Category :**Cardiovascular: monitoring**

A89 - ***Evaluation of bias and trending ability of non-calibrated multi-beat analysis continuous cardiac output monitoring in critically patients***

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Introduction:

Prediction of fluid responsiveness using non-calibrated continuous cardiac output remain poorly evaluated. We aimed to evaluate bias and trending ability of non-calibrated multi-beat analysis continuous cardiac index (CCI_{MBA}), against calibrated pulse-contour analysis continuous cardiac index (CCI_{PCA}) in ICU patients undergoing a passive leg raise (PLR) and/or a fluid challenge (FC).

Methods:

In this single-center observational prospective study, we enrolled hemodynamically stable adult patients treated with norepinephrine, monitored with transpulmonary thermodilution-calibrated CCI_{PCA} (reference), and in which a PLR and/or a FC (500 ml in <15 min) was clinically indicated. After connection of the CCI_{MBA} device (evaluated method) to the bedside monitor, paired CCI_{MBA} and CCI_{PCA} were recorded prior to (*baseline replicate*) and during the PLR and/or FC (*maximum replicate*, i.e. highest value). Fluid responsiveness was identified if the relative change in CCI_{PCA} between baseline and maximum replicates ($\Delta\%CCI_{PCA}$) was >10% during PLR and >15% during FC. Bias of paired data was evaluated using all replicates, and the trending ability using 4-quadrant and radial plots. $\Delta\%CCI_{MBA}$ optimal threshold during PLR to predict fluid responsiveness ($\Delta\%CCI_{PCA}$>15% during FC) was estimated using the receiver-operating curve (AUROC).

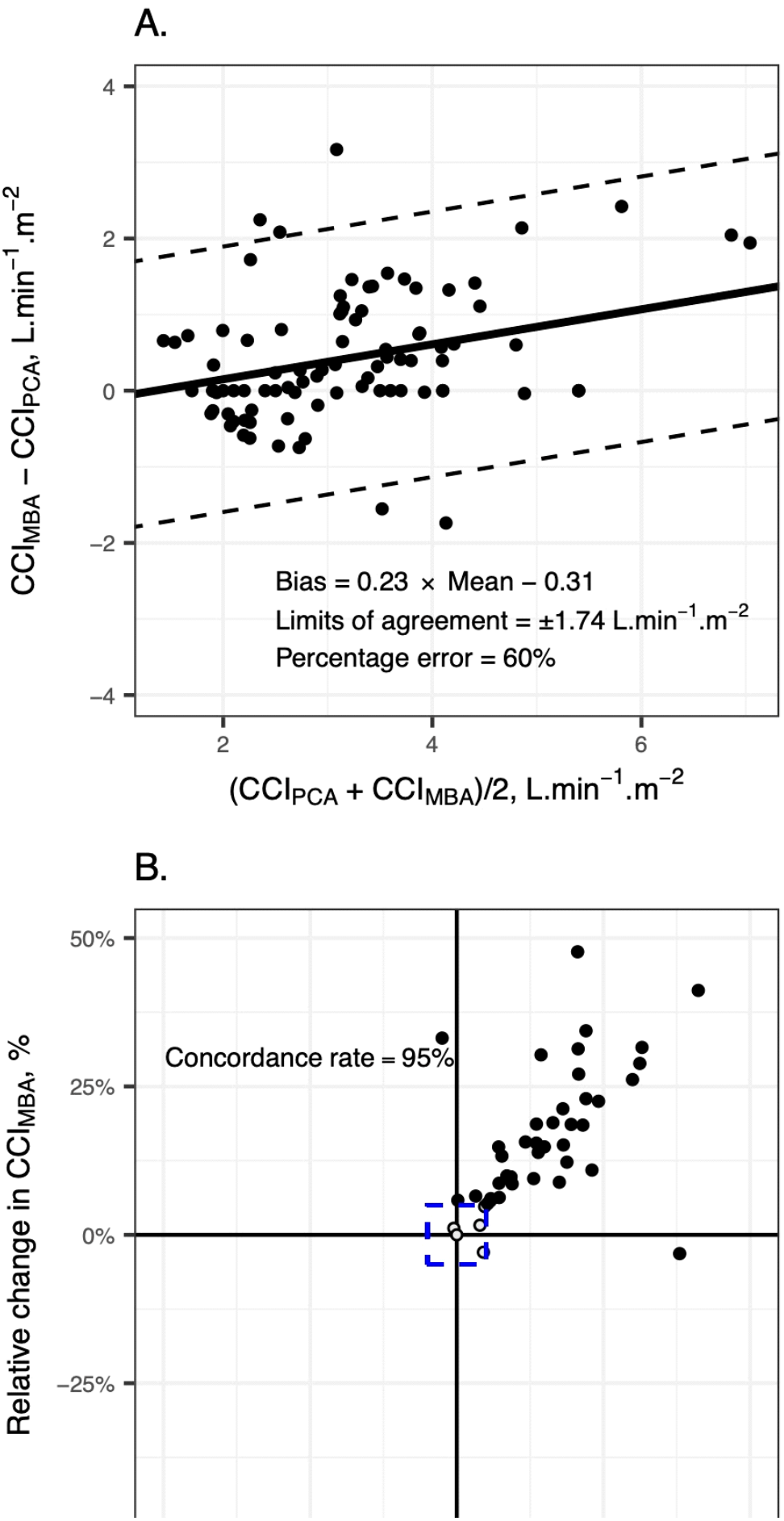
Results:

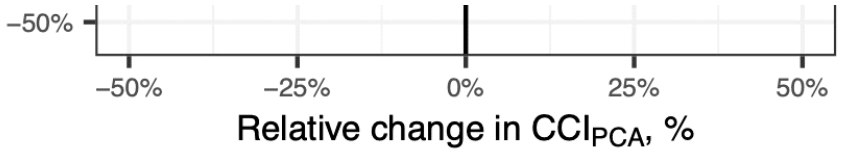
29 patients (median 68 [IQR: 57–74] yo, SOFA 12 [8–14]) received 28 PLR and 16 FC. CCI_{MBA} and CCI_{PCA} were significantly correlated (R^2=0.73). The bias between methods increased with higher cardiac index values (Figure 1A). $\Delta\%CCI_{MBA}$ adequately tracked changes in $\Delta\%CCI_{PCA}$ (Figure 1B) with an angular bias of 2±23° (*P*=0.52 compared to 0°, Figure 1C). $\Delta\%CCI_{MBA}$ during a PLR had an AUROC of 0.82 (*P*<0.05), and an optimal diagnostic threshold >15% to predict fluid responsiveness (sensitivity: 0.99, specificity: 0.76).

Conclusion:

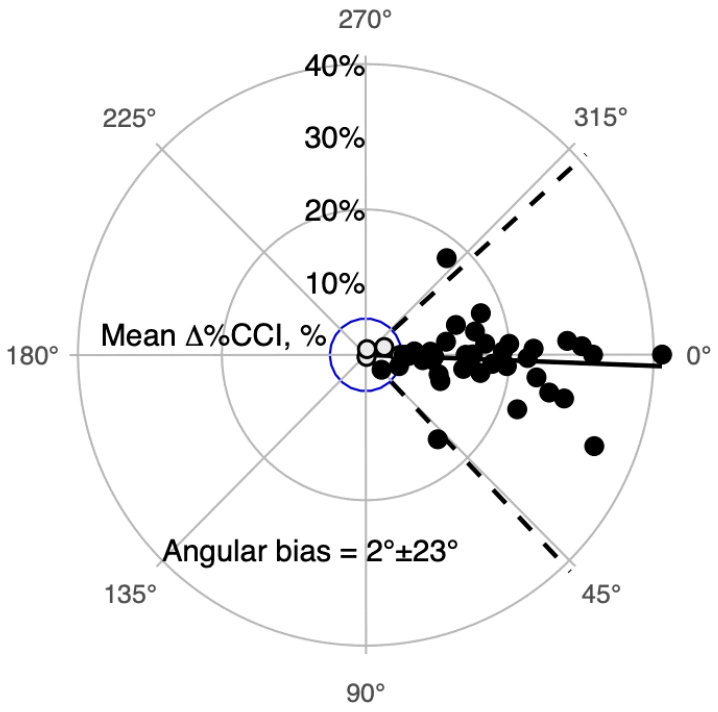
Non-calibrated CCI_{MBA} showed a non-constant bias but an adequate ability to track changes in CCI_{PCA} and good performance to predict fluid responsiveness.

Image :


A.
4
2
0
−2
−4
2
4
6
$CCI_{MBA} - CCI_{PCA}$, $L.min^{-1}.m^{-2}$
$(CCI_{PCA} + CCI_{MBA})/2$, $L.min^{-1}.m^{-2}$
Bias = 0.23 × Mean − 0.31
Limits of agreement = ±1.74 $L.min^{-1}.m^{-2}$
Percentage error = 60%
B.
50%
25%
0%
−25%
Relative change in CCI_{MBA}, %
Concordance rate = 95%



C.



Bland and Altman plot of CCI_{MBA} against CCI_{PCA} (panel A), quadrant plot of Δ% CCI_{MBA} against Δ% CCI_{PCA} (panel B), and corresponding radial plot (panel C). Broad solid lines are bias (A) and angular bias (C), and dashed lines are their limits of agreement. Vertical and horizontal solid lines delimit quadrant limits (B). The blue square/circle identifies excluded Δ% CCI values with a relative change < 5% (B and C). The equation describing the non-constant bias is given in panel A.