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 non-reversible airway obstruction. Ventilatory function tests, pattern of breathing, mouth occlusion pressure (MOP) were measured in 23 patients (15 with bronchial asthma, 8 with COPD), age 48±16.7. Their mean FEVI was 1.6±0.7 l/s, mean Row 0.79±0.36 kPa/s. Control group consisted of 20 healthy subjects, aged 38.2±6.6 8 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/min and 13.3±3.7 vs 9.9±1.9 l/min), 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/s).

In all patients these measurements were repeated 20 minutes after beta-agonist inhalation (0.2 mg inhaled). 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 FEVI > 15%) and revealed significant decrease in PO.1/Vt/Ti (6.6±2.4 vs 4.2±1.1 cmH2O/s/l). Gr.B consisted of 8 pts (mostly with COPD) who did not respond to bronchodilator (ΔFEVI < 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.

Table 1: Percentages of good and bad perceivers for each method.

<table>
<thead>
<tr>
<th>Method</th>
<th>Good perception</th>
<th>No good perception</th>
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<tbody>
<tr>
<td>Slope</td>
<td>71.3%</td>
<td>28.7%</td>
</tr>
<tr>
<td>Correlation</td>
<td></td>
<td></td>
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<tr>
<td>Any increase in VAS score</td>
<td>97.4%</td>
<td>2.6%</td>
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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 perceivers" depends on the kind of measurement.

Pulmonary gas transfer and exercise

Factors underlying the relationship of transfer factor (Tl, CO) to alveolar volume (VA)
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Background and Aim: In normal subjects Tl, CO is described more accurately by age, stature (St) and VA than by age and St alone (Chinn et al, Eur Respir J 1996; 9: 1269-1277). Tl, CO reflects the diffusing capacity of the alveolar capillary membrane (Dm) and volume of blood in alveolar capillaries (Vc); hence our question: Can the distribution of VA to Tl, CO mediated via an effect on Dm or Vc or both by air pollution?

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 29-72) yr. To avoid co-linearity with St, VA was expressed as VA.St^-2.

Results: Tl, CO was related to VA. St^-2, stature and smoking (p < 0.05); age contributed in the absence of VA.St^-2. Dm was negatively related to VA.St^-2. St was significant in the absence of VA. Vc was related to St but not to VA. St^-2. Conclusions: VA contributes to between subject variation in Tl, CO by affecting Dm. This result resembles that within subjects measured at different levels of VA (Hamer NJ, Clin Sci 1963; 24: 275-285).

Consequences of carbon monoxide from tobacco smoke on hemoglobin

We studied 132 consecutive subjects (77% males), age 60.4±12.7 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 was sent to our lab for blood gas analysis and with PaO2 higher than 65 mmHg.