

POSTER PRESENTATION

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# Effects of pressure-support ventilation with different levels of positive end-expiratory in a mild model of acute respiratory distress syndrome

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## Introduction

Pressure-support ventilation improves lung mechanics, blood gas exchange, hemodynamics, and work of breathing (WOB) in mild acute respiratory distress syndrome (ARDS) [1,2]. Nevertheless, those beneficial effects could be dependent of positive end-expiratory pressure (PEEP) applied during mechanical ventilation. So far, no study has compared pressure-support ventilation (PSV) with pressure controlled ventilation (PCV) in different PEEP levels.

## Objective

To compare PSV and PCV target to protective tidal volume ( $V_T=6\text{ml/kg}$ ) using two PEEP levels (2 and 5  $\text{cmH}_2\text{O}$ ) in a mild ARDS model.

## Methods

Thirty-two male Wistar rats ( $310 \pm 19$  g) were submitted to intratracheal *Escherichia coli* lipopolysaccharide (200 $\mu\text{g}$  in 200 $\mu\text{l}$  of saline) instillation. After 24 hours, animals were anesthetized, tracheotomized, and their lungs were mechanically ventilated in PSV to achieve  $V_T = 6$  ml/kg. After baseline data collection, animals were randomly divided to four groups ( $n=8/\text{group}$ ):

- 1) PCV + PEEP = 2  $\text{cmH}_2\text{O}$  (PCV-P2);
- 2) PCV + PEEP = 5  $\text{cmH}_2\text{O}$  (PCV-P5);
- 3) PSV + PEEP = 2  $\text{cmH}_2\text{O}$  (PSV-P2);
- 4) PSV + PEEP = 5  $\text{cmH}_2\text{O}$  (PSV-P5).

Animals were ventilated for 2 hours. Mean arterial pressure (MAP), arterial blood gases, peak airway (Ppeak,<sub>RS</sub>) and peak transpulmonary (Ppeak,<sub>L</sub>) pressures, and

pressure-time product (PTP), as a surrogate of WOB, were evaluated.

## Results

All animals showed better oxygenation along time, regardless of ventilator strategy. Animals submitted to PCV, regardless of PEEP, received more colloids to keep  $\text{MAP}>70$  mmHg. Ppeak,<sub>RS</sub> and Ppeak,<sub>L</sub> were higher in animals submitted to PEEP = 5  $\text{cmH}_2\text{O}$  than PEEP = 2  $\text{cmH}_2\text{O}$ , independently of pressure-controlled, and pressure-support ventilator strategies. Nevertheless, at PEEP = 5  $\text{cmH}_2\text{O}$ , but not at PEEP = 2  $\text{cmH}_2\text{O}$ , animals submitted to PSV showed lower Ppeak,<sub>RS</sub> and Ppeak,<sub>L</sub> compared to PCV animals (PSV-P5:  $11.2 \pm 1.9$   $\text{cmH}_2\text{O}$  vs PCV-P5:  $15.3 \pm 1.4$   $\text{cmH}_2\text{O}$ ,  $p < 0.05$ ). In accordance, PTP was lower in animals submitted to PEEP = 5  $\text{cmH}_2\text{O}$  compared to PEEP = 2  $\text{cmH}_2\text{O}$  during PSV (PSV-P5:  $0.08 \pm 0.03$   $\text{cmH}_2\text{O.s}$  vs PSV-P2:  $0.22 \pm 0.09$   $\text{cmH}_2\text{O.s}$ ,  $p < 0.05$ ).

## Conclusion

In a mild ARDS model, pressure-support ventilation is associated to better hemodynamics, lung mechanics, and it seems to have a dependent effect of the adjusted PEEP level, as depicted by work of breathing.

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#### References

1. Guldner A, Pelosi P, Gama de Abreu M: Spontaneous breathing in mild and moderate versus severe acute respiratory distress syndrome. *Curr Opin Crit Care* 2014, **20**(1):69-76.
2. Grinnan DC, Truwit JD: Clinical review: Respiratory mechanics in spontaneous and assisted ventilation. *Crit Care* 2005, **9**(5):472-484.

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