

**MODEL STUDIES ON RESPIRATORY PARAMETERS
FOR DIFFERENT LUNG STRUCTURES.
PART I. THEORETICAL CONSIDERATION**

Marek Darowski, Maciej Kozarski, Tomasz Gólczewski

Abstract

A computer model of lungs mechanics has been developed to simulate changes of basic respiratory variables during spontaneous breathing and mechanical ventilation. This non-homogeneous lungs model can be used as a part of hybrid, gyrator model of the respiratory system, which enables to transform static and dynamic properties of the modelled lungs into pneumatic impedance connected to the respirator. The proposed computer model may be presented as a quasi-electrical network, built out of RLC-like elements, in which non-linear mechanical properties of the human respiratory system have been taken into account. Computer simulation showed on-line changes on p-V plane as a function of tidal volume during spontaneous breathing.

Keywords: lung mechanics model, non-homogeneous structure of the lungs, computer simulation, respiratory variables