Estimation of body composition in hemodialysis patients by anthropometry method and electrical bioimpedance

Mercedes Albaladejo Pérez, Susana Roca, Laura Bucalo, Diana Manzano, Marisol Ros, Rosa María de Alarcón, Manuel Molina

HGU Santa Lucía. FMC Services, Nephrology, Cartagena, SPAIN.

Introduction

The techniques used for the analysis of body composition in the healthcare setting should be safe, non-invasive and cost-efficient. Hence, it is usual to perform an indirect estimation of FM (fat mass) and FFM (fat-free mass), based on methods like anthropometric measurements or bioimpedance analysis.

Objectives

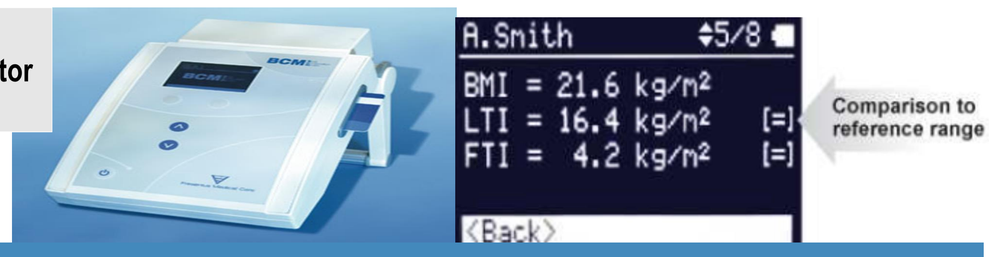
The purpose of this study is to correlate the information provided by both methods, applied to the same group of patients on hemodialysis, in order to assess the usefulness of the anthropometric method in patients on hemodialysis

Methods

In this observational study, a nutritional assessment was performed on 54 randomly-chosen stable patients from our center.

1. **Measurements of the arm and calf perimeters and the four folds** necessary for the calculation of body density (BD) according to the Durnin and Womersley formulas were used: bicipital, tricipital, subscapular, and iliocrestal. The equation of Siri et al. was used to predict the fat mass percentage from the estimated BD **(1,2,3).** Finally, the sample was divided into different nutritional states according to the body fat percentage, using as reference the normal fat percentages accepted by SEEDO (Spanish Society for the Study of Obesity), as well as those published by Bray G. et al. and Gallagher et al.
2. **Bioimpedanciometry:** BCM system (Body Composition Monitor). This system provides information about both the state of fluids in the individual and the nutritional status given by lean tissue mass (fat free mass) and fat mass in kilograms (kg) as well as in relation to body weight (%). All this information is shown in relation to the reference ranges of healthy individuals and hemodialysis patients **(4)**.
3. All statistical analyzes were performed using SPSS 13.

BCM - Body Composition Monitor - Test



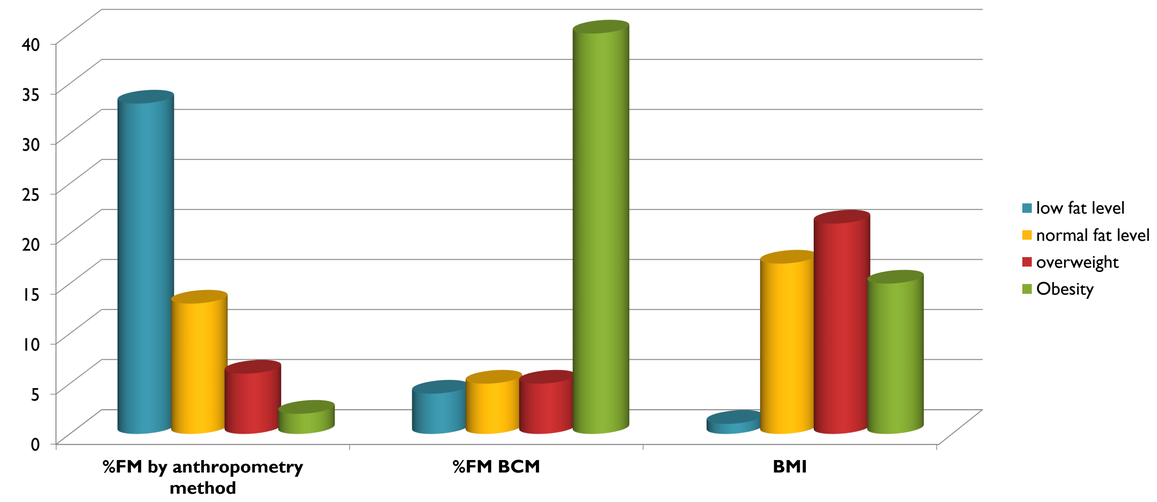
OUTPUT. Information about the patient's body composition

Iliocrestal fold

Tricipital fold

Subscapular fold

Analysis of body composition by anthropometric measures



Prevalence of obesity according to the different methods employed

Results

When calculating the fat mass percentage (fat in kg in relation to body weight (%)) according to the anthropometric method, in our sample composed of 54 patients 33 of them presented optimal fat levels (61.1%); 13 patients showed average fat levels (24.1%); 6 patients got high fat levels corresponding to overweight (11.1%), and 2 patients revealed very high fat levels indicative of obesity (3.7%). In relation to the fat mass percentage indicated by the BCM system, 4 patients showed an optimal fat mass level (7.4); 5 patients did average fat levels (9.3%); 5 patients were at a level corresponding to overweight (9.3%) and 40 patients at a level corresponding to obesity (74.1%). High fat levels according to anthropometric measurements were associated with high fat levels according to BCM (Pearson correlation 0.309; Sig. (Bilateral) 0.023), although in absolute values there were large differences. The predictive model based on anthropometry underestimated the fat content with respect to that using the bioelectrical parameters (only 3.7% obese versus more than 70% obese by BCM). Statistical analysis (Pearson's chi-square) yielded significant valuation differences (p = 0.005).

Conclusion

In conclusion, the anthropometric method seems to underestimate the fat content when it is used on the population of hemodialysis patients.

References

1- Siri WE. Body composition from fluid spaces and density: analysis of methods. Brozec J, Henschel A, eds. Techniques for measuring body composition. Washington DC: National Academy of Sciences, Natural Resources Council; 1961. p. 223-4

2- Durnin, JGVA and Womersley. Body fat assessed for total body density and its estimation from skinfold thickness: measurements on 481 men and women aged from 16-72 years. British Journal of Nutrition 1974;32: 77-97.

3- Estándares Internacionales para la valoración antropométrica. Sociedad internacional para el avance de la kinantropometría. Marfell-Jones. 2001.

4- Morales R, Román AC. Composición corporal: intervalos de lo normal en el estudio mediante bioimpedancia eléctrica de la población de referencia. Medisan 2004; 8(4):22-34

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Mercedes Albaladejo Pérez

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