

# CHANGES OF BIOIMPEDANCE ANALYSIS MEASURES IN CHRONIC HEMODIALYSIS PATIENTS DURING ONE YEAR

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## AIM AND OBJECTIVES

To evaluate changes of body composition, phase angle and volemia status in chronic hemodialysis patients over 1 year period:

1. To evaluate differences between hypervolemia and normovolemia groups, and changes in volemia status in chronic hemodialysis patients over 1 year;
2. To evaluate changes in phase angle in chronic hemodialysis patients over one year period;
3. To compare body composition in chronic hemodialysis patients in the year 2013 and 2014.

## METHODS

Cross-sectional study included all adult chronic hemodialysis (HD) patients (n=63) with more than 3 months dialysis vintage dialysed in Hospital of Lithuanian University of Health Sciences in October 2013. Exclusion criteria: amputated limb, electrocardiostimulator, big metal implants. Bioimpedance analysis (BIA) was performed after dialysis session in all study patients in October 2013 and again in October 2014. Also we collected demographical data, data about blood pressure, diuresis. Volemia status was evaluated according to ratio of extracellular (ECW) and total body water (TBW) – hypervolemia being higher than 39%. Phase angle was used as an indicator of cellular health and integrity. Statistical analysis was performed using SPSS packages. Student's t-test, Mann-Whitney-Wilcoxon test, Pearson Chi-Square test were used to compare hypervolemia and normovolemia groups. Comparison between bioimpedance analysis measures in 2013 and 2014 was performed by paired samples t-test. Statistical significance assumed at  $p < 0.05$ .

## RESULTS

### Comparison of HD patient's data in the years 2013 and 2014

| Factor                   | Year 2013             | Year 2014            | p    |
|--------------------------|-----------------------|----------------------|------|
| ECW/TBW ratio            | 39±1%                 | 41±0.1%              | 0.14 |
| Hypervolemia             | 46%                   | 47%                  | 0.9  |
| Weight gain / own weight | 3.0±1.2%              | 3.1±1.4%             | 0.6  |
| Phase angle              | 5.2±1.02 <sup>0</sup> | 5.3±1.1 <sup>0</sup> | 0.3  |

### Comparison of normovolemia and hypervolemia groups of HD patients in the year 2013

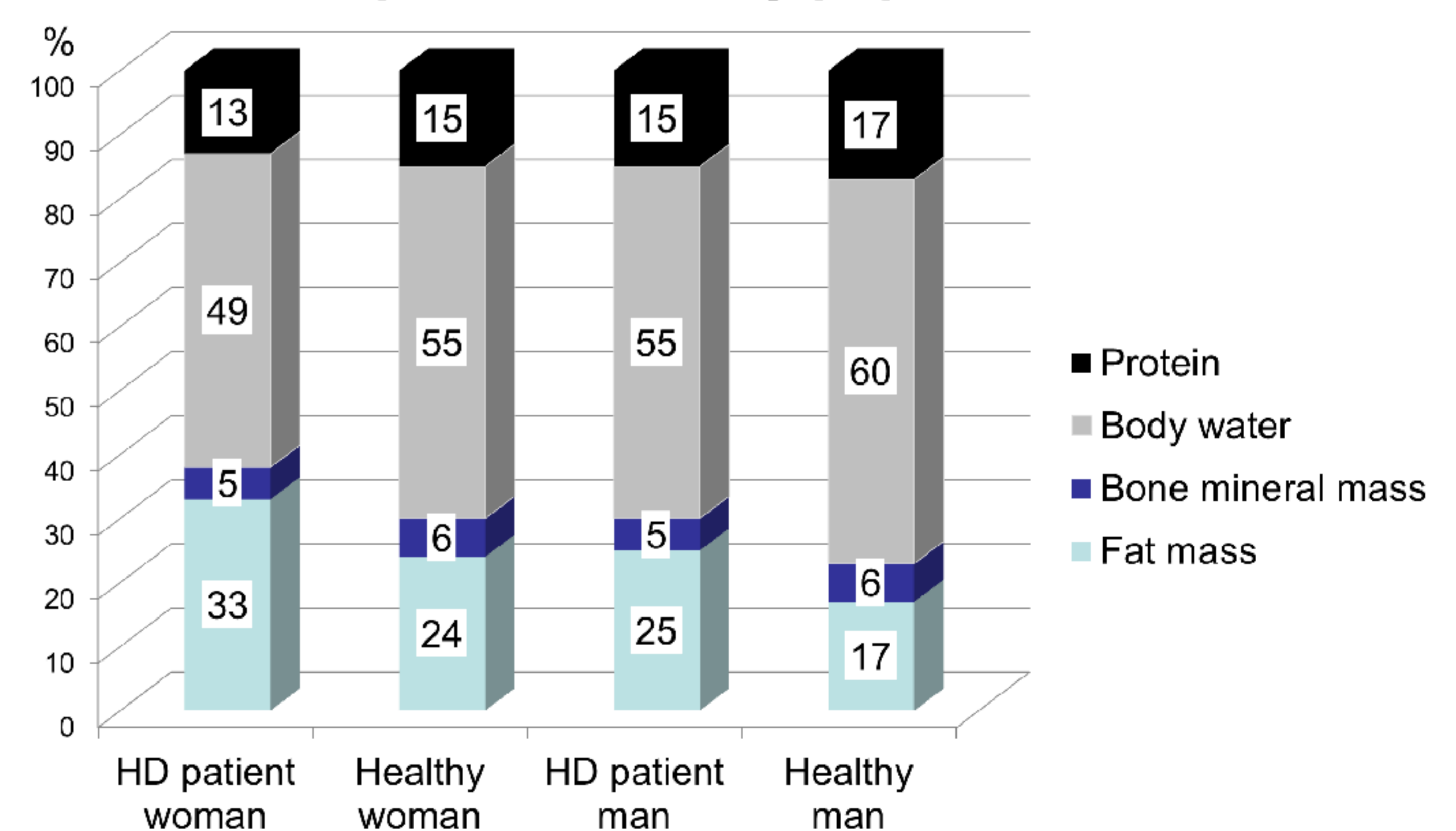
| Factor                        | Normovolemia<br>ECW/TBW ≤ 0.39<br>n= 34 | Hypervolemia<br>ECW/TBW >0.39<br>n=29 | p     |
|-------------------------------|---|---------------------------------------|-------|
| Age (years)                   | 58.3±16                                 | 68±15                                 | 0.012 |
| Diuresis (ml)                 | 522.7±453                               | 275±386                               | 0.03  |
| Years of dialysis             | 3.6±3.1                                 | 6.6±5.7                               | 0.015 |
| Phase Angle                   | 5.8±1.3                                 | 4.3±0.9                               | 0.001 |
| Diastolic BP before HD (mmHg) | 82.7±12.6                               | 73.1±18.4                             | 0.02  |
| Diastolic BP after HD (mmHg)  | 83.5±12.5                               | 73.4±10.7                             | 0.001 |

### Blood pressure of HD patients in the years 2013 and 2014

| Blood pressure (mmHg) | Year 2013 | Year 2014 | p   |
|-----------------------|-----------|-----------|-----|
| Systolic before HD    | 141±21    | 146±24.3  | 0.3 |
| Diastolic before HD   | 79.6±12.8 | 81±13     | 0.6 |
| Systolic after HD     | 137±21    | 136±23    | 0.6 |
| Diastolic after HD    | 78.9±12.7 | 78.2±12   | 0.3 |

We analysed data of 63 ambulatory hemodialysis patients (32 men and 31 women), mean age 63 16 years. Hypervolemic chronic HD patients were older, with longer dialysis vintage, lower diuresis as compared to normovolemic patients but there were no major changes during 1 year period despite our efforts to lower dry weight according to bioimpedance measurements. There were no differences in blood pressure before and after dialysis in the year 2014 as compared to 2013. Phase angle was significantly lower in hypervolemia group of chronic HD patients as compared to normovolemic. Body composition of our hemodialysis patients was: 29% of fat mass, 14% of protein mass, 5% of mineral mass, 52% of total body water in the year 2013 and it did not change during 1 year.

### Body composition of hemodialysis patients as compared to healthy population



## CONCLUSIONS

1. Nearly half of hemodialysis patients were hypervolemic in the year 2013, and this group of patients was older, with less diuresis, lower phase angle and more years on hemodialysis as compared to normovolemic patients. Volemia status did not change during the 1 year period.
2. Marker of cellular health did not worsen during one year of hemodialysis.
3. There were no changes in body composition during one year on hemodialysis.

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