KSN SEOUL, KOREA 2023
April 27(Thu) - 30(Sun), 2023
Coex, Seoul, Korea

Abstract Type : Poster
Abstract Submission No. : 1194

Mortality and bioimpedance spectroscopy based dry weight measurement error in elderly hemodialysis patients

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Objectives: Dry weight (DW) estimation is important for hemodialysis patients. Although bioimpedance spectroscopy (BIS) is commonly used to measure DW, the BIS-based DW frequently differs from the clinical DW. In this study, the elderly patients' characteristics were analyzed by dividing the groups according to the gap of difference between the BIS-based DW and the clinically proper DW(DW_{GAP}), and the mortality of each group was compared.

Methods: This retrospective study included patients who underwent hemodialysis at Chungnam National University Hospital from January 1, 2016, to June 2020. All patients were aged ≥60 years. Body composition was assessed using a portable BIS device.
To assess differences in blood chemistry and survival rate, four groups were classified based on the absolute value of DW_{GAP}; Group 1: DW_{GAP}<0.5 kg, Group 2: 0.5kg ≦ DW_{GAP}< 1kg, Group 3:1kg ≦ DW_{GAP}<2 kg, and Group4: 2kg GAP.

Results: A total of 715 patients were analyzed: Group1 (n = 236), Group2 (n = 171), Group3 (n = 137), and Group4 (n = 171). Groups1 and 2 had the same survival rates (78%); however, Group3 had a lower rate (73%) and Group 4 showed a significant decline (59%). In the laboratory test, Group4 had lower hemoglobin, total protein, albumin, creatinine, and chloride levels than Groups1, 2, and 3. In the BIS data, ECW and E/I were higher in Group4 than in Groups1, 2, and 3.

Conclusions: In the elderly patient group, mortality increased in the group where the DW_{GAP} was >2 kg. Lower blood albumin levels, total protein levels, and E/I ratios of ≥1 were detected in the group with a gap of ≥2 kg, and these parameters are likely to adversely affect the survival of elderly patients requiring dialysis.

Table 1. Clinical characteristics as subdivision of DWGAP