

# Following the target of normohydration provided by bioimpedance spectroscopy (BIS) reduces fluid overload and intra-dialytic morbid events (IMEs)

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### AIMS

- Assessment of hydration status in HD-patients is a basic pre-requisite for successful dialysis treatment. It was shown (Wabel et al NDT, 2008) that at least 25% of HD-patients suffer from pre-dialysis fluid overload FOpre>2.5L, which is associated with a significantly increased mortality (Wizemann et al. NDT Plus 2008). It has been a matter of debate if this fluid overload can be removed without increasing intra-dialytic morbid events (IME).
- It was the aim of this study to assess whether extreme pre-dialysis fluid overloads >3.5 L and <0.5 L can be corrected and whether this reduction has an effect on IMEs.

### METHODS

- 529 BCM-Body Composition Monitor (Fresenius Medical Care) measurements were performed in 60 HD patients.
- Dry weight was carefully adjusted over a period of 18 months following the normohydration target provided by the Body Composition Monitor as fluid overload in liters:
  - Dry weight was reduced in patients with FOpre > 3.5 L
  - Dry weight was increased in patients with FOpre < -0.5 L.

### RESULTS

- 20% of all HD patients presented a pre-dialysis fluid overload >3.5 L at the start. The fluid overload of these patients could be reduced by more than 2 L without the appearance of additional hypotensive episodes.
- Additionally 20% of HD patients were responsible for more than 85% of all intra-dialytic morbid events (IME) in this center. Most of these patients were in a state of severe dehydration at the end of the HD session. Their dry weight was carefully increased by an average of 1.3 L and this resulted in a 4-fold reduction of IMEs.

### CONCLUSION

- Achieving a state of normohydration and thus avoiding severe over- or dehydration helps to improve the treatment quality with less intra-dialytic morbid events and an improved BP control.
- The target provided by the BCM-Body Composition Monitor is of invaluable assistance to assess and achieve normohydration.

**Please visit the following related posters:**  
 Thursday:  
 • TH-PO608 "Intradialytic Connection between Blood Pressure and Hydration Status in HD Patients."  
 • TH-PO615 "Fluid Overload in European Dialysis Centers."  
 Friday:  
 • F-PO1682 "Malnutrition and Fluid Overload in HD patients – prevalence and risk."

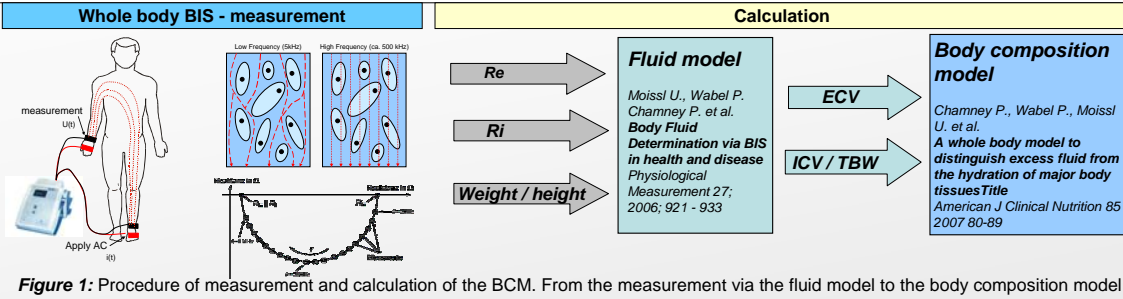


Figure 1: Procedure of measurement and calculation of the BCM. From the measurement via the fluid model to the body composition model distinguishing overhydration from lean tissue and adipose mass.

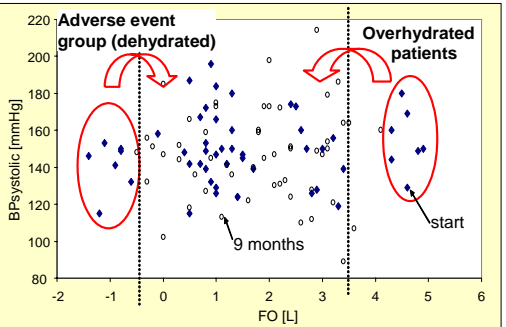


Figure 2: Patients selected for increase / decrease of dry weight.

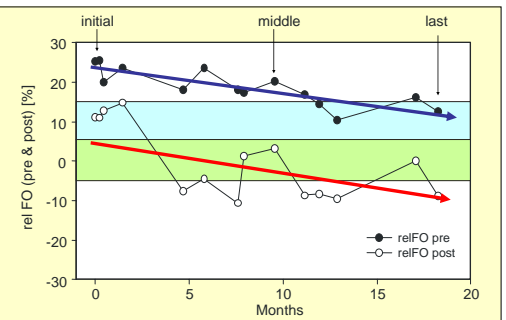


Figure 3: Exemplaric reduction of fluid overload in a selected patient over 18 months.

Table 1: Comparison between first and last assessment. In the overhydrated group, BP was reduced without need of more medication. In the dehydrated group IME's dropped significantly.

Overhydrated patients	First assessment	Last assessment
Fluid Overload pre [L]	4.2 ± 0.6	2.0 ± 0.8 (p<0.001)
Fluid Overload post [L]	2.0 ± 1.1	-0.7 ± 1.2 (p<0.001)
BP pre [mmHg] (mean of 6 treatments)	153 ± 17 89 ± 10	133 ± 31 (p=0.042) 70 ± 25 (n.s.)
Antihypertensive Medication	1.6 ± 1.5	1.0 ± 1.2 (p=0.031)
IMEs: Hypotensive episodes & cramps (in previous 4 weeks)	0.7% ± 2.4%	0.7% ± 2.4%

Adverse events (dehydrated group)	First assessment	Last assessment
FO pre [L]	0.4 ± 0.8	1.7 ± 0.8 (p<0.05)
FO post [L]	-2.3 ± 1.2	-1.0 ± 0.7 (p<0.05)
BP pre [mmHg] (mean of 6 treatments)	155 ± 27 82 ± 15	159 ± 19 77 ± 9 (n.s.)
Antihypertensive Medication	0.5 ± 0.8	0.3 ± 0.5
IMEs: Hypotensive episodes & cramps (in previous 4 weeks)	25.7% ± 10.0%	6.9% ± 7.8% (p<0.001)

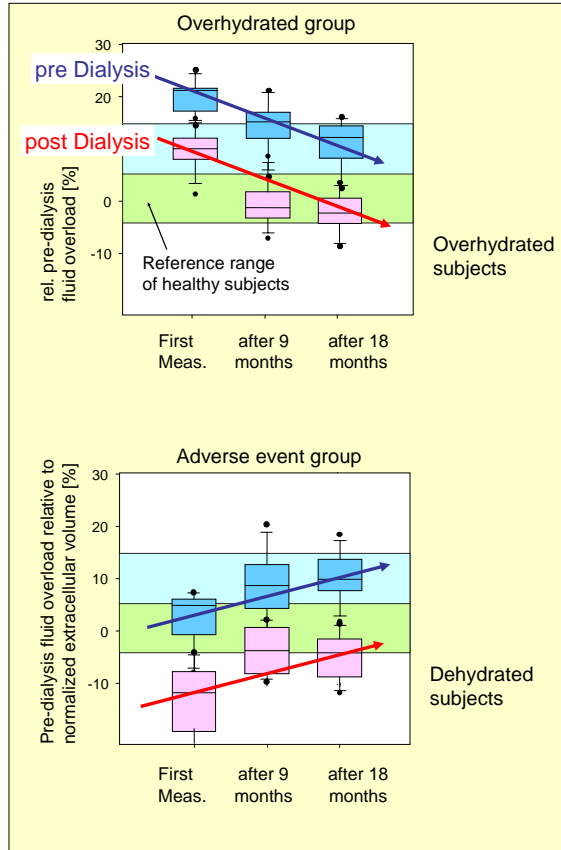


Figure 4: Development of fluid status in the overhydrated patients (upper diagram) and in the dehydrated patients (lower diagram) over 18 months. In both groups, normohydration was finally achieved, as indicated by the green reference range of a healthy population.

**Take-home message:**

- Following the target of normohydration reduces intra-dialytic morbid events and improves BP control
- It is possible to reduce fluid overload in prevalent dialysis patients and maintain this hydration status longterm