Correspondence

References


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Preoxygenation: Comparison of Maximal Breathing and Tidal Volume Techniques

To the Editor.—Baraka et al. recently demonstrated that preoxygenation using eight deep breaths within 60 s (8 DB/60 s) at an oxygen flow of 10 L/min can produce arterial oxygen tension (Pao2) values comparable to those obtained using normal tidal volume breathing (TVB) for 3 min. In addition, they showed that this technique significantly delayed the onset of apnea-induced hemoglobin desaturation.

Before this new method becomes widely accepted, several issues need to be clarified. First, we wonder what role the baseline values for PaO2 played in the delayed hemoglobin desaturation after 8 DB/60 s. For this portion of their study, Baraka et al. used a separate group of subjects, group B, in whom baseline PaO2 values were 407 ± 53 mmHg after 5 min of TVB and 434 ± 45 mmHg after 8 DB/60 s. Both values were higher than those of subjects in group A, in whom 3 min of TVB yielded a PaO2 higher than 392 ± 72 mmHg versus 369 ± 69 mmHg after 8 DB/60 s. It cannot be ruled out that the higher PaO2 values observed in group B after 8 DB/60 s contributed to the delay in hemoglobin desaturation. If subjects from group A were subjected to apnea, the benefit of 8 DB/60 s may not have been evident, or at least may not have been as dramatic.

Second, we think that reporting this technique as eight breaths in 60 s underestimates the number of breaths and the time of preoxygenation. If we understand the protocol correctly, after the eight breaths, face-mask oxygenation was continued until apnea ensued, a period described as 15 to 30 s. In addition, they showed that this technique significantly delayed the onset of apnea-induced hemoglobin desaturation.

Third, Baraka et al. state that using the technique of four deep breaths in 30 s (4 DB/30 s), PaO2 values increased exponentially as oxygen flow is increased from 5 to 10 to 20 L/min. Although this description may accurately describe the increase from baseline values, the mean values for PaO2 at 5, 10, and 20 L/min oxygen flow all decrease within the linear, essentially flat portion of the curve. The differences appear minimal, and the authors make no statement concerning the significance of the differences among the values for PaO2 at the three fresh gas flows. Recently, Nimmagadda et al. demonstrated that increasing fresh gas flows from 5 to 7 to 10 L/min had no significant effect on end-tidal oxygen or nitrogen during preoxygenation using 4 DB/30 s or 2-min TVB techniques in healthy volunteers. Although Nimmagadda et al. did not test 20 L/min, this value is probably not encountered in most circumstances in the operating room. Although interesting and provocative, the study of Baraka et al. is far from conclusive. More studies are required to ascertain if the 8 DB/60 s method actually delays hemoglobin desaturation, and whether this method is more beneficial than the traditional TVB. It is clearly premature to anoint the 8 DB/60 s technique as the method of choice for preoxygenation.

M. Ramez Salem, M.D.
Chairman
Ninos J. Joseph, B.S.
Research Associate
ninojsj@aol.com
George J. Crystal, Ph.D.
Director of Research Laboratory
Usharani Nimmagadda, M.D.
Attending Anesthesiologist
Department of Anesthesiology
Illinois Masonic Medical Center
Chicago, Illinois

References


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