**Physico-Mathematical Model of the Effect of High Flow Therapy on Work of Breathing**

**Abstract**

High flow therapy (HFT) is a therapeutic procedure where humidified air which is warmed to body temperature and maintained at a constant flow rate is administered to patients to improve gaseous exchange. It is reported that a reduction in the work of breathing (WOB) during administration of HFT constitutes one of its mechanisms of action. However, there is a lack of predictive and analytical tools to quantitatively evaluate WOB from the changes in physical parameters of the lung under diseased and therapeutic conditions. A physico-mathematical approach has been considered adequate to investigate, within physiologic ranges, the influence of pulmonary CO2 tension and other parameters on WOB. The concentration of CO2 in the lungs is an important parameter to clinicians, serving as a good indicator of the efficiency of the body’s metabolic, respiratory and circulatory apparatus. With pulmonary and arterial CO2 tensions known to modulate respiratory rate via homeostatic control by the respiratory center, which in turn affects WOB, this work will further provide a better understanding of the principles underpinning the function of the respiratory center. It is the aim of this paper to shed some light on the theoretical framework on which the physico-mathematical model will rest and some preliminary results achieved thus far.