

An Observational Study Comparing Intrathoracic Pressure Changes and Stroke Volume Variation with Abdominal Insufflation: SVV vs Pes

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BACKGROUND

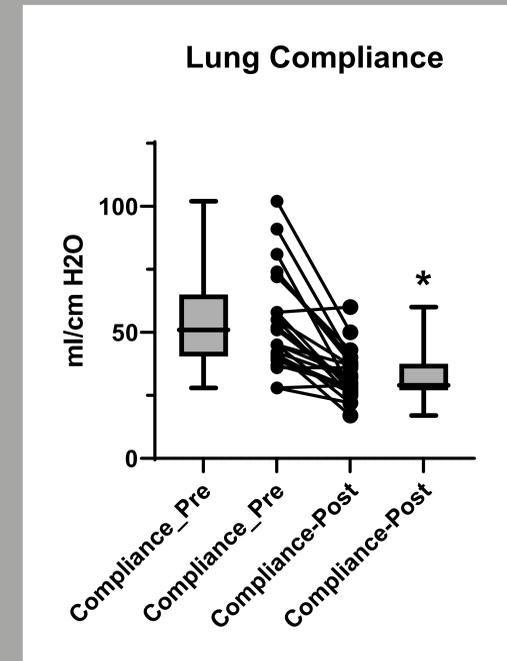
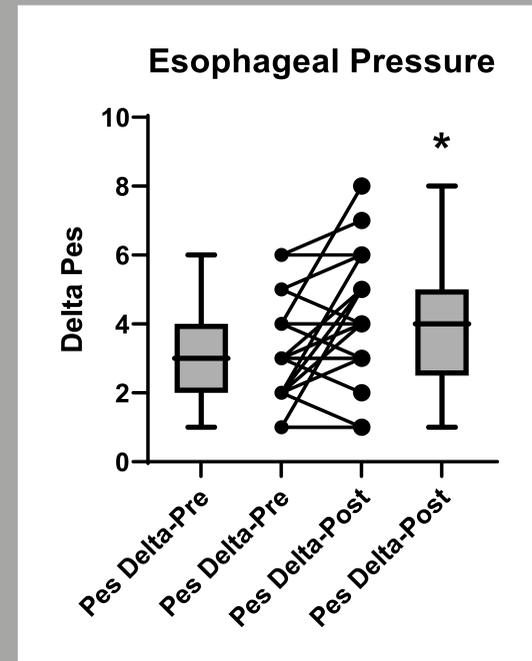
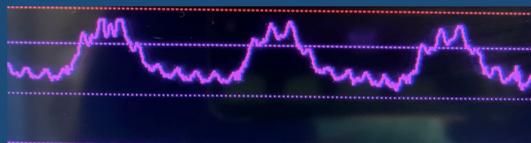
- Stroke volume variation (SVV) is a proxy for fluid responsiveness in mechanically ventilated patients¹
- Esophageal pressure (Pes) is an accepted method of determining transpulmonary pressure and estimation of intrathoracic pressure²
- Current literature is sparse and conflicting regarding SVV or PPV changes with pneumoperitoneum

STUDY OBJECTIVE

Compare and correlate predictive agreement between Pes and Edwards ClearSite hemodynamic measurement changes following abdominal insufflation

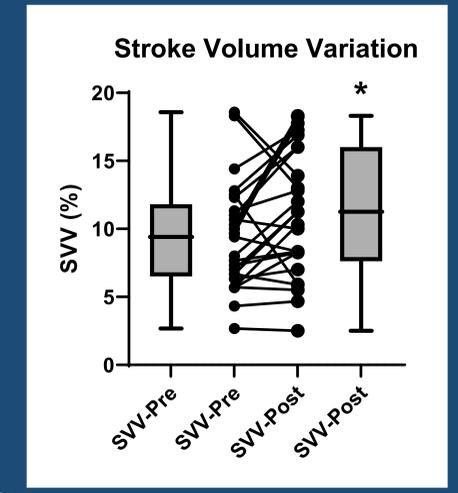
METHODS

- Approved by Human Subjects Research Committee . Written, informed consent
- ASA I-III adult patients undergoing elective laparoscopic surgery with general anesthesia and abdominal insufflation
- Standardized tidal volume (8ml/kg) and PEEP (5 cm H₂O)
- Esophageal balloon catheter inserted after induction to measure Pes with optimized waveform
- Measured pre- and post- insufflation min/max Pes, lung compliance and SVV
- ClearSite cuff connected to Edwards HemoSphere advanced monitoring platform to measure SVV
- Paired t-test to analyze Pes, lung compliance and SVV changes.



RESULTS

- 18 female and 7 male subjects undergoing general abdominal surgery
- Average Age: 53±17 yr. Height: 169±9 cm, Weight: 83±18 kg, Ideal Weight: 61±10 kg



Pneumoperitoneum increases Pes & decreases lung compliance. There is a corresponding increase in SVV.

CONCLUSION

- Abdominal insufflation to 15mmHg increases the esophageal pressure swing (Δ Pes) from 3±1.5 cm H₂O to 3.8±2 cm H₂O
- Abdominal insufflation decreases lung compliance from 54±19 L/cm H₂O to 33±9.3 L/cm H₂O
- There is a corresponding significant increase in SVV with abdominal insufflation from 9.4±4 to 11±4.7

NEXT STEPS

- Extend study to confidently establish the relationship between abdominal insufflation, Pes, lung compliance and SVV
- Characterize the potential correlation between SVV and Pes

REFERENCES

1. Reuter, et al, Intensive Care Med; 2002; 28(4):392-8.
2. Grieco, et al., Annals of Translational Medicine; 2017; 5(14):a:285

