

ECW/TBW index is reliable parameter for dry weight monitoring in hemodialysis patients

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Background

Achieving desired dialysis adequacy parameters like Kt, Kt/V as well as proper dry weight (DW) to control volemia are important goals in hemodialysis (HD). Bioimpedance analysis (BIA) has been reported as an accurate way for estimating DW, however among many generated output data, like resistance, TBW etc, no single parameter has been recommended. Recently combination of biochemical and bioimpedance parameters like Kt/R (resistance) has been proposed as better single index of adequacy.

Objectives

In this study, we aimed to monitor BIA parameters reflecting body fluid and DW in hemodialysis patients without clinical features of overhydration during 6 month follow-up to identify the most reliable single parameter.

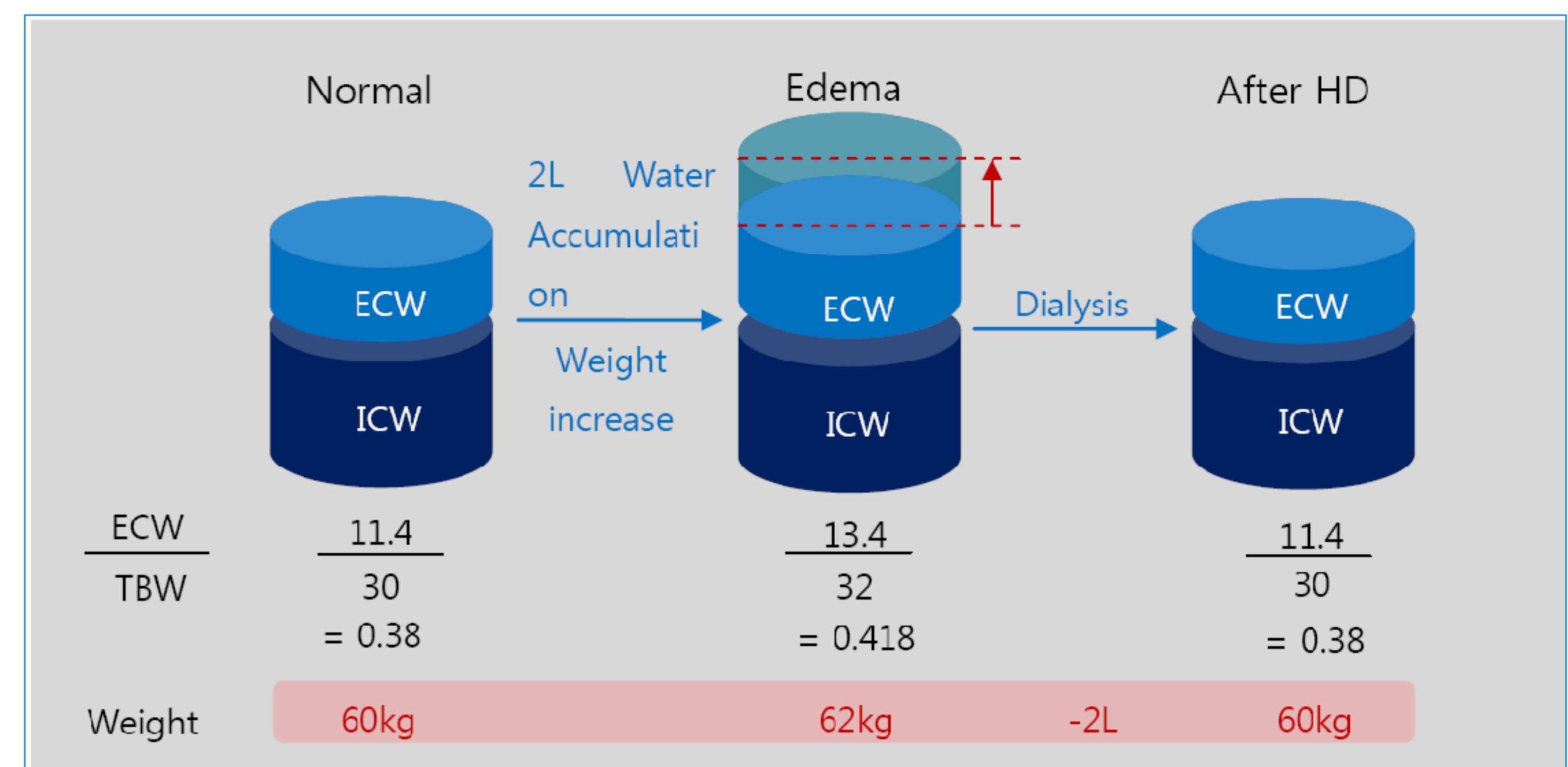
Design and Patients

Since Jan.2012 to Jan.2014 in two HD centres (one academic and one commercial) 317 patients were on standard HD program for more than 6 months. Among them 28 uremic patients (18 F; 10 M) with mean age 64,5 ± 11 y. meet following inclusion criteria:
1. lack of clinical signs of hyperwolemia (no congestion or edemas), 2. pre-HD blood pressure <150/90mmHg, 3. maintained diuresis, 4. lack of malnutrition, 5. interdialytic weight gain <0,5kg and 6. repeated BIA measurement during 6 months.

Methods

Each patient was evaluated before HD session every 6 weeks by means of BIA measurement using portable apparatus BCM (Fresenius) and presence of any symptoms of body fluid change. Recorded BIA parameters were R – resistance read at 50kHz, ECW –extra cellular water, TBW – total body water and ECW/TBW index.

Figure 1. Clinical meaning of ECW/TBW index



Results

All recorded BIA parameters did not significantly changed in 6 months follow up (M1 vs M6) : R 582.84 vs 574.91, ECW 14,9 ± 2,6 vs 15,1 ± 2,1 L, TBW 31,1 ± 5,7 vs 31,2 ± 5,9L, ECW/TBW index 0,483 ± 0,03 vs 0,486 ± 0,03; all NS. (table 1). Other clinical parameters were also stable (M1 vs M6) BMI 27.48 vs 26,6 ± 4,4 kg/m², eKt/V 1,34 vs 1,43, SBP/DBP 139,5/74,1 mmHg vs 140/76,1 mmHg; all NS.

Internal consistency calculated from the pairwise correlations for single parameters was the highest for ECW/TBW index (0,71; p<0,001) and the lowest for R (0,54; p=0,04).

Table 1. BIA parameters and blood pressure at month (M) 1 and 6

BIA parameter	mean M1	mean M6	SD M1	SD M6	p
BMI M1 vs. BMI M6 kg/cm ²	27,00	26,61	4,8	4,5	0,738
R M1 vs. R M6 Ohm	582,08	574,58	84,9	90,8	0,750
ECW M1 vs. ECW M6 L	14,94	15,08	2,6	2,2	0,425
TBW M1 vs. ECW M6 L	31,08	15,08	5,8	2,2	0,000
ECW/TBW M1 vs. ECW/TBW M6	0,48	0,49	0,0	0,0	0,764
Blood pressure pre-HD					
SBP M1 vs. SBP M6 mmHg	139,58	140,00	11,7	10,0	0,458
DBP M1 vs. DBP M6 mmHg	74,17	76,17	5,8	4,6	0,254

Conclusion Based on repeated BIA measurement in stable HD patients with maintained diuresis the most reliable single parameter indicating proper DW was ECW/TBW index. Hidden subclinical fluid overload was noticed in BIA within 6 months since ECW, TBW, DBP slightly raised while BMI declined

