

Reply to Letter to the Editor

Response to Letter to the Editor: 'High-frequency percussive ventilation and initial biomarker levels of lung injury after smoke inhalation – Not straightforward to interpret'



Dear Editor,

We thank R.S. Shah, M. Vizacaychips for their thoughts about the published work and would like to describe some important points about our study of biomarkers following high frequency percussive ventilation in patients with acute respiratory failure following inhalation injury without extensive burns [1].

Patients included in this study had no important comorbidities; active smokers were excluded from the study. None had preexisting medical history of chronic pulmonary disease, asthma or medical follow up for respiratory problems and certainly not for documented (severe) COPD history. The patients were recruited consecutively according to the restrictive selection criteria and received systematically mask oxygen, intensive chest physiotherapy and aerosols with bronchodilators before intubation. Oxygenation deterioration is similar in all these patients who requires artificial ventilatory support with High Frequency Percussive Ventilation administered by a VDR4 device less than 6 h after smoke inhalation injury. No patient was intubated and conventionally ventilated before starting HFPV. Sedation practice combines administration of midazolam and morphine derivatives like for other burn or non burn ICU patients; fluid administration was adapted for baseline perfusions because instable patients requiring vasoactive support were also not eligible for this study. Gazometric and clinical deterioration after admission leads to rapid artificial ventilatory support.

None of the patients were intubated nor ventilated on the fire scene.

HFPV parameters were adjusted using the Bicore monitoring which enhances the follow up and monitoring under HFPV giving ventilatory volumes and pressures which are more difficult to determine and not directly available on the VDR4 monitoring. This leads to a better control of ventilatory parameters under HFPV than with the VDR4 monitoring certainly when protective ventilation following the guidelines for conventional ventilation in ARDS patients for ventilatory pressures and volumes has to be applied.

Bicore monitoring produces a kind of “conventionalization” of the VDR4 follow up.

The aim of the study was to determine if markers of lung injury would be significantly influenced by starting HFPV which seems not be the case in our specific group. Therefore initial biomarkers levels variation would not necessarily explain or be correlated with the total ventilatory days and further complications of inhalation developing after the initial period following smoke injury but could per se influence the lung markers determination after the study period. Initial markers levels have been correlated with severity of lung injury following smoke exposure [2].

The differences in the levels of proinflammatory IL-6 and TNF alpha at the different time points of our study were so minimal that it is not likely that more patients would have shown a completely different response than what we observed. The study population related to the specific and restrictive inclusion criteria was homogenous: the total number of patients in this study ($n = 15$) even modest seems to be sufficient to rule out a significant increase in the initial biological markers of inflammation or endothelial and epithelial injury after smoke inhalation and HFPV institution.

Further studies are necessary to confirm the results obtained in this cohort of specific patients (and consecutively included in the study). Inclusion criteria were decided to diminish as possible the influence of important factors like severe and extended burns, or affections that could influence cardiorespiratory mechanics and pulmonary immune function like in COPD, asthma or patients with respiratory medical history or smoking history. The combination of numerous factors would probably influence markers levels of lung injury. Interpretation of these results would also be very difficult due to the combined effects on pulmonary tissues through different mechanisms. It seems not easy to answer to the question on the effects of HFPV on biomarkers of lung injury and following inhalation injury and in smoking patients with severe burns, COPD or chronic respiratory problems. Therefore the choice of restricted inclusion criteria and a small cohort of patients to discuss this question.

Conflict of interests

The authors declare that they have no competing interests.

Authors' contributions

The authors wrote, read, and approved the final manuscript.

REFERENCES

- [1] Reper P, Heijmans W. High-frequency percussive ventilation and initial biomarker levels of lung injury in patients with minor burns after smoke inhalation injury. *Burns* 2015;41(1):65–70. <http://dx.doi.org/10.1016/j.burns.2014.05.007>. Epub 2014 Jun 28.
- [2] Albright JM, Davis CS, Bird MD, Ramirez L, Kim H, Burnham EL, et al. The acute pulmonary inflammatory response to the graded severity of smoke inhalation injury. *Crit Care Med* 2012;40(April (4)):1113–21.

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