Balancing the risks and benefits is essential for reaping the success of adding in-circuit bacterial filters

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To the Editor:

We read the innovative study by Rabec *et al*. [1] with great interest, in which they evaluated the impact of use of different inline bacterial filters on the performance of non-invasive ventilator (NIV) using positive inspiratory pressure (PIP) ventilation. After analysing the study, we want to raise some points which are vital in interpreting the outcomes of this study.

While inline placement of bacterial filter will obviously protect against inhalation of any broken parts of the NIV machine, they are known to affect the overall performance of the NIV. They are well-known to cause reduction of delivered tidal volumes, rise in PIP, and delay in the inspiratory trigger which will obviously necessitate higher trigger and PIP setting to overcome this extra load [2, 3].

Along with the measured interferences of these bacterial filters that are assessed in this study, some data on the additional dead space, airflow resistance, and loss of any delivered tidal volume through air leak imposed by these filters will allow us to understand the consequence of their overall impact on the performance of the NIV. Also, the measured tidal volumes here differed widely, from 568–946 mL among the groups, which look well above the recommended limits of lung protective ventilation. Presumably a higher gas flow was possibly used to generate these extra volumes which is known to cause higher resistance to expiration and can lead to intolerance as well as ventilation asynchrony [4]. This aspect was neither thought of, nor was analysed in this study. It is interesting to note that the NIV asynchrony index was not affected in this study. Possibly the simulated design of this study failed to show this side which is known to happen in the real-life scenario. As most sick patients with acute respiratory failure prefer to remain in recumbent position, which results in collapse of airways in the lesser ventilated areas, a much higher PIP will be required primarily to overcome this where trigger sensitivity becomes secondary [5].

Also, it is not clear from the study what type of NIV circuit (double or single) and interface were used. Performance of NIV (inspiratory flow and trigger, trigger delay, generation of maximum PIP, delivered tidal volume), work of breathing and inspiratory pressure time product are well-known to be affected by the choice and types of these two important equipment as well [5]. Thus, knowing the exact types of those used here will be vital to assess the actual contribution of the inline bacterial filter on the overall performance of the NIV.

We applaud the innovative approach by the authors to find the most suitable inline bacterial filter to be preferred during NIV, which is now a recommended practice, but to interpret the final impact of this we need further clarifications on the above-mentioned dilemmas.

Shareable abstract (@ERSpublications)
Balancing the benefits and drawbacks is essential to extract the advantages of adding an inline bacterial filter during non-invasive ventilation https://bit.ly/3JDHjwL

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