

Category : **Respiratory: mechanical ventilation**

A124 - Impact of ultrasound settings on b-lines: an exploratory study in mechanically ventilated patients

J Leote¹; A Gonçalves²; J Fonseca²; D Guerreiro²; H Dias²; I Ribeiro²; R Meireles²; R Varudo¹; J Bacariza¹; F Gonzalez¹

¹Hospital Garcia de Orta, EPE, Almada, Critical Care, Almada, Portugal, ²Escola Superior de Tecnologia da Saúde de Lisboa, Instituto Politécnico de Lisboa, , Lisboa, Portugal

Introduction:

The number of B-lines in lung ultrasound (LUS) impacts patients clinical management. This study aimed to demonstrate the US settings influence on the number of B-lines in patients under invasive mechanical ventilation (IMV).

Methods:

Patients were prospectively recruited for LUS recordings including three breathing cycles with a motionless curvilinear probe on the thoracic region with more B-lines. Three clinicians were randomly enquired for the number of B-lines in baseline LUS and, blindly, after altering US settings for a total of 20 test recordings. The number of B-lines (mean± standard deviation (SD)) across clinicians was compared between recordings.

Results:

Twenty-nine patients (mean age 58±18y.o) admitted to critical care (mean SOFA score of 6.9±3.3; mean delta SOFA of 2.4±1.6) were under IMV due to neurological (n=19) and respiratory illness (n=10). They were evaluated at day 4 (±2.6 days) of passive ventilation (plateau pressure 16±3 mmHg; PEEP 6±2 mmHg). On LUS day, patients had a fluid balance of 835±1326 ml, an ultrasound-driven cardiac index of 3.1±0.7 ml/min/m² and seven were under norepinephrine (0.5±0.7 mcg/kg/min). Baseline recordings showed a mean number of 1.6±1.2 B-lines from a total of 87 clinicians classifications. Clinicians classifications were grouped in grades (grade 0, one to two B-lines: 59; grade I, three to six B-lines: 25; grade II, above seven B-lines: 3). The classifications agreement level was strong (Kendall's coefficient of 0.77, p <0.002). The probe frequency of 4MHz (vs. 6/8MHz), a gain of 90% (vs. 80%), and dynamic range of 84dB (vs. 60dB) increased the B-lines number by 0.4±0.03 (Friedman pairwise comparison test, p<0,03). US post-processing tools such as frame averaging, image enhancement or artifact, and speckle reduction decreased the B-lines number by 0.9±0.24 (p<0.007).

Conclusion:

In this study, the US settings mildly influenced the number of B-lines but had a minor impact on clinical practice grades (+/- one B-line).