Reviewer's report

Title: Bench Experiments Comparing Simulated Inspiratory Effort when Breathing Helium-Oxygen Mixtures to that during Positive Pressure Support with Air

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Reviewer: Manuel Sanchez Luna

Reviewer's report:

This is a well designed and very interesting paper related to the effects of using Heliox and PS with NIV in a bench model of different compliance and airway resistance modified as needs.

No major modifications are suggested as the introduction and objectives are well exposed by the authors.

The model is difficult to understand when trying to compare to the clinical situation of increased airway resistance in chronic lung disease. The effect of the Heliox mix is well expressed for decreasing the work of breathing due to the increase in airway resistance, but not well explained when a decreased in compliance is induced.

The effect of decreasing the work of breathing by the PS and its effect when Heliox is combined is well demonstrated. The two different concentrations of Heliox used are so similar in the content of Helium that probably there is no effect in decreasing airway flow or resistance.

Fig 5 analyzed the effect in decreasing the work of breathing by different PS with Air, but this is not compared with different PS with Heliox. As it is shown, when using Heliox there is a lower inspiratory effort at the same compliance compared to Air at the same PS. This effect should be tested before saying that there is no effect of the Heliox mix on the inspiratory effort when compliance is decreasing.

Conclusions are clear and adapted to the results

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests'.