

SIGH35

Assessing fluid responsiveness in PSV

- Challenging to perform
- Spont. breathing affects heart-lung interplay.
- **EEOT:** Stops ventilation, increases preload if responsive.
- **SIGH35:** Brief sigh at 35 cmH₂O for 4s, reduces Pulse Pressure, if responsive.

Best test is unknown

- EEOT fails ~22% due to inspiratory efforts.
- SIGH35 inhibits efforts via Hering-Breuer reflex.
- Prior study: 35% PP drop predicted with 75% sens, 92% spec.

The big question...

- Would SIGH35 predict fluid responsiveness better than EEOT in PSV
- Vs standard EEOT.

Prospective Study

- Single-centre ICU.
- Investigator-initiated.
- Humanitas Research Hospital, Italy.
- Registered: NCT04924920.



Inclusion

- PSV with PS 8-15 cmH₂O, PEEP 5-12 cmH₂O.
- Need VE: Hemodynamic instability (SBP \leq 90, MAP \leq 70, vasopressors, etc.) + signs (oliguria, tachycardia, mottling, lactate \geq 4).
- Stable ventilatory pattern (<15% variation in RR, TV, MV).



Critical Care
Messina A et al.
2025;29:178



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Exclusion

- LVEF <30% or severe valves.
- Arrhythmias.
- Severe ARDS.
- Abdominal compartment.
- Air leaks.
- Waveform artifacts.
- Neurological respiratory issues.

Intervention

- Random order: EEOT (15s hold) or SIGH35 (35 cmH₂O for 4s via SIMV-PC).
- Hemodynamics via MOSTCARE®.
- VE: 4 ml/kg crystalloids over 10 min.
- Responder: CO \geq 10% increase.

Usual Care

- EEOT: CO change from baseline to zenith (highest at end).
- Threshold tested: 4% CO increase.

Targets

- All had arterial line.
- P0.1 measured (avg of 3).
- Beat-to-beat for tests, 30s avg for VE.
- SIGH35: PP change baseline to nadir (lowest after).
- Extrasystoles or triggering excluded.

Primary outcome

- Compare AUCs for predicting responsiveness

Secondary outcomes

- Subgroup with low inspiratory effort (P0.1 <1.5 cmH₂O).
- Grey zones.

Primary Outcome

- Overall: AUC SIGH35 0.93 vs EEOT 0.67 (P<0.0008).
- SIGH35: Threshold -25% PP (grey -15%/-35%). Sens 93%, spec 92%.
- EEOT: Threshold 4% CO (grey -1%/10%). Sens 72%, spec 70%.
- Similar misclassification: SIGH35 9%, EEOT 32%.

Secondary Outcomes

Intervention (SIGH35) better:

- Low P0.1 subgroup (n=24): AUC SIGH35 0.98 vs EEOT 0.89 (P=0.26).
- SIGH35: Threshold -28% PP. Sens 93%, spec 100%.
- EEOT: Threshold 5% CO. Sens 100%, spec 80%.
- Responders 48%, no diff in baseline characteristics.
- Higher PP drop in responders (-45% vs -14%, P<0.001).
- No diff in vasoactives or sedation.

PP = Pulse Pressure changes

- Used as a surrogate for SV changes during sigh manoeuvre.
- Preload-responsive patients, sigh reduces RV preload \rightarrow drops LSV \rightarrow lowers PP significantly (nadir PP after sigh).
- Measured as % change from baseline to the lowest PP post-sigh.
- Threshold: ~ -25% (grey zone -15% to -35%) predicts fluid responsiveness with high accuracy (AUC 0.93).