Background Most respiratory diseases are associated with abnormal adventitious lung sounds. In contrast to auscultation, computerised lung sound analysis is objective, can be done continuously over an extended period and audio recordings can be stored. To date, only little is known about its application in young infants. Therefore, the aim of this study was to compare computerised wheeze detection with the auditory assessment of trained clinicians during the first months of life.

Methods Lung sounds were recorded in 120 sleeping infants on 144 test occasions by an automatic wheeze detection device (PulmoTrack®) at a median (interquartile range) postmenstrual age of 51(44.5–67.5) weeks. The records were blinded and evaluated retrospectively by three trained clinicians. If there was agreement in their assessment, these data were used to calculate optimal cut-off values for the automatically detected duration of inspiratory and expiratory wheezing related to the inspiratory or expiratory time, using ROC-analysis. Sensitivity, specificity and the inter-rater agreement were calculated.



Abstract PS-179 Figure