#3651

COMPARISON OF WHOLE-BODY VERSUS THORACIC BIOIMPEDANCE IN RELATION TO ULTRAFILTRATION VOLUME AND SYSTOLIC BLOOD PRESSURE DURING HEMODIALYSIS

Melanie Schoutteten[1], Lucas Lindeboom[2], Astrid Brys[3], Dorien Lanssens[1], Christophe Smeets[5], Hélène De Cannière[1], Bart De Moor[1], Jacques Peeters[5], Line Heylen[5], Chris Van Hoof[??], Willemijn Groenendaal[2], Jeroen Kooman[3] and Pieter Vandervoort[5]

[1]University Hasselt, Belgium, [2]Imec The Netherlands, Eindhoven, Netherlands, [3]MUMC+, Netherlands, [4]Imec Belgium, Belgium and [5]Imec Belgium, Belgium

Background and Aims: In contrast to portable whole-body bioimpedance, which estimates fluid status at a single point in time, thoracic bioimpedance applied by a wearable device could enable continuous measurements. However, clinical experience with thoracic bioimpedance in patients in dialysis is still limited. The aim of this study is to test the reproducibility of whole-body and thoracic bioimpedance measurements and to compare their association with hemodynamic changes during hemodialysis.

Method: In total, 54 patients were included in this cross-sectional observational study. Whole-body resistance at 5kHz, thoracic resistance at 8kHz, systolic blood pressure and ultrafiltration volume were measured. All measurements were taken at pre- and end-dialysis during two consecutive sessions. Data were approached by mixed-modelling and Spearman correlation analysis.

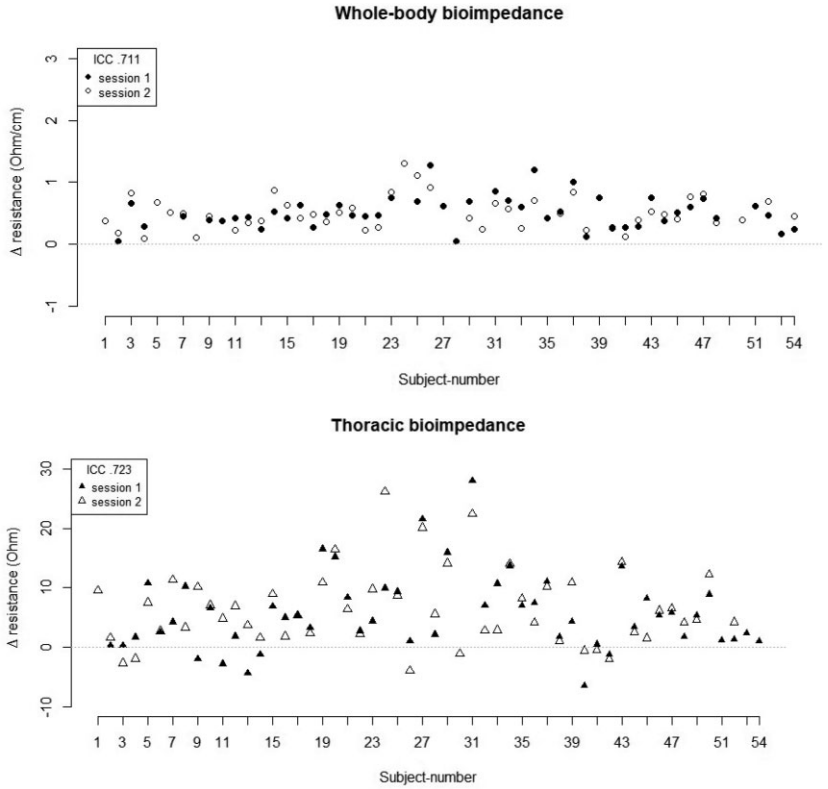

Figure 1: Subject-specific plot showing the pre-to-end changes in whole-body (A) and thoracic (B) bioimpedance for session 1 and 2, representing the intraclass correlation (ICC).

Table 1: Spearman correlation coefficient between hemodynamic parameters (ultrafiltration volume and pre-to-end dialysis changes in blood pressure) and changes in the resistance component of whole-body and thoracic bioimpedance. All *p*-values were < .001.

	Session 1		Session 2	
	Δ whole-body	Δ thoracic	Δ whole-body	Δ thoracic
Ultrafilration volume	.94 [.91 — .96]	.76 [.66 — .83]	.95 [.93 — .97]	.75 [.65 — .82]
Δ blood pressure	-.37 [-.19 — -.53]	-.45 [-.28 — -.59]	-.37 [-.19 — -.53]	-.39 [-.22 — -.54]

Results: Intraclass correlation of pre- to end-dialysis changes in whole-body and thoracic resistance between the first and second session was .71 [.58 – .8] and .72 [.6 – .81] respectively (Fig. 1). The correlation between ultrafiltration volume and relative whole-body and thoracic resistance was respectively .94 [.91 — .96], $p < .001$ and .76 [.66 — .83], $p < .001$ in the first session and .95 [.93 — .97], $p < .001$ and .75 [.65 — .82], $p < .001$ in the second session (Table 1). Changes in systolic blood pressure negatively correlated to both bioimpedance techniques (whole-body resistance in the first session: -.37 [-.19 — -.53], $p < .001$; in the second session: -.37 [-.19 — -.53], $p < .001$; thoracic resistance in the first session -.45 [-.28 — -.59], $p < .001$; in the second session -.39 [-.22 — -.54], $p < .001$) (Table 1).

Conclusion: Bioimpedance signals from both devices were moderately reproducible between two dialysis sessions. Whereas the relation between changes in ultrafiltration volume and resistance was stronger for whole-body bioimpedance, the relation between changes in systolic blood pressure and resistance was at least comparable for thoracic measurements. Thoracic bioimpedance measurements by a wearable device may serve as an interesting alternative to whole-body measurements for continuous hemodynamic monitoring during hemodialysis.