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Interdialytic Weight Gain and Mortality in Hemodialysis Patients: Association with Serum Albumin and Nutrition Parameters: A One-Year Prospective Cohort Study

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Objectives : Interdialytic weight gain (IDWG) in hemodialysis patients has conflicting clinical implications, perceived as a combination of volume and nutritional markers. This study aimed to examine the predictive value of IDWG in terms of mortality and its association with albumin and nutritional parameters in hemodialysis patients.
Methods : The study was done at the renal unit of Chong Hua Hospital, Cebu, from November 2022 to October 2023. It comprised 74 chronic kidney disease patients on thrice weekly dialysis. Patients were categorized into two groups according to the IDWG%: <3% (Group I) and >3% (Group II). Bioimpedance analysis (BIA) was used to calculate the dry weight and body composition data. The mean IDWG% of 12 hemodialysis sessions were studied in the first, sixth, and twelfth months. After a year, the link between IDWG% and mortality risk was determined.
Results : Group 1 had considerably lower IDWG, IDWG%, albumin, and phosphorous. Interestingly, our study showed that higher IDWG% was associated with younger patients, lower BMI, and lower dry weight. Bioimpedance measurements didn't differ in both groups. In terms of mortality, Group 1 patients exhibited a higher death rate than those with IDWG% >3% (46.7% vs. 15.09%). There was no mortality among patients with albumin >3.8 g/dL. Intriguingly, just two (28%) of the patients in Group 1 died from cardiovascular causes, but cardiovascular issues brought on 75% of the fatalities in Group 2. Sepsis (43%) accounted for the majority of deaths in Group 1.
Conclusions : In our study, all recorded mortalities were from patients with albumin levels of <3.8 g/dL. Thus, regardless of IDWG%, albumin is an independent predictor of death in this study. The mortality risk was, however, significantly increased in the low IDWG% group (46.7 vs. 15.09%) compared to the high IDWG% group. Our findings support the concept that IDWG goals should be tailored to individual patients.

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Table 2.
The Comparison of Laboratory and Anthropometric Parameters between IDWG Category at Initial Assessment, After 6 Months, and After 12 months of Follow-Up

	Initial assessment		After 6 months		After 12 months	
	IDWG% <3% *n* = 15	IDWG% ≥3% *n* = 59	IDWG% <3% *n* = 11	IDWG% ≥3% *n* = 53	IDWG% <3% *n* = 8	IDWG% ≥3% *n* = 51
Dry Weight *in kg*	69.60 ± 19.77	60.67 ± 12.57	67.08 ± 23.74	60.64 ± 12.48	76.37 ± 23.51	60.14 ± 13.09
IDWG *in kg*	1.72 ± 0.40*	2.76 ± 0.76*	2.08 ± 0.92	2.59 ± 0.83	2.09 ± 0.36*	2.74 ± 0.81*
IDWG *in %*	2.53 ± 0.42*	4.60 ± 1.13*	3.28 ± 1.53	4.38 ± 1.29	2.93 ± 0.58*	5.60 ± 7.38*
Single pool Kt/V	1.53 ± 0.58	1.68 ± 0.54	1.56 ± 0.54	1.73 ± 0.47	1.54 ± 0.62	1.79 ± 0.40
URR	70.75 ± 16.07	73.73 ± 8.42	71.14 ± 11.88	75.05 ± 7.29	69.19 ± 15.37	89.45 ± 96.54
BMI *in kg/m²*	26.91 ± 6.18*	23.80 ± 4.03*	26.82 ± 7.14	23.85 ± 3.90	28.56 ± 7.72	23.29 ± 4.84
Pre-HD SBP	132.57 ± 9.81	131.14 ± 8.45	129.73 ± 11.76	132.25 ± 9.53	133.75 ± 13.94	135.59 ± 10.69
Pre-HD DBP	74.79 ± 2.61	74.21 ± 3.64	74.55 ± 3.01	74.52 ± 4.58	73.38 ± 3.96	74.88 ± 4.27
MAP	93.93 ± 4.68	93.29 ± 4.81	92.91 ± 5.72	93.73 ± 5.66	93.63 ± 6.99	95.08 ± 5.87
Albumin	2.88 ± 0.31*	3.18 ± 0.51*	3.00 ± 0.55	3.33 ± 0.53	3.05 ± 0.19*	3.26 ± 0.49*
Phosphorous	4.22 ± 1.30*	5.33 ± 1.95*	4.59 ± 1.26	5.37 ± 1.53	4.98 ± 1.67	5.19 ± 1.85
Creatinine	9.46 ± 3.29	9.62 ± 3.01	9.12 ± 4.21	9.63 ± 3.11	9.41 ± 3.45	9.17 ± 2.98
Bioimpedance parameters						
- Phase Angle	4.07 ± 1.05	5.58 ± 8.22	6.50 ± 5.85	5.54 ± 4.54	8.43 ± 6.99	5.88 ± 4.99
- Total Body Water	36.51 ± 8.57	35.06 ± 9.31	38.57 ± 10.11	34.56 ± 8.61	41.00 ± 10.59	34.90 ± 8.04
- Extracellular Body Water	14.42 ± 3.15	14.07 ± 3.53	14.85 ± 3.35	13.81 ± 2.85	15.93 ± 3.12	14.01 ± 3.23
- Extracellular Body Water %	0.40 ± 0.02	0.39 ± 0.02	0.39 ± 0.03	0.39 ± 0.03	0.37 ± 0.03	0.39 ± 0.02
- Body Fat Mass	18.49 ± 16.08	13.10 ± 8.49	23.45 ± 23.98	13.63 ± 8.63	19.29 ± 22.26	13.70 ± 10.73
- Body Fat %	25.40 ± 14.82	20.77 ± 11.72	22.35 ± 17.42	21.48 ± 11.49	23.01 ± 19.40	20.22 ±12.21

Note: * Significant at 0.05

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Table 4.
The Comparative Analysis of the Mortality Rate Between IDWG Category and Mortality by Serum Albumin

Serum Albumin Category	IDWG% <3% *n* = 15	IDWG% ≥3% *n* = 59	P-Value
Albumin ≥ 3.8 g/dL	---	0/6 (0.00)	---
Albumin < 3.8 g/dL	7/15 (46.67)	8/53 (15.09)	0.015 *

Note: * Significant at 0.05