

Intradialytic connection between blood pressure and hydration status in HD patients

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AIMS

- to investigate whether the prevailing hydration status (HS) and systolic blood pressure (BP) before dialysis could predict how an individual patient is likely to react to fluid removal.

METHODS

- BP was measured before and after dialysis treatment in 566 patients.
- Pre-dialysis hydration status (HSpre) was measured before the treatment using the BCM-Body Composition Monitor (Fresenius Medical Care), see Figure 1.
- Post-dialysis hydration status was calculated by subtracting the ultrafiltration volume (UFV) from pre-dialysis hydration status.
- Each measurement was entered into a diagram (hydration reference plot, HRP), see Figure 4. The region N characterises the reference range of a healthy population, Dx indicates a range of well controlled dialysis patients, and I to IV resemble different relationships between BP and hydration status.
- Each short line in the diagram represents a single treatment indicating the pre to post change in BP and hydration status.
- The data was filtered using a 2D lowpass filter to reveal the underlying morphology (streamlines a to g).

RESULTS

- Patients in group II (high BP, normal or low hydration status) exhibit the strongest average decrease in blood pressure over the treatment (streamline a).
- Patients in group IV with low BP and high hydration status on the contrary may even present increases in blood pressure during treatment (streamline g).
- Group N, Dx and I patients show mild or stronger changes in BP and hydration status, depending on the prevailing location of BP and pre-dialysis hydration status.

CONCLUSION

- In patients with reduced hydration status, intradialytic fluid removal leads to larger drops in BP, increasing the likelihood of hypotensive events.
- Despite the low prevailing BP presented in some patients, intradialytic fluid removal does not always cause a drop in BP. In some patients within this category an improvement in cardiac output might be implicated.
- This study further underlines the necessity of measuring both BP and hydration status.

Please visit the following related posters:

- Thursday:
- TH-PO606 "Following the Target of Normohydration provided by BIS reduces Fluid Overload and IMEs."
 - TH-PO615 "Fluid Overload in European Dialysis Centers."
- Friday:
- F-PO1682 "Malnutrition and Fluid Overload in HD patients – prevalence and risk."

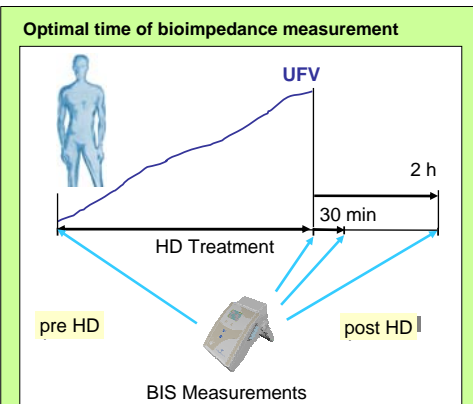
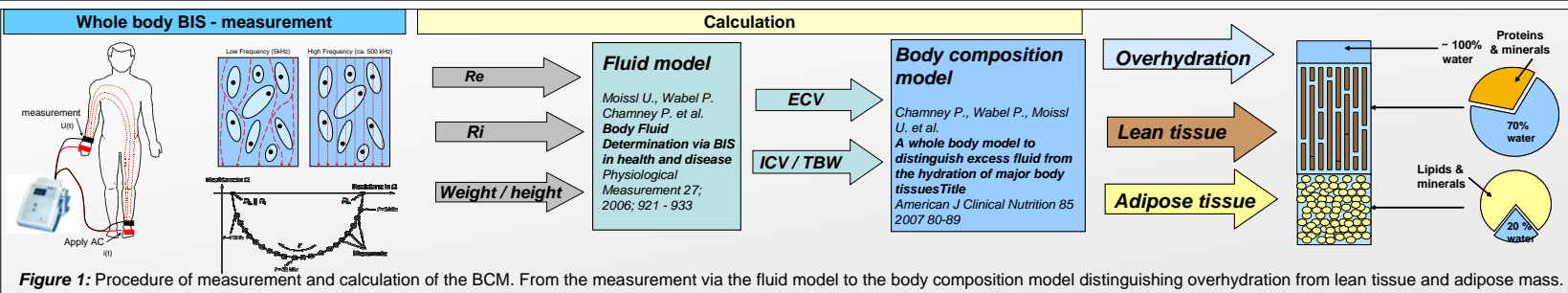


Figure 2: BIS was measured at different times before and after dialysis. Results show that a valid BIS measurement requires at least 30 minutes of equilibration time after the treatment (see Table 1).

Table 1: Comparison of BIS-results versus Ultrafiltration volume (UFV)

	Immediately after treatment	30 min after treatment
UFV (Δweight) [L]	2,50 ± 0,79	2,50 ± 0,79
Δ ECW [L]	2,48 ± 1,0*	2,45 ± 1,12*
Δ TBW [L]	1,92 ± 1,63*	2,54 ± 1,4*
Δ Hydr. Status [L]	2,78 ± 1,1*	2,44 ± 1,09*
Δ ICW [L]	-1,34 ± 1,54° p<0,001	-0,09 ± 0,57**
Δ Fat mass [kg]	0,90 ± 1,37° p<0,001	-0,39 ± 0,9**
Δ Lean mass [kg]	-1,12 ± 1,7* p<0,001	-0,39 ± 0,95**

* = n.s.d. from UFV, ° = s.d. from Zero, ** = n.s.d. from Zero

➡ After 30 min, the changes in hydration status measured by BIS precisely reflect the ultrafiltration volume.

What happens with BP and Hydration Status during dialysis?

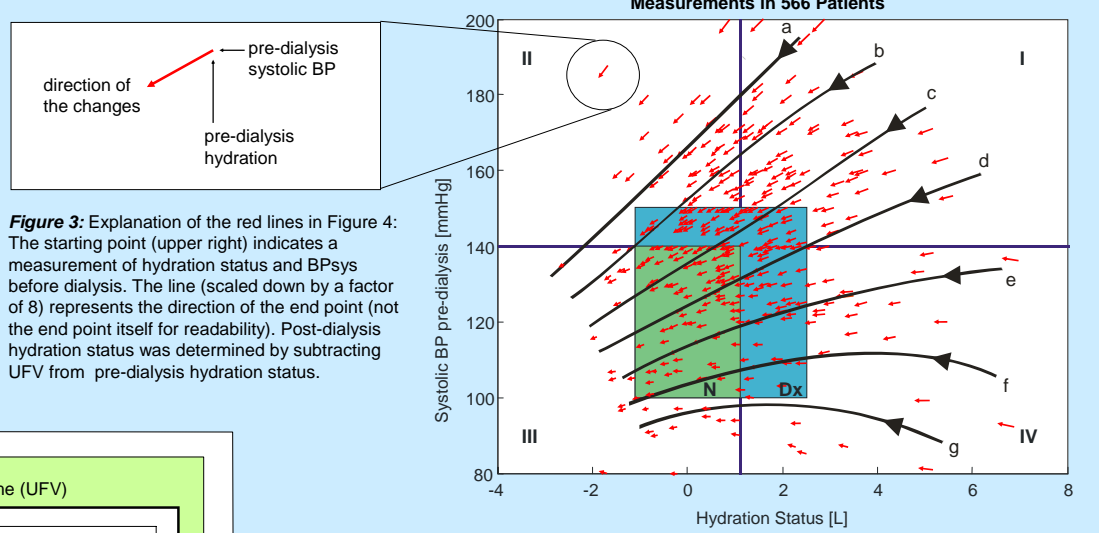


Figure 4: Streamlines in the BP/HS-Plot: Patients react differently to fluid removal, depending on their initial hydration status and pre-dialysis systolic blood pressure. Each short line in the diagram represents a single treatment indicating the pre to post change in BP and hydration status.

Take-home message:

- Low or normal BP is not always a sign of optimal hydration status
- The amount of BP change is dependent on the combination of pre-dialysis hydration status and BP