Changes of breathing pattern and mouth occlusion pressure in patients with airway obstruction after bronchodilator inhalation

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It is known that neuromuscular drive is increased in patients with airway obstruction. The aim of the study was to estimate an influence of beta-agonist on breathing pattern and mouth occlusion pressure (PO.1) in patients with reversible and non-reversible airway obstruction. Ventilatory function tests, pattern of breathing, mouth occlusion pressures, and FEV1 were measured in 23 patients (15 with bronchial asthma, 8 with COPD), age 48 ± 16.7. Their mean FEV1 was 1.6 ± 0.7 l, mean Row 0.79 ± 0.36 kPa/l/s. Control group consisted of 20 healthy subjects, aged 38 ± 8.6 years. Pattern of breathing in patients was changed in comparison to control group – the tidal volume and minute ventilation were increased (0.81 ± 0.19 vs 0.67 ± 0.16 l and 13.3 ± 3.7 vs 9.9 ± 1.9 l/s), mean inspiratory flow (Vt/Ti) was higher, inspiratory and total time were shortened but these differences did not reach statistical significance. Also mouth occlusion pressure and inspiratory impedance were significantly increased (PO.1 3.6 ± 1.6 vs 1.6 ± 0.5 cmH2O and PO.1/Vt/Ti 6.6 ± 2.3 vs 3.8 ± 1.0 cmH2O/l/s).

In all patients these measurements were repeated 20 minutes after beta-agonist inhalation (0.2 mg fenoterol). Patients were divided in two groups according to reaction to the drug. Gr.A consisted of 15 pts. (mostly with bronchial asthma), who responded to bronchodilator (increase in FEV1 > 15%) and revealed significant decrease in PO.1 1.8 ± 0.7 vs 4.2 ± 1.1 cmH2O/l/s and PO.1/Vt/Ti 6 (6.6 ± 2.4 vs 4.2 ± 1.1 cmH2O/l/s). Gr.B consisted of 8 pts (mostly with COPD) who did not respond to bronchodilator (ΔFEV1 < 15%) and did not present changes in PO.1 and PO.1/Vt/Ti.

The reduction of neuromuscular drive and inspiratory impedance in responsive patients (Gr.A) is a consequence of diminishing of nonelastic respiratory load and seems to be an additional advantage for the patient.

P0481
The problem of measuring perception of dyspnoea
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Background: During recent decades we have become more interested in how people perceive their dyspnoea. Research in this area is focused on the relationship between physiological changes and the associated sensation. One of the problems has been the difficulty in quantification of this relationship. In literature several different measurements for this quantification are being used among each other: (1) The "evoked sensation/physical change" slope; (2) the correlation between these two parameters and (3) any increase in magnitude of the evoked sensation for a given physical change. These three measurements are indexes of dyspnoea sensitivity for each subject: the steeper the slope or the stronger the correlation the better the perception. The third measurement considered any increase in magnitude of the evoked sensation as a good perception. However, the question is: are the results of these different methods comparable? We have studied the perception of dyspnoea during a histamine provocation test in asthmatic patients by three different methods to assess the comparability of these techniques.

Methods: In 154 asthmatic patients a histamine provocation test was obtained. The FEV1 was measured after each inhalation of histamine, and the subjects were asked to rate their symptoms of dyspnoea on a Visual Analogue Scale (VAS). VAS score were dichotomized as follows. Any increase in VAS score was coded as good perception; no change in VAS score was coded as no perception.

Results: Dyspnoea as indicated by the VAS scale increased as the FEVi decreased in 150 subjects (97.4%). The correlation and slope between increase in VAS score and the reduction in FEVi, the results of these three different methods were compared.

Conclusion: In this study we have shown that obtained perception of dyspnoea during a histamine provocation test by three different methods leads to different results. Therefore, the qualification "good perceiver" depends on the kind of measurement.

P0482
Triggered hyperventilation – Is it safe?
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Objective: We tried to establish whether the hyperventilation created by a ventilator during Synchronised IPPV evoked by fluid in the ventilatory hoses could or could not be safe for the brain and lungs.

Methods: We measured the cerebral blood flow velocity (CBFV) in 3 neonates with pulsed Doppler during SIPPV. In all neonates we measured the pneumotachogram with Baby link Dräger 8000. We compared the cerebral blood flow velocity with pCO2, ventilatory setting, minute ventilation (MV) and clinical condition.

Results: Changes in CBFV were found in all neonates early after the increase of minute ventilation created by hyperventilation during SIPPV, with an appropriate response of CBFV to the decrease in pCO2. The monitoring of MV can indicate instability of the volumes related to the hyperventilation created by triggered ventilation. The reduction of neuromuscular drive and inspiratory impedance increases both the ventilatory rate and MV, decrease of CBFV, mean velocity and pCO2.

Conclusion: It is very important to have more and continual informations about changes in blood gases or brain perfusion during conventional ventilation. The evaluation of pneumotachograms could help to detect uncontrolled hyperventilation, especially in neonates with SIPPV. Uncalculated hyperventilation generated by the fluid in the hoses could increase the risk for both hyperperfusion of the brain and brainstem.

P0483
Factors underlying the relationship of transfer factor (T; CO) to alveolar volume (VA)
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Background and Aim: In normal subjects T; CO is described more accurately by age and stature (St) and VA than by age and St alone (Chinn et al, Eur Respir J 1996; 9: 1269–1277). T; CO reflects the diffusing capacity of the alveolar capillary membrane (Dm) and volume of blood in alveolar capillaries (Vc); hence our question: Is the contribution of VA to T; CO mediated via an effect on Dm or Vc? We compared the cerebral blood flow velocity with pCO2 and with both variables.

Methods: Measurements of Dm and Vc by the single breath CO method for 46 asymptomatic men (33 smokers and 13 non-smokers) from a previous study (Cotes et al. Br J Indust Med 1985; 40: 13–21) were re-analysed. The mean age was 41.7 (range 20–72) yr. To avoid co-linearity with St, VA was expressed in VA/St2. Dm and Vc were analysed in the reciprocal forms in which they were derived.

Results: T; CO was related to VA. St–2, and smoking (p < 0.05); age contributed in the absence of VA/St–2. Dm was not related to VA/St–2. St–2 was significant in the absence of VA. Vc was related to St but not to VA. St–2.

Conclusion: VA contributes to T; CO in two separate ways which affect Dm and Vc respectively. This result resembles that within subjects measured at different levels of VA (Ham R Soc Med 1996; 24: 275–285).

P0484
Consequences of carbon monoxide from tobacco smoke on hemoglobin
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We studied 132 consecutive subjects (77% males), age 60.4 ± 17.2 yr (22–85 yr) sent to our lab for blood gas analysis and with PaO2 higher than 65 mmHg. They answered a questionnaire asking for age, number of cigarettes smoked per day the last fifteen days, number of hours per day they stayed in a room where other people were smoking, their occupations and if they had gas or fuel heating systems at home. 3 ml blood samples were anaerobically drawn from the radial artery. Blood samples were sent to our lab for blood gas analysis and with PaO2 higher than 65 mmHg.

Results: COHb contributed in the absence of VA/St–2. COHb was negatively related to VA/St–2. COHb was negatively related to VA/St–2. COHb was negatively related to VA/St–2. COHb was negatively related to VA/St–2.

Conclusion: It is very important to have more and continual informations about changes in blood gases or brain perfusion during conventional ventilation. The evaluation of pneumotachograms could help to detect uncontrolled hyperventilation, especially in neonates with SIPPV. Uncalculated hyperventilation generated by the fluid in the hoses could increase the risk for both hyperperfusion of the brain and brainstem.

Pulmonary gas transfer and exercise

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