Supplementary Appendix I: STARD 2015

the Standards for Reporting of Diagnostic Accuracy Studies (STARD 2015) guidelines

Section & Topic	No	Item	Reported on page #
TITLE OR ABSTRACT			
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ABSTRACT			
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	8	Where and when potentially eligible participants were identified (setting, location and dates)	5-6
	9	Whether participants formed a consecutive, random or convenience series	5-6
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	10b	Reference standard, in sufficient detail to allow replication	8
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Analysis	**14**	Methods for estimating or comparing measures of diagnostic accuracy	10-12
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Supplementary Appendix II: Supplementary Table S1. Hemodynamic parameters during the intervention.

Parameter	Baseline-1 (T0)	Reverse Trendelenburg 10° (T1)	Trendelenburg -13° (T2)	p-value between T1–T2	Baseline-2: Before fluid loading (F0)	After fluid loading (FL)	p-value between F0–FL
MAP (mmHg)	76.5±13.1	71.9±13.1	83.7±10.7	< 0.001*	77.0±12.3	80.7±13.3	< 0.001*
- Responders	79.2±14.7	73.2±14.8	86.6±10.5	< 0.001*	79.2±13.5	84.6±15.1	< 0.001*
- Non-Responders	73.2±10.4	70.3±10.8	80.2±10.3	< 0.001*	74.2±10.3	76.0±8.9	0.24
Heart rate (bpm)	96.4±17.2	96.8±17.2	95.1±16.8	0.007*	95.1±17.5	93.9±15.8	0.28
- Responders	93.1±17.4	93.7±16.8	92.0±16.3	0.12	91.2±17.6	91.6±14.2	0.78
- Non-Responders	100.0±16.7	101.0±17.4	98.8±17.2	0.009*	99.9±16.7	96.8±17.6	0.03
CVP (mmHg) (n = 27)	8.5±5.1	5.2±5.4	14.0±5.6	< 0.001*	8.7±5.6	10.4±5.9	< 0.001*
- Responders (n= 14)	6.4±4.6	3.4±5.3	11.1±4.6	< 0.001*	6.2±5.2	7.5±5.1	< 0.001*
- Non-Responders (n= 13)	10.8±4.8	7.0±5.1	17.2±4.9	< 0.001*	11.4±4.9	13.6±5.1	< 0.001*
PPV (%)	12.5±6.7	14.1±8.5	11.5 ±5.8	0.002*	12.5±6.9	9.1±4.3	< 0.001*
- Responders	14.6±7.9	17.6±9.5	13.7±6.6	0.002*	15.7±7.5	10.4±4.6	< 0.001*
- Non-Responders	9.8±3.7	9.8±4.1	8.9±3.0	0.28	8.6±3.1	7.4±3.2	0.09
SVV (%)	10.7±5.6	12.0±7.1	10.2±4.9	0.003*	11.0±6.1	8.6±5.3	< 0.001*
- Responders	13.1±6.1	15.3±7.5	12.3±5.3	0.001*	13.8±6.3	10.3±5.9	0.004*
- Non-Responders	7.8±3.3	7.9±3.9	7.5±2.7	0.60	7.5±3.6	6.5±3.4	0.05
CI (L/min/m²)	3.34±1.28	3.29±1.28	3.33±1.23	0.58	3.29±1.32	3.66±1.52	< 0.001*
- Responders	3.12±1.46	3.04±1.44	3.26±1.43	0.01*	3.04±1.51	3.73±1.82	< 0.001*
- Non-Responders	3.61±0.99	3.61±1.01	3.41±0.96	0.03*	3.60±1.02	3.58±1.08	0.63

Values are reported as the mean ± standard deviation (SD). *p < 0.05 was considered statistically significant. MAP: mean arterial pressure; CVP: central venous pressure; PPV: pulse pressure variation; SVV: stroke volume variation; CI: cardiac index.

Supplementary Table S2 : Statistical analysis of hemodynamic parameters over time using Linear Mixed-Effects Models

Parameter	Interaction (Group × Time) P-value	T0 (Baseline)	T1 (Reverse Trend)	T2 (Trendelenburg)	F0 (Pre-fluid)	FL (Post-fluid)
CI	< 0.001	0.268	0.199	0.732	0.207	0.728
CVP	0.006	0.028	0.071	0.003	0.011	0.003
MAP	0.094	0.145	0.475	0.119	0.220	0.038
SVV	0.015	0.003	< 0.001	0.007	< 0.001	0.028
PPV	0.002	0.017	< 0.001	0.017	< 0.001	0.133

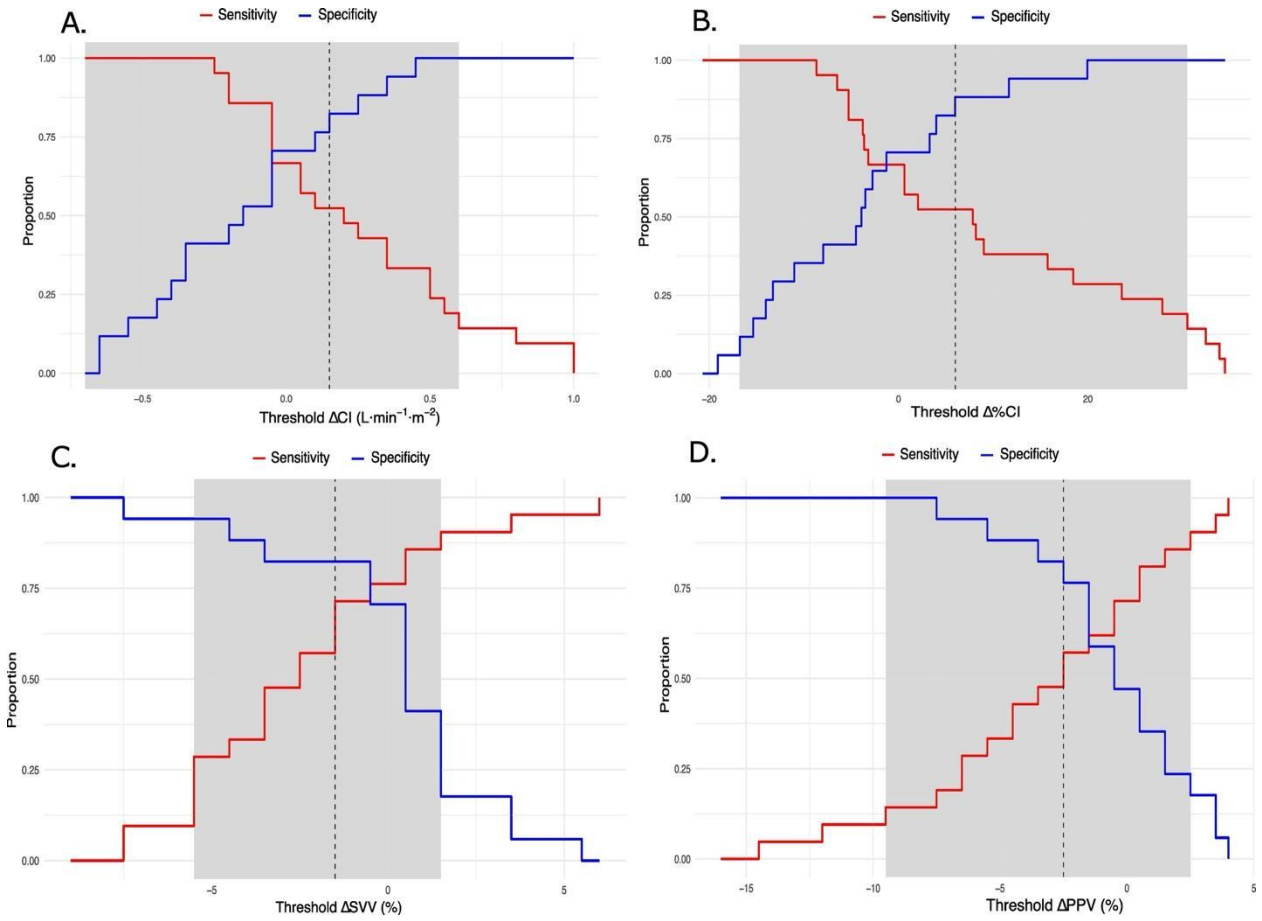
Values displayed are P-values derived from linear mixed-effects models. Bold values indicate statistical significance ($p < 0.05$). Abbreviations: CI: cardiac index; CVP: central venous pressure; MAP: mean arterial pressure; PPV: pulse pressure variation; SVV: stroke volume variation; T0: baseline (supine); T1: reverse Trendelenburg; T2: Trendelenburg; F0: pre-fluid loading (supine); FL: post-fluid loading.

Supplementary Table S3. Comparison of hemodynamic changes (T2 – T1) between fluid responders and non-responders.

Parameter	Responder group	Non-responder group	p-value
ΔCI T2 - T1 (L/min/m²)	0.22 ± 0.38	-0.19 ± 0.34	<0.001*
Δ%CI T2 - T1 (%)	9.26 ± 14.87	-4.85 ± 10.60	0.0016*
ΔSVV T2 - T1 (%)	-3.0 ± 3.6	-0.4 ± 3.1	0.02*
ΔPPV T2 - T1 (%)	-3.9 ± 5.2	-0.9 ± 3.2	0.04*
ΔCVP T2 - T1 (mmHg)	7.6 ± 3.4	10.2 ± 2.6	0.04*
ΔMAP T2 - T1 (mmHg)	13.4 ± 7.4	9.9 ± 5.6	0.110
ΔHR T2 - T1 (bpm)	-1.7 ± 4.8	-1.9 ± 2.7	0.82

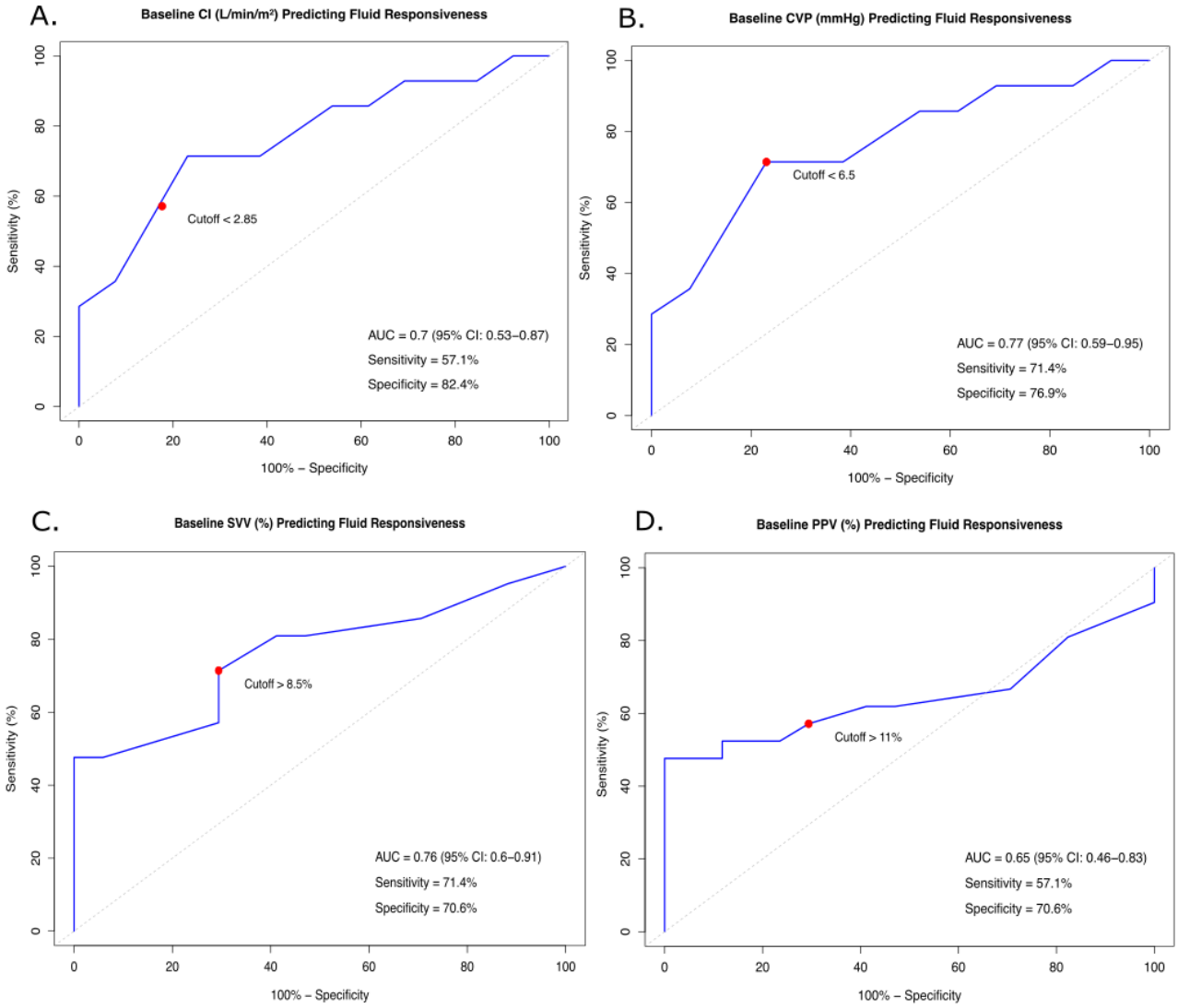
Values are reported as the mean ± standard deviation (SD). *P < 0.05 indicates statistical significance. T1: reverse Trendelenburg position; T2: after Trendelenburg positioning. ΔCI: change in cardiac index (T2–T1); Δ%CI: percent change in cardiac index from T2 - T1; ΔSVV: change in stroke volume variation (T2–T1); ΔPPV: change in pulse pressure variation (T2–T1); CVP: central venous pressure; ΔCVP: change in central venous pressure (T2–T1); ΔMAP: change in mean arterial pressure (T2–T1); ΔHR: change in heart rate (T2–T1).

Supplementary Figure S1. Gray-zone analysis of diagnostic performance for Trendelenburg-induced hemodynamic changes.



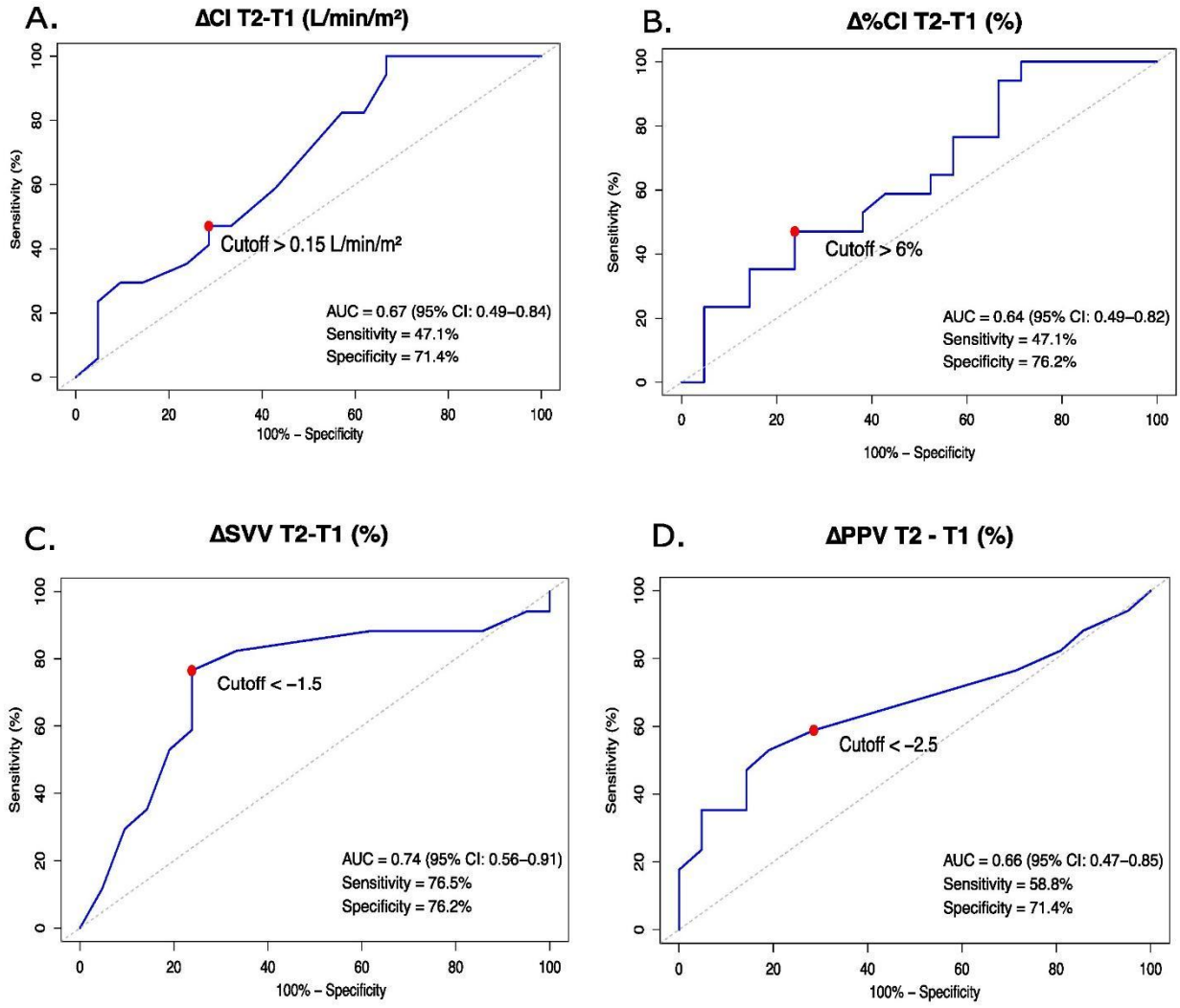
Each panel displays the relationship between sensitivity (red line) and specificity (blue line) across thresholds of the tested parameter, with the shaded gray area indicating the gray zone and the dashed line marking the optimal cutoff value.
(A) ΔCI (T_2–T_1): absolute change in cardiac index (L/min/m²).
(B) Δ%CI (T_2–T_1): percent change in cardiac index (%).
(C) ΔSVV (T_2–T_1): change in stroke volume variation (%).
(D) ΔPPV (T_2–T_1): change in pulse pressure variation (%).
CI = cardiac index; SVV = stroke volume variation; PPV = pulse pressure variation.

Supplementary Figure S2. The receiver operating characteristic (ROC) curves for baseline hemodynamic parameters (T0) in predicting fluid responsiveness in mechanically ventilated patients with spontaneous breathing activity.



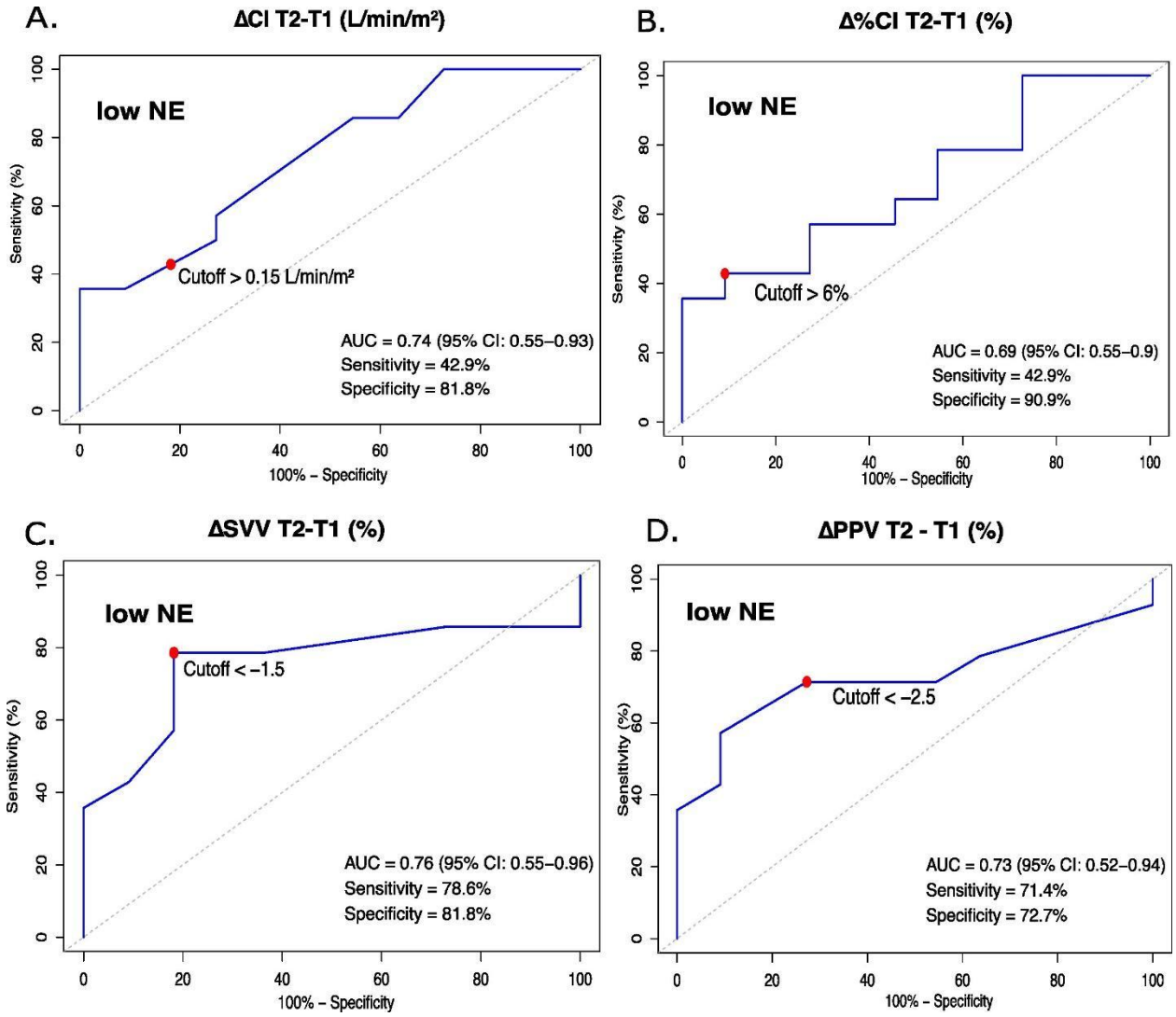
ROC curves for baseline (T0) hemodynamic parameters in predicting fluid responsiveness (n = 38). (A) Cardiac index (CI, L/min/m²). (B) Central venous pressure (CVP, mmHg). (C) Stroke volume variation (SVV, %). (D) Pulse pressure variation (PPV, %). The red dot indicates the optimal cutoff value for each variable. The area under the curve (AUC) with 95% confidence intervals, along with sensitivity and specificity, are displayed within each panel. The dashed diagonal line represents the reference (AUC = 0.5).

Supplementary Figure S3. Diagnostic performance of Trendelenburg-induced hemodynamic changes (T2–T1) for predicting fluid responsiveness defined as ≥ 15% increase in cardiac index.



Receiver-operating characteristic (ROC) curves are shown for (A) ΔCI, (B) Δ%CI, (C) ΔSVV, and (D) ΔPPV. AUROC values with 95% confidence intervals are presented in each panel. CI = cardiac index (L/min/m²); SVV = stroke volume variation (%); PPV = pulse pressure variation (%).

Supplementary Figure S4. Diagnostic performance of Trendelenburg-induced hemodynamic changes (T2–T1) in patients receiving low-dose norepinephrine (< 0.1 µg/kg/min).



Receiver-operating characteristic (ROC) curves are shown for (A) ΔCI, (B) Δ%CI, (C) ΔSVV, and (D) ΔPPV. AUROC values with 95% confidence intervals are presented in each panel. CI = cardiac index (L/min/m²); SVV = stroke volume variation (%); PPV = pulse pressure variation (%).