Reviewer's report

Title: Respiratory mechanics in infants with severe bronchiolitis on controlled mechanical ventilation

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Reviewer: Sandrine Essouri

Reviewer's report:

I would like to congratulate the authors on their work addressing the physiopathology in infants with severe bronchiolitis.

This study investigates the respiratory mechanics of infants with severe bronchiolitis requiring invasive ventilation but important data and considerations are lacking making their results less credible and representative of patients with severe bronchiolitis.

This study investigates a very specific population of severe bronchiolitis and also among them the most severe patients. The study gives to the reader a strong description of respiratory mechanics but there is no clinical correlation and most important no description of the patients.

Introduction

1. line 25: Bronchiolitis is usually ....requiring mechanical ventilation... you need to precise that now, bronchiolitis even the most severe forms, are mainly managed with noninvasive ventilation. The percentage of patients needing invasive support is very low. Your manuscript will be strengthened by the addition of epidemiologic data of the specific population studied here.

2. A better characterization of respiratory mechanics in severe bronchiolitis is crucial... A totally agree with this point of view but the population studied in this study doesn't reflect most of bronchiolitis.

3. "ultimately, it may improve outcomes" Can you clarified because the mortality is very low and do you really think that it should improve other factors such as length of ventilatory support or length of PICU stay?
Materials and methods

4. Study population: when did this study was performed? Give a brief description of the PICUs involve in the study, number of beds....

5. The authors should describe the criteria for invasive ventilation. Are they similar in each center?

6. Did you registered clinical data and gaz exchange just before invasive ventilation?

7. "Resistive component: PIM-PPL” you need to define PIM

   Figure 1: autoPEEP was not measured in ZEEP??

Results

8. What was the percentage of bronchiolitis with oxygen support alone, highflow nasal canula, NIV and IV during the period study?

9. PF ratio were obtained for all patients? Are these patients had an invasive arterial line?

10. In the studied population, how many patients have bacterial coinfection? It need to be add in the manuscript or table 1. Bacterial coinfection is a main factor of severity and may change the physiopathology.

11. What are the ventilatory settings used?

12. line 41: IT de 0.7 s, you mean Ti?

13. no significant différences were found between Ti and Te. All patients were Under the effect of neuromuscular blocker as describe in material and methods thus Ti and Te depend on ventilatory settings rather than respiratory mechanics.

14. Table 2: can you give the data for each patients instead of median. Is there a difference between the younger patients <2 months? When regarding the table 1, we can separate patients less than 2 months with the higher PF ratio from intubated patients over 2
months who have the lowest PF ratio. For the oldest patients, PF ratio are lower and we can suppose that they have a P-ARDS, most of them have criteria either PF ratio or OI but what about chest X ray. Adding the results of coinfection and chest X ray would help.

Discussion

13. "These observations place severe bronchiolitis as a primarily restrictive disease" The data presented in this study do not support such conclusion. The population need to be better describe as previously required.

14. "These findings may seem unexpected and contradictory with the current understanding of severe bronchiolitis as a primarily obstructive airway disease." Your population may not reflect only bronchiolitis. The youngest patients may have an obstructive disease as previously demonstrate in physiopathologic studies of patients with severe bronchiolitis needinf respiratory support (NIV). Refer to Milesi et al. and Essouri et al.

15. "but they are supported by Krieger et al" This study was published in 1964....since then there is a major gap in the management of invasive ventilation and ventilatory settings. You need to find more recent study to reinforce your results.

16. As you well describe in a paragraph, your findings are similar to ARDS pathophysiology, the population studied may not reflect only bronchiolitis even if RSV was found in most cases.

Conclusion

"according to our results traditional pharmacological and ventilatory strategies may need to be revised"

The design of the study do not allowed such conclusion. There is no comparaison between different ventilatory strategies and no outcomes measured.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

No

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I am able to assess the statistics

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