

OVERHYDRATION BY BIOIMPEDANCE SPECTROSCOPY (BCM) IS RELATED TO INFLAMMATION AND MALNUTRITION

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INTRODUCTION

Fluid overload is an important cardiovascular risk factor by itself and by its effects on blood pressure. Furthermore, hypervolemia involves an inflammatory condition which influences on the morbidity and mortality of patients on haemodialysis¹.

AIM

Demonstrate the association between hydration and nutrition parameters by bioimpedance spectroscopy with Fresenius Medical Care's Body Composition Monitor (BCM), with clinical and analytical indicators related to morbi-mortality in dialysis.

METHOD

We included 1.316 hemodialysis patients whose hydration status was measured monthly with BCM, among 3.719 patients from Fresenius Medical Care Spanish Centres.

We excluded those patients hospitalized during the monitoring period and patients with amputation or wearing a unipolar pacemaker. Technically wrong BCM measurements defined as those with Quality (Q) less than 80 were also excluded.

We followed our patients during 3 months after their first BCM measurement and we recorded: renal disease etiology, Charlson Index (age adjusted), diabetes mellitus and ischaemic heart disease as comorbidities, age, Hemodialysis (HD) vintage, predialysis systolic and diastolic blood pressure; BCM parameters (relative overhydration (ROH), lean Tissue Index and Fat Tissue Index), C-Reactive Protein (CRP), Hemoglobin (Hb), Ferritin, Transferrin Saturation Index (TSAT), Erythropoiesis Stimulating Agents (ESA), monthly iron endovenous dose, Erythropoietin Resistance Index (ERI) and antihypertensive drugs (num./week).

We set patients in two groups based on their ROH: greater than 15% versus lower or equal to 15% (table 1). Patients with ROH>15% were considered to have Overhydration following Wizemann methodology².

The analysis was performed with the SPSS computer program, version 19. P< 0.05 was considered to indicate statistical significance.

PARAMETER	ROH>15%	ROH<=15%
Gender (% male)	68,6	60,4
Age (years)	67,22±14,71	68,31±14,22
Charlson Index (age adjusted)	4,89	5,11
Diabetes Mellitus (%)	26,08	25,73
Cardiovascular events (%patients)	8,35	11,51
HD Vintage* (months)	48,79±45,31	34,98±34,8
SBP* (mm Hg)	140,64±22,98	134,82±20,79
DBP (mm Hg)	68,49	66,38
antiHTA* (unit/month)	76,29±66,52	58,09±57,34
CRP* (mg/dl)	16,9±41,38	10,72±18,01
Albumin* (mg/dl)	3,73±0,41	3,87±0,33
LTI* (mg/kg ²)	11,07±2,33	11,6±2,9
FTI* (mg/kg ²)	11,97±4,4	15,8±6,63
Hb* (g/dl)	11,4±1,29	11,6±1,22
Ferritin (µg/l)	524,24±401,30	493,25±382,7
TSAT (%)	29,7±14,61	30,64±14,69
ERI* (UI/Kg/Week/Hb)	10,93±9,98	8,01±7,42
ESA* (UI/Kg/week)	120,09±102,83	90,85±81,76
Iron dose* (mg/week)	303,22±237,95	268,5±186,98

Table 1: Parameters in Relative Overhydration greater versus lower or equal to 15% (*)p<0.05. SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; LTI: Lean Tissue Index; FTI: Fat Tissue Index.

RESULTS

In our study, there were 921 patients (69.08%) with a ROH lower or equal to 15% and 395 patients (30.92%) with ROH higher 15%. Those patients with a baseline ROH higher than 15% compare to patients with ROH <= 15%, had more HD Vintage and showed higher criteria related to inflammation as CRP, ERI, Lower Hb levels and higher ESA consumption.

Systolic Blood Pressure and hypotensive drugs consumption were higher. Also, malnutrition related criteria (Albumin, and LTI and FTI) were lower. No statistically significance was found for age, Ferritin and TSAT.

CONCLUSIONS

- Overhydration is correlated with an increase of ERI and CRP, likewise lower albumin, and lean and fat tissue index.
- Overhydration is related to a higher blood pressure and a higher consumption of hypotensive drugs.
- The correlation between parameters of bioimpedance spectroscopy and inflammation and malnutrition markers may indicate that a good volume control is the optimal strategy for reducing morbid-mortality in hemodialysis patients.

BIBLIOGRAPHIC REFERENCES

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