ATS Highlights 2022:
Critical Care Assembly Early Career Professionals

Irene Telias, MD

Research and clinical fellow
Interdepartmental Division Critical Care Medicine, University of Toronto

Tell us about yourself.

Internist and Intensivist born and raised in Argentina working and doing my PhD in Canada. I am a woman, passionate about work but also love spending time with family and friends. I enjoy playing tennis and sailing.

Is your research clinical, basic science, or translational?

My research is clinical.

Tell us about your research.

My research is focused on respiratory and sleep physiology in critically ill patients that require mechanical ventilation. I am currently working on validating techniques to monitor respiratory drive and effort and understanding the incidence, determinants, and consequences of synchronous and dyssynchronous efforts during acute respiratory failure

Where do you see yourself in 5 years?

With a faculty position at a University Hospital, continuing to develop my research program and building a research network between North- and South- American research teams

Published manuscripts in ATS journals.

Telias I, Junhasavasdikul D, Rittayamai N, Piquilloud L, Chen L, Ferguson ND, Goligher EC, Brochard L. (2020) Airway occlusion pressure as an estimate of respiratory drive and inspiratory effort during assisted ventilation. *American Journal of Respiratory And Critical Care Medicine*. May 1;201(9):1086-1098

Telias I, Beitler JR (2021). Reverse Triggering, the Rhythm Dyssynchrony: Potential Implications for Lung and Diaphragm Protection. *American Journal of Respiratory And Critical Care Medicine.* Jan 1;203(1):5-6

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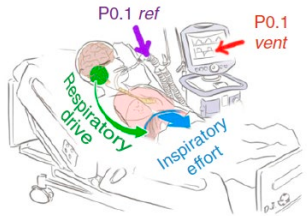

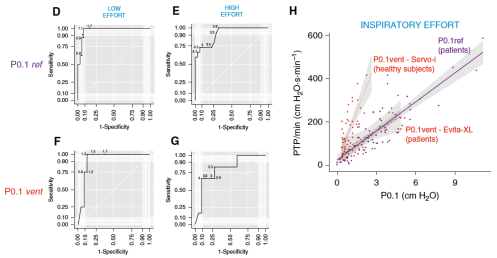

Airway occlusion pressure to detect potentially injurious inspiratory efforts during assisted ventilation

Rationale: Monitoring and controlling respiratory drive and effort may help to minimize lung and diaphragm injury. Airway occlusion pressure (P0.1) is a non-invasive measure of respiratory drive.

Objectives: To determine: (1) the ability of P0.1 measured from airway pressure during an occlusion (P0.1*ref*) to detect potentially injurious levels of inspiratory effort; (2) how P0.1 displayed by ventilators (P0.1*vent*) compares to P0.1*ref*; and (3) the ability of P0.1*vent* to detect potentially injurious effort.

Methods: Analysis of three studies in patients and one in healthy subjects under assisted ventilation. Performance of P0.1*ref* and P0.1*vent* to detect pre-defined potentially injurious effort was tested using derivation and validation datasets using esophageal pressure-time product as the reference standard for inspiratory effort. Accuracy of P0.1*vent* vs P0.1*ref* was tested primarily on a bench with six ventilators.

Results: P0.1*ref* >3.5 cmH_2O was 80% sensitive and 77% specific for high effort (≥ 200 cmH_2O.sec/min); P0.1*ref* ≤1.0 cmH_2O was 100% sensitive and 92% specific for low effort (≤ 50 cmH_2O.sec/min). On the bench, mean bias for P0.1*vent* was low for most ventilators but precision was variable and lower in ventilators measuring P0.1*vent* without occlusions, underestimating P0.1. In patients, precision of P0.1*vent* was slightly lower (limits of agreement around 1.5 cmH_2O) but P0.1*vent* correlated well with esophageal pressure-time product (within-patient R^2=0.8). Area under Receiver-Operating-Characteristic Curve for P0.1*vent* to detect potentially high and low effort was 0.81 and 0.92, with optimal thresholds of 4.0 (sensitivity 67%, specificity 91%) and 1.3 cmH_2O (sensitivity 100%, specificity 88%).

Conclusions: P0.1 is a reliable bedside tool to detect potentially injurious inspiratory effort.

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