EFFECT OF SPONTANEOUS PEAK FLOW AND HIGH NASAL GAS FLOW ON UPPER AIRWAY PRESSURE.

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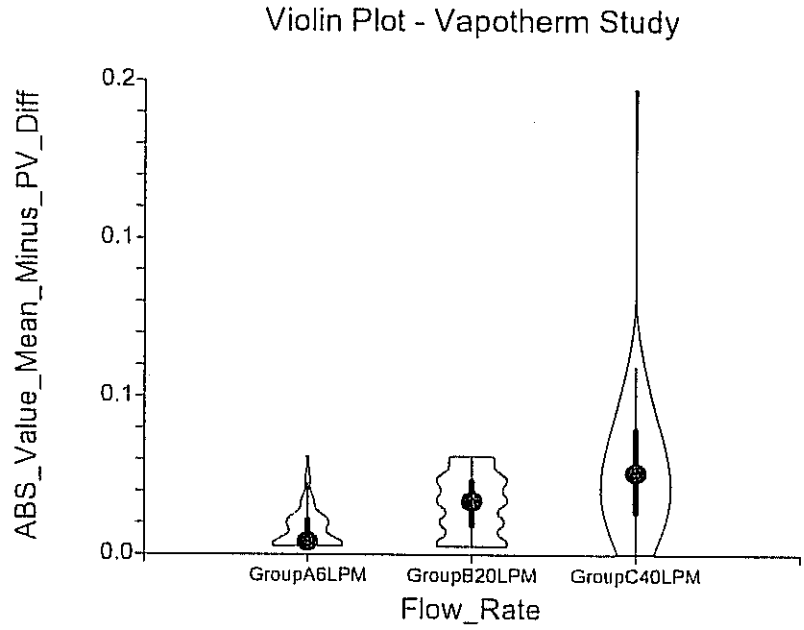
INTRODUCTION: The purpose of this bench study was to determine the variation in airway pressure differences [peak-to-valley (P-V)] and consistency at different flows delivered by a high flow nasal cannula. METHODS: A Vapotherm 2000i high flow nasal cannula was used at settings of 6, 20, and 40 L/min. Spontaneous breathing through a Laerdal Airway Management Model was simulated using a Michigan Instruments TTL lung simulator configured similar to the system described by Op't Holt, et al (Respir Care 1982;27:1200-1209). The test system was set to achieve peak inspiratory and expiratory flow rates of 60 L/min. The P-V pressure differences from 50 breaths were measured at each nasal cannula flow level. RESULTS: The coefficient of variation (CV) values were: 3.16 (6 L/min group), 4.96 (20 L/min group), and 6.60 (40 L/min group). The average P-V pressure difference was calculated for each flow level group and the absolute P-V difference for each breath was subtracted from the group mean and compared by ANOVA. The variations for each group indicated by this method were statistically different ($p<0.001$). See graph for data distributions.



CONCLUSIONS: These results from simulated spontaneous breathing flow rates double that of typical resting ventilation yielded CV values close to the traditional 5% standard. The pressure variations around the mean difference were significant and increased as the cannula flow rate increased. This flow-controlled device gave relatively consistent P-V pressure differences across its operating range. Comparison to human data at similar flows would be helpful.

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