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37208. *Effect of Compliance on TGI Efficiency: experimental and mathematical analyses.*

This study investigates if compliance plays a key role in determining the efficiency of tracheal gas insufflation(TGI). Experiments were performed in a test lung keeping the tidal volume and the frequency of breathing constant. The application of TGI was limited to late expiratory period with a constant flow through the catheter. Compliance values were varied and capnograph data for PACO₂ was recorded with increasing TGI duration of 10%, 20%, 40%, 60%, 80% and 100%. A mathematical model was developed to compute PACO₂ in terms of important clinical variables and the results from the mathematical model are compared against bench study data. The bench study shows that TGI reduces PACO₂ values significantly for each compliance and most importantly, in each case PACO₂ attains a minimum value within 40-60% TGI duration. The mathematical model shows the same pattern as the bench model, the degree of difference of two models being very small in most cases. This finding indicates that TGI efficiency has an optimal value which varies primarily with flow and it is independent of impedance characteristics. (Received November 03, 2005)