Fluid overload in European Dialysis Centres

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Introduction

- In renal replacement therapy, the control of blood pressure has been one of the cornerstones of dry weight management on the basis that fluid accumulation predisposes to hypertension. Recently however, developments in bioimpedance technology have paved the way for objective monitoring of fluid overload. See Fig 1.

- We have shown previously in a limited number of dialysis centres that a direct relationship between blood pressure and fluid overload holds true only for a proportion of patients (Wabel et al NDT, 2008). It has been shown elsewhere that in those patients where fluid overload exceeds 2.5L the mortality risk is significantly increased (Wabel et al. EDTA 2008).The objective of the current study was to investigate further the diverse relationships between blood pressure and fluid overload in a larger number of European centres.

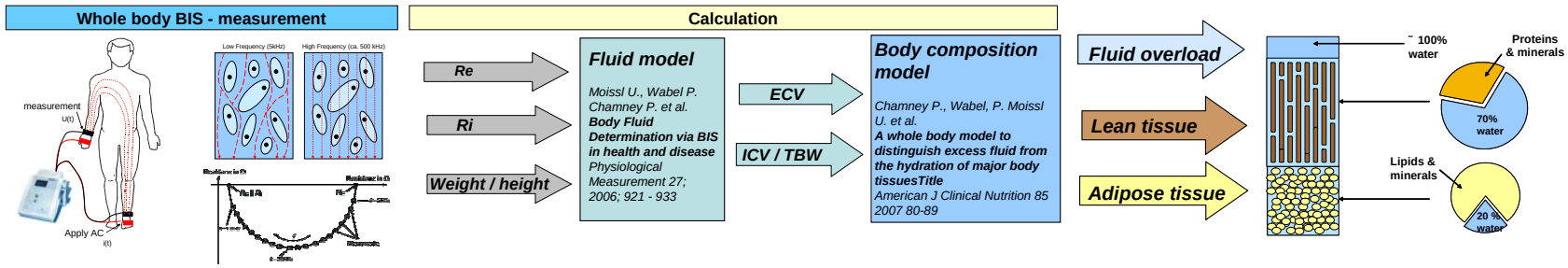

Figure 1: Procedure of measurement and calculation of body composition information by the BCM. The intracellular and extracellular volumes are calculated from the measured whole body impedance. These volumes in combination with a whole body composition model, enables the fluid overload to be distinguished from lean and adipose tissue.

METHODS

- 22 European HD centres participated in the study
- The pre dialysis fluid overload in1500 prevalent patients from these centres were measured using the BCM—Body Composition Monitor
- The fluid overload and systolic blood pressure data were used to generate a hydration reference plot (HRP) which allows HD patients to be compared with an age and gender matched healthy population (Wabel NDT, 2008)

It has been shown that the change in fluid overload (ΔFO) pre to post dialysis reflects the ultrafiltration volume (UFV). (UFV =2.5±0.8, ΔFO=2.4±1.1 *Wabel P, Moissl U, Schultheiss B et al. Accuracy of bioimpedance spectroscopy (BIS) to detect fluid status changes in hemodialysis patients. EDTA 2007*

The reproducibility of volumes using the BCM is high ±0.36 ± 0.71 for extracellular and intracellular spaces respectively. Wabel P., Chamney P., Moissl, U. et al. Reproducibility of bioimpedance spectroscopy (BIS) in health and disease EDTA 2007. This allows cross sectional data to be obtained easily with the BCM, requiring only a single measurement per patient.

RESULTS

•The distribution of patients in the hydration reference plot in terms of fluid overload (FO) and systolic blood pressure (BP) is shown in Fig 2.

• FO exceeding 2.5L is indicated by regions I and IV in the hydration reference plot and was found to be present in 25% of patients (n=380)

•Of the patients where FO>2.5 L, 38% (n=145) presented normal blood pressure (<140mmHg), depicted by region IV of the hydration reference plot.

•In 22.6% of patients (n=349), BP exceeded 150 mmHg despite a fluid overload of less than 2.5 L which is shown as region I-II & II in the hydration reference plot.

•Underhydration, indicated by III in the hydration reference plot, was found be present in 5% of patients (n=83) where BP<140mmHg and FO<-1.1L

•The group N and Dx exhibited fluid overload in the range -1.1 to 2.5 L with a BP below 140 mmHg, representing 47% (n=729) of all patients

CONCLUSION

•In a cross section of European centres, at least 25% of patients exceed 2.5 L and are of cardiovascular increased risk.

•The BCM allows FO to be monitored easily and could be invaluable in the correction of excess FO.

Please visit the following related posters:
Thursday:
TH-PO608 “Intradialytic Connection between Blood Pressure and Hydration Status in HD Patients.”

TH-PO606 “Following the Target of Normohydration provided by BIS reduces Fluid Overload and IMEs.”

Friday:
F-PO1682 “Malnutrition and Fluid Overload in HD patients – prevalence and risk.”

Homepage: www.bcm-fresenius.com

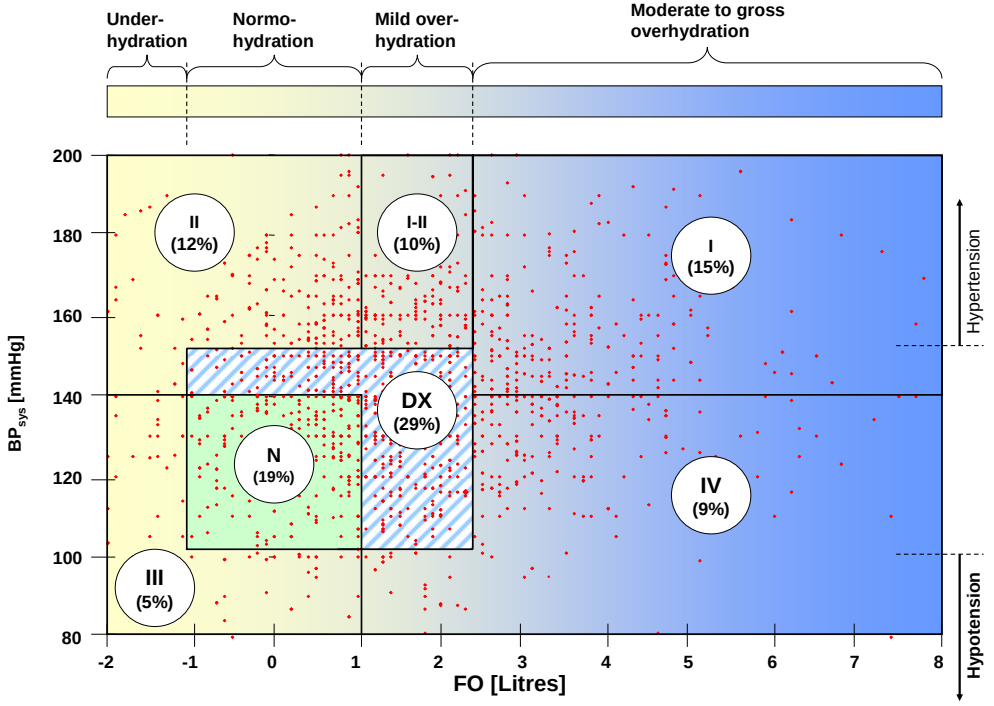

Figure 2: Distribution of pre-dialysis fluid overload and blood pressure in 22 European centres. This plot shows that the relationship between blood pressure and fluid overload is diverse. Group II patients for example are hypertensive despite the absence of any fluid overload. By contrast Group IV patients can exhibit gross fluid overload and this is not reflected in the blood pressure.