

PATTERNS OF INTRATHORACIC GAS VOLUME AND AIRWAY RESISTANCE IN CHILDREN WITH ASTHMA

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Airway resistance (Raw) decreases with increase of lung volume during body growth; moreover, it is modified by changes of intrathoracic lung volume (ITGV) in chronic obstructive lung diseases. We wanted to analyze Raw and ITGV in children with asthma during provocation (histamine-challenge) and subsequent bronchospasmolysis. Thirty five children (mean age 8.8 yr) suffering from asthma underwent body plethysmographic measurements 24 h after withdrawal of a spasmolytic medication. Raw and ITGV were measured before provocation (control), at the endpoint of histamine-challenge (provocation: increase of Raw x ITGV by 80-100%), and after subsequent bronchospasmolysis with salbutamol. Control measurements showed increased values of ITGV and Raw with high interindividual variability. In 18 patients, histamine challenge resulted in a further increase of both ITGV and Raw (normal pattern). Twelve patients showed an increase predominantly of Raw (obstructive pattern), 5 patients an increase predominantly of ITGV (hyperinflammatory pattern). On provocation and after bronchospasmolysis, all the subjects presented with the expected inverse relation between ITGV and Raw. Experimental data during acetylcholine-challenge showed pulmonary vagal afferents to be involved in the regulation of diaphragmatic activity and the inspiratory vs. expiratory breathing pattern. Thus, the significant interindividual variability of ITGV-Raw patterns in children with asthma may point to a variable role of vagal reflex-mechanisms and tonic inspiratory diaphragmatic activity, not only in chronic obstructive disease but also during induced bronchoconstriction. In children with asthma the ITGV–Raw pattern may help to identify groups with different risk-profiles.