LETTERS TO THE EDITOR

Targeting supernormal frequencies and very low tidal volumes in high-frequency oscillatory ventilation: can ‘volume guarantee’ deliver?


In a recent paper, González-Pacheco et al.1 demonstrated that it is possible to achieve very low-tidal volumes using combined high-frequency oscillatory ventilation (HFOV) and volume guarantee (VG) mode in Drager Babylog VN500 ventilator (Dräger Medical, Lübeck, Germany). Unintended hyperventilation and CO2 wash-out remain pertinent issues in HFOV, especially in inexperienced hands, and hence, meticulously applied VG mode can potentially overcome the risks of hypocarbia, as well as volutrauma due to inadvertently high-tidal volume (VThf).1,2 However, we would like to highlight the following points and seek response from the authors:

First, considering that it was a prospectively conducted experiment to test the feasibility of use of lower VThf, the context remains that the target group is premature and low-birth-weights babies. We find it intriguing that the authors recruited a heterogenous group including term as well as preterm infants. In fact, it is not clear whether term-born babies were ventilated also. This contention is more apparent when we consider that individual ventilator performance in term infants can differ from that in preterm infants and it is unknown whether low-tidal volume ventilation has any impact on short- and long-term outcomes in term-born.4

Second, the authors were able to maintain the target diffusion coefficient (DCO2) because they intended to control this variable directly, using the VG feature. However, its seems variability in DCO2 probably existed when we look at the standard deviations of initial and final settings of HFOV, which suggest that some DCO2 values were extreme and hence not ‘stable’ as interpreted by the authors based on non-significant P-value. Rather, high-standard deviation is expected when we ventilate a heterogenous group of infants. Our point is further reinforced by the finding that DCO2 was indeed significantly lower (P < 0.047) in babies weighing <1000 g.

Third, the key observation that delta pressure (ΔP) was maintained, or even decreased, at higher frequencies (probably due to compensation of VThf) needs further explanation. This result must be viewed in the context of a recent bench-top study that hinted at the possible limits in the ΔP, which Drager VN500 could achieve at higher frequencies.5 Also, in a previous animal study, the authors documented ΔP at various VThf levels but not for values below 2 mlkg−1.s−1.6 Therefore, we think the authors could well have presented data about the relationship between ΔP and frequencies in low-birth-weight infants, similar to their demonstration of the correlation between frequencies and VThf.

Finally, it would be interesting to know, in the authors’ experiment, the time taken to achieve ‘maximum frequency’ settings as well as the average duration of ventilation at those high frequencies.

We consider HFOV+VG mode in Drager VN500 as promising, and hope further details of some of the points raised above could guide other interested researchers to emulate the authors’ experiment.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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