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PULMONARY NEUROENDOCRINE CELLS (PNEC) IN NEONATAL RATS WITH CONGENITAL DIAPHRAGMATIC HERNIA (CDH).
Hanneke IJsselstein¹, Donald G. Perrin², Ernest Cutz², Jan C. Molenaar¹, Dick Libbe¹, Dept. of Pediatr. Surg., Sophia Children's Hospital, Rotterdam, The Netherlands¹ and Dept. of Path., The Hospital for Sick Children, Toronto, Ontario, Canada².

Lung hypoplasia and persistent pulmonary hypertension are the principal causes of high mortality and morbidity in infants with CDH. Amine and peptide producing PNEC, widely distributed throughout airway mucosa, are thought to play an important role in both pulmonary development and in regulation of pulmonary vascular tone. Furthermore, recent studies show modulation during chronic hypoxia of calcitonin gene-related peptide (CGRP), a pulmonary vasodilator produced by PNEC (Anat Rec 1993;256:95). We report data on morphometric analysis of CGRP immunoreactive PNEC clusters (neuroepithelial bodies, NEB) in a neonatal rat model of CDH induced by oral administration of Nitrofen to pregnant rats at 10 days of gestation (J Ped Surg 1990;25:850). Sections of lungs from term neonatal rats with CDH and controls were immunostained for CGRP (marker of NEB) with specific antibody against rat CGRP. NEB size and number of NEB/area of lung were assessed using semiautomatic image analysis system.

	NEB size (μm^2)	number of NEB	area of lung (mm^2)	number of NEB per mm^2 lung
Controls (N=7)	737.5 (40.9)	30 (4.3)	51.4 (1.2)	0.58 (0.07)
CDH (n=7)	843.1 (67.6)	20.9 (2.2)	22.2 (1.1)	0.95 (0.11)

* $p < 0.01$, ** $p < 0.001$. Values indicated as mean (SE).

Our findings show that in lungs of neonatal rats with CDH, there is an increase in relative frequency of NEB per surface area of lung parenchyma, while the size of NEB is not significantly affected. Whether this results in altered NEB function including imbalance in vasoactive mediators requires further studies. (Supported by NAF 91.56).

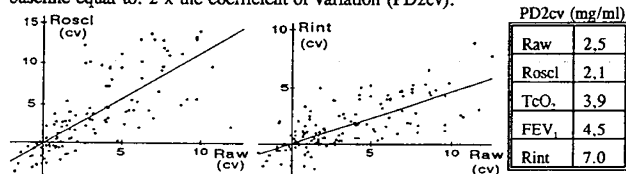
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NON-INVASIVE LUNG FUNCTION TESTING DURING TIDAL BREATHING IN AWAKE YOUNG CHILDREN WITH ASTHMA.

Bent H. Klug, Hans Bisgaard.

Department of Pediatrics, State University Hospital, Rigshospitalet, Copenhagen.

Measurement of lung function during tidal breathing in young awake children can be accomplished by the forced oscillation technique (Roscl) and the interrupter technique (Rint). Measurements were compared to forced expiratory volume (FEV₁) and whole body plethysmography (Raw) in 21 asthmatic children aged 4-6 years (median age 5.9 years) for each dose during metacholine provocation. Transcutaneous oxygen tension was monitored continuously. For each method measurements are expressed as an index: % change from baseline/coefficient of variation. The sensitivity is expressed as the median provocative dose causing a change from baseline equal to: 2 x the coefficient of variation (PD2cv).



Conclusion: In awake young children Roscl (reactance at 5 Hz), Rint and TeO₂ correlate well with Raw during metacholine provocation and have a comparable sensitivity, except for Rint which has a significantly lower sensitivity.

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SEX-DEPENDENT UNDERDIAGNOSIS IN CHILDHOOD ASTHMA - WHO IS RESPONSIBLE?

Claudia E. Kühni, Felix H. Sennhauser, Department of Pediatric Pulmonology, Ostschweizerisches Kinderspital, St.Gallen, Switzerland

Objectives: Analysis of possible reasons for the reported sex differences in diagnosis and treatment of childhood asthma.

Methods: A cluster sample was selected and stratified by age, sex and asthma symptoms. The children performed a flow-volume curve. An extended questionnaire was applied. A final diagnosis of bronchial asthma based on reported symptoms was made by the investigators.

Results: A response rate of 98.5% gave a total of 439 children (218 m, 221 f). The only sex difference in 19 asthma symptoms was found for current (within previous 12 months) allergen induced cough and for the lifetime prevalence of chest tightness during infections being both more prevalent in boys. Hayfever and atopic eczema were equally prevalent in both sexes. No sex difference could be found in lung function testing. The final diagnosis of bronchial asthma was made in 50% of boys and in 52% of girls. In contrast, the prevalence of the reported asthma diagnosis was significantly higher in boys than in girls (19% vs 10%, $p < 0.01$). Mothers referral rate to the doctor showed no sex difference for wheeze or for other complaints. But the diagnostic procedures were significantly different according to the sex of the child: in boys significantly more lung function testing (10% vs 4%, $p < 0.01$), allergy skin testing (23% vs 14%, $p < 0.02$), and IgE analysis by RAST (17% vs 6%, $p < 0.05$) were performed. Chest X-rays were reported equally often in both sexes (14% vs 15%).

Conclusion: Sex dependent diagnostic management by the family doctor seems to be a major cause for the underdiagnosis of asthma in girls.

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DOBUTREX® AND VENTILATION-PERFUSION INEQUALITIES

István Laki, Kálmán Gyurkovits, Zolt Bóni, László Rgo
Hospital for Chest Diseases, Mosdós, Hungary

Dobutrex (Dobutamin HCl, Lilly) is a positive inotrop drug, which increases the stroke volume and blood flow, and reduces the systemic and pulmonary vascular resistance. In case of higher perfusion in poorly perfused areas, the ventilation-perfusion (V/Q) inequality will increase. If it is located in the well-perfused areas, the V/Q inequality will decrease, i.e. the gas exchange will be more effective.

The effectiveness of gas exchange can be controlled with breath by breath spirometry (Medical Graphics CPX) through a mask in lying patients. We gave Dobutrex by an infusion pump: 2.5 $\mu\text{g}/\text{kg}/\text{min}$ in the first half an hour and it was doubled every half an hour until 20 $\mu\text{g}/\text{kg}/\text{min}$ was given in the last quarter of the investigation. Ventilation (VE), O₂ consumption (VO₂), CO₂ production (VCO₂), heart rate and the arterial blood gas values were registered. 9 patients with severe bronchiectasis were tested. The mean age was 16.8 years (13-31). The ratio of functional dead space/tidal volume reduced slightly, the VE/VO₂ and the VE/VCO₂ quotients - indicating the effectiveness of gas exchange - reduced significantly ($P < 0.01$). The arterial pCO₂ decreased considerably. The more severe the disease is, the stronger the beneficial effect of the drug.

Our observations suggest that Dobutrex is able to reduce both pulmonary vascular resistance and - selectively - the vascular resistance in well-ventilated areas of the lungs. Dobutrex medication increases the effectiveness of gas exchange, so it can be advantageous in severe pulmonary diseases especially in case of inequality of ventilation.

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AUTOMATED MEASUREMENT OF RESPIRATORY MECHANICS IN MECHANICALLY VENTILATED NEONATES. Yvon Riou, Laurent Storme, Régis Logier, Alain Martinot, Jean F Diependale, Francis Leclerc, Pierre Lequien. Service de Médecine Néonatale. Hôpital CALMETTE. CHRU de LILLE.

Monitoring of respiratory mechanics is not a well developed technique in neonatal intensive care units. The aim of this report was to describe an automated system that could be routinely used at bedside in neonatal and pediatric intensive care units. This system is composed of a microcomputer IBM 486 PC equipped with an analog-to-digital data acquisition board (12 bits resolution). Flow was measured by a Fleisch pneumotachometer n°00 inserted between the endotracheal tube and the breathing circuit and connected to a pressure transducer ($\pm 2 \text{ cmH}_2\text{O}$). Pressure variations were measured at airway opening. Signals were sampled at 256 Hz. Data processing includes "time function" and "loop function". Time function provides data processing (low pass and high pass filtering, gain and sweep frequency tuning, numeric integration) and real time computing of several parameters (tidal volume, respiratory frequency, inspiratory time, peak inspiratory pressure, mean pressure, positive end expiratory pressure and air leak ratio). With Loop function, flow/volume, volume/pressure and pressure/flow loops are displayed in real time at each ventilatory cycle. At any time, the operator can freeze the display and calculate respiratory mechanic parameters (resistances, compliance, time constant, trapped volume and intrinsic positive end expiratory pressure) by using the passive inflation method. This system provides qualitative informations by displaying loops and quantitative data. The use of microcomputer makes this technique attractive and highly suitable for understanding the pathophysiology of the underlying disease, for optimizing ventilator settings and/or for evaluating drug efficiency.

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STRIDOR IN FIBEROBRONCHOSCOPIC EXAMINATION

G.Lis, T.Szoczerbiński, E.Cichocka-Jarosz. 1st Clinic of Children's Diseases, Polish-American Children's Hospital, Krakow, Poland.

Stridor was examined with fiberobronchoscope in 52 infants and children. Median age was 5 months, weight 9kg, (boys) girls ratio 2:1. Endoscopy was performed when other noninvasive diagnostic methods failed to establish the origin of stridor. The most common cause of stridor was laryngomalacia, found in 34 (65%) children. The form of laryngomalacia with large, floppy arytenoid cartilages was observed twice more often than other forms, and boys suffered from this form more than twice as often as girls. In children with laryngomalacia there was weight deficiency (mean for group: -24%) comparison to normal healthy population ($p < 0.001$). Stridor which was not caused by laryngomalacia was observed in about 35% of the study group. Findings in this group were heterogeneous and some presented by single cases. However, the diagnosis of this patients is important because of treatment possibility and appropriate prognosis.