**Supplementary data: BR trending data**

Supplemental Table S1: Comparison of trending data for weight indexed vs non-weight indexed hemodynamic variables according to different exclusion zones

Grey shaded data represent non-weight indexed data

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | n | Mean ± SD | Concordance rate (%) | p-value | Angular bias(°) | p-value | Radial LOA(°) | Angular concordance rate(%) | p-value |
| **No exclusion zone** |
| ΔCO-TTE (ml/kg/min) | 690 | -1.47±30.07 | 57.2 | 1.000 | 16.7±60.0 | 1.000 | 134.3; -100.9 | 14.3 | 0.957 |
| ΔCO-BR (ml/kg/min) | 690 | 0.89±29.85 |
| ΔCO-TTE (ml/min) | 690 | -2.38±46.44 | 57.2 | 16.7±60.0 | 134.3; -100.9 | 14.4 |
| ΔCO-BR (ml/min) | 690 | 1.33±47.70 |
| ΔSV-TTE (ml/kg) | 690 | -0.11±0.19 | 57.8 | 0.940 | 16.2±61.1 | 0.951 | 132.2; -99.8 | 15.0 | 1.000 |
| ΔSV-BR (ml/kg) | 690 | 0.00±0.21 |
| ΔSV-TTE (ml) | 690 | -0.01±0.31 | 58.0 | 16.4±61.2 | 136.3; -103.5 | 15.0 |
| ΔSV-BR (ml) | 690 | 0.00±0.35 |
| **10% exclusion zone\*** |
| ΔCO-TTE (ml/kg/min)(25ml/kg/min excl zone)  | 182 | -1.43±47.21 | 92.3 | 0.756 | 43.8±45.4 | 0.417 | 132.7; -45.1 | 19.7 | 0.868 |
| ΔCO-BR (ml/kg/min)(25ml/kg/min excl zone) | 182 | -2.40±45.85 |
| ΔCO-TTE (ml/min)(38ml/min excl zone)  | 176 | -2.06±72.48 | 91.4 | 39.8±47.9 | 133.6; -45.9 | 20.4 |
| ΔCO-BR (ml/min)(38ml/min excl zone) | 176 | -3.53±74.50 |
| ΔSV-TTE (ml/kg)(0.16ml/kg excl zone) | 184 | -0.14±0.29 | 91.2 | 0.679 | 43.3±45.9 | 0.685 | 133.2; -46.6 | 21.7 | 0.342 |
| ΔSV-BR (ml/kg)(0.16ml/kg excl zone)  | 184 | -0.00±0.335 |
| ΔSV-TTE (ml)(0.28ml excl zone) | 159 | -0.02±0.49 | 89.8 | 41.2±50.1 | 139.3; -56.9 | 17.6 |
| ΔSV-BR (ml)(0.28ml excl zone)  | 159 | -0.02±0.58 |
| **5% exclusion zone#** |  |
| ΔCO-TTE (ml/kg/min)(12.5ml/kg/min excl zone)  | 374 | -0.59±37.5 | 78.3 | 0.766 | 29.8±55.7 | 0.769 | 138.9; -53.4 | 17.3 | 0.971 |
| ΔCO-BR (ml/kg/min)(12.5ml/kg/min excl zone) | 374 | 0.10±37.1 |
| ΔCO-TTE (ml/min)(19ml/min excl zone)  | 377 | -1.70±57.41 | 77.2 | 28.6±56.6 | 139.5; -82.3 | 17.4 |
| ΔCO-BR (ml/min)(19ml/min excl zone) | 377 | 1.38±59.12 |
| ΔSV-TTE (ml/kg)(0.08ml/kg excl zone) | 377 | -0.00±0.236 | 78.2 | 0.896 | 24.4±57.7 | 0.167 | 137.4; -88.6 | 19.1 | 0.651 |
| ΔSV-BR (ml/kg)(0.08ml/kg excl zone)  | 377 | -0.00±0.272 |
| ΔSV-TTE (ml)(0.14ml excl zone) | 353 | -0.00±0.38 | 77.8 | 30.3±57.7 | 143.3; -82.7 | 17.8 |
| ΔSV-BR (ml)(0.14ml excl zone)  | 353 | -0.00±0.45 |

\* 10% excluion zone: ΔCO 25ml/kg/min & 38ml/min based on average cardiac output in neonates (150-350ml/kg/min)[12] and 229-534ml/min([13,14]) and ΔSV 0.16ml/kg and 0.28ml for stroke volume (based on an average stroke 1.63ml/kg and 2.97ml [15]

# 5% exclusion zone: ΔCO 12.5ml/kg/min & 19ml/min based on average cardiac output in neonates (150-350ml/kg/min)[12] and 229-534ml/min([13,14]) and ΔSV 0.08ml/kg and 0.14ml for stroke volume (based on an average stroke 1.63ml/kg and 2.97ml [15]

BR – bioreactance; CCC – concordance correlation coefficient; CO – cardiac output; LOA – limits of agreement; TTE – transthoracic echocardiography; SD – standard deviation

Supplemental data Table S2: Comparison of trending data for different exclusion zones

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **No exclusion zone** | **5% exclusion zone** | **10% exclusion zone** | **Difference (no-5%)\*** | **p-value** | **Difference (5 – 10%)\*\*** | **p-value** |
| **Cardiac Output** |  |  |
| **Concordance rate (%)** | ml/kg/min | 690 | 57.2 | 374 | 78.3 | 182 | 92.3 | 21.1 | **<0.001** | 14 | **<0.001** |
| ml/min | 690 | 57.2 | 377 | 77.2 | 176 | 91.4 | 20.0 | **<0.001** | 14.2 | **<0.001** |
| **Angular bias****(°)** | ml/kg/min | 690 | 16.7±60.0 | 374 | 29.8±55.7 | 182 | 43.8±45.4 | 13.1 | **<0.001** | 14 | **0.003** |
| ml/min | 690 | 16.7±60.0 | 377 | 28.6±56.6 | 176 | 39.8±47.9 | 11.9 | **0.001** | 11.2 | **0.023** |
| **Angular concordance rate (%)** | ml/kg/min | 690 | 15.0 | 374 | 17.3 | 182 | 19.7 | 4.7 | 0.326 | 2.4 | 0.490 |
| ml/min | 690 | 15.0 | 377 | 17.4 | 176 | 20.4 | 2.4 | 0.305 | 3 | 0.396 |
| **Stroke volume** |  |  |
| **Concordance rate (%)** | ml/kg | 690 | 57.8 | 377 | 78.2 | 184 | 91.2 | 20.4 | **<0.001** | 13 | **<0.001** |
| ml | 690 | 58.0 | 353 | 77.8 | 159 | 89.8 | 19.8 | **<0.001** | 12 | **0.001** |
| **Angular bias** **(°)** | ml/kg | 690 | 16.2±61.1 | 377 | 29.4±57.7 | 184 | 43.3±45.9 | 13.2 | **<0.001** | 13.9 | **0.004** |
| ml | 690 | 16.4±61.2 | 353 | 30.3±57.7 | 159 | 41.2±50.1 | 13.9 | **<0.001** | 10.9 | **0.040** |
| **Angular concordance rate %)** | ml/kg | 690 | 15.0 | 377 | 19.1 | 184 | 21.7 | 4.1 | 0.084 | 2.6 | 0.469 |
| ml | 690 | 15.0 | 353 | 17.8 | 159 | 17.6 | 2.8 | 0.242 | -0.2 | 0.956 |

\* Difference between no exclusion and 5% exclusion zone data (5% exclusion zone minus no exclusion zone)

\*\* Difference between 5% and 10% exclusion zone data (10% exclusion zone minus 5% exclusion zone)

Supplemental data Table S3: Influence of clinical parameters on trending data

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **n\*** | **Concordance rate (%)** | **p-****value** | **Angular bias (°)** | **p-****value** # | **Angular concordance rate° (%)** | **p-value**# |
| **Cardiac Output** |
| **PDA closed**  | 391 | 56.5 | 0.712 | 17.8±59.3 | 0.583 | 85.1 | 0.816 |
| **PDA Open** | 299 | 57.9 | 15.2±60.7 | 85.7 |
| **CO level ≥ 150ml/kg** | 169 | 62.7 | 0.098 | 19.1±62.3 | 0.548 | 91.1 | 0.017 |
| **CO level <150ml/kg** | 521 | 55.4 | 15.9±59.2 | 83.7 |
| **No CPAP** | 372 | 55.1 | 0.219 | 17.1±60.3 | 0.851 | 84.4 | 0.383 |
| **CPAP** | 318 | 59.7 | 16.3±59.7 | 86.7 |
| **Stroke Volume** |
| **PDA closed** | 391 | 65.1 | 0.341 | 20.1±59.8 | 0.097 | 83.7 | 0.229 |
| **PDA open** | 299 | 56.1 | 12.2±62.7 | 87.0 |
| **CO level ≥ 150ml/kg** | 169 | 56.8 | 0.694 | 13.0±64.6 | 0.400 | 93.4 | **<0.001** |
| **CO level <150ml/kg** | 521 | 58.5 | 17.5±60.0 | 82.1 |
| **No CPAP** | 372 | 54.0 | 0.020 | 14.1±62.6 | 0.286 | 85.6 | 0.572 |
| **CPAP** | 318 | 62.8 | 19.1±59.4 | 84.1 |

\* n is number of measurements

# Bonferonni correction applied p<0.005 significant (0.05/36 groups)

CPAP – continuous positive airway pressure; PDA – patent ductus arteriosus; CO level – left ventricular output level (as measured by TTE)