SU-PO264

Comparing Four Body Composition Assessment Methods for Body Fat Measurement in Dialysis Patients. Kamyar Kalantar-Zadeh,[1] Rochelle Bross,[1] Jennifer Zitterkoph,[1] Sara Colman,[2] David W. Gjertson,[3] Joel D. Kopple.[1] [1]*Nephrology & GCRC, Harbor-UCLA, Torrance, CA;* [2]*Wild West, DaVita, Inc, Norwalk, CA;* [3]*Biostatistics, UCLA, Los Angeles, CA.*

When assessing total body fat, some methods are less costly & more convenient. We examined 4 methods & evaluated their accuracy in 90 maintenance hemodialysis patients (pts), who underwent whole body dual-energy X-ray absoptiometry (DEXA), near-infrared interactance (NIR) of the upper arm, bioelectrical impedance analysis (BIA) & caliper anthropometry triceps skinfold (TSF). All 4 tests were performed within an hour during a non-dialysis day. Pts, 43% females, 44% diabetics, 33% Blacks & 51% Hispanics, were 50.8±13.3 (±SD) yrs & had undergone dialysis for 31.1 mos. Their BMI was 26.0±6.3 kg/m². Paired differences, Pearson correlations & coefficients of variation (CV) were calculated based on DEXA as the reference standard. Bland-Altman plots were explored & Pitman's test of variance difference & ratio between DEXA & each of the 3 methods were examined (p-value>0.20 indicates lack of significant difference or ratio between the studied method & DEXA):

Measures/Test	DEXA	NIR	BIA	TSF
Mean±SD (% total body)	28.7±9.9	27.0±10.4	32.5±10.9	31.7±7.9
Median (%)	28.6	27.3	32.2	33.2
Inter-quartile range (%)	20.4-37.0	20.0-34.3	24.9-40.3	26.6-37.9
Minimum-Maximum (%)	9.9-53.7	4.3-45.8	10.4-58.4	12.8-43.8
Paired difference (%)	0	-2.3	+3.3	+2.7
Correlation vs. DEXA	n/a	0.86	0.89	0.76
Paired CV with DEXA	n/a	41%	45%	38%
Pittman's difference p	n/a	0.516	0.024	0.003
Pittman's variance p	n/a	0.514	0.016	0.003

Compared to DEXA, BIA & TSF tend to overestimate while NIR tends to underestimate the body fat percentage. Both BIA & NIR, but not TSF, have superior correlations with DEXA (r>0.85). NIR was the only method with difference & ratio against DEXA not statistically significant, indicating lack of non-differential misclassification. Hence, both NIR & BIA appear to be acceptable methods. However, the NIR is a less elaborate & more pt- & evaluator-friendly method, especially suitable for fast & convenient body fat screening in dialysis clinics.

SU-PO265

Estimate of Body Composistion and of Body Water Volumes in ESRD Patients Treated by Hemodialysis - Comparison of Different Methods. Carlo Donadio,[1] Michela Ardini,[1] Cristina Consani,[1] Annalisa Lucchesi,[1] Barbara Nerucci.[1] [1]*Internal Medicine - Nephrology, University of Pisa, Pisa, PI, Italy.*

Malnutrition is closely related with morbidity and mortality of hemodialysis (HD) patients. Advanced malnutrition induces alterations in body composition, mainly a reduction in muscle mass and hence in body cell mass (BCM), and an increase in total body water (TBW) and extra-cellular water (ECW). The measurement of electrical body impedance (BIA) should allow to evaluate BCM and the values of ECW and TBW. However, it has not yet been ascertained if single-frequency (SF) and multi-frequency (MF) BIA are equally adequate.

The aim of this study was to evaluate the adequacy of SF-BIA and MF-BIA to assess nutritional status in ESDR-HD patients, and, in particular, to evaluate BCM, TBW and ECW.

Nineteen ESRD-HD patients (12 m, 7 f), aged 28-82 years, mean 58.9, were examined. TBW was estimated (e-TBW) according to Chertow et al (Kidney Int 51:1578,1997). In all patients, SF-BIA and MF-BIA were performed at the beginning of a dialysis séance and values of SF- TBW, ECW and BCM, and of MF- TBW, ECW and BCM were obtained. Furthermore, creatinine generation (CreatGen, mg/die) was calculated from the increase in serum creatinine, from the end of the dialysis to the beginning of next dialysis séance.

No statistically significant difference was found between mean values of e-TBW (39.2±8.7 L) and SF-TBW (37.5±9.8 L) or MF-TBW (37.6±9.2 L). A good correlation was found between e-TBW and either SF-TBW (r=0.967) or MF-TBW (r=0.971). However, the correlation between SF-TBW and MF-TBW was definitely higher (r=0.997), and the agreement between SF-BIA and MF-BIA was excellent, better than the agreement with e-TBW. The values of SF-ECW and MF-ECW were significantly different (p<0.001).

A close linear correlation was found between CreatGen and SF-BCM (r=0.834). This correlation was closer with MF-BCM (r=0.921). Since creatinine is produced by muscle mass, these data indicate that both values of BCM correlate with the amount of muscle mass.

BIA, either using SF or MF method, seems adequate to assess TBW and BCM in ESRD patients. The values of ECW may be significantly different, depending on the employed method.

SU-PO266

Artificial Neural Network Is More Reliable Than Anthropometrical Equations To Predict Total Body Water in Taiwanese Hemodialysis Patients Based on Bioelectrical Impedance. Chia-Chao Wu,[1] Jainn-Shiun Chiu,[2] Shih-Hua Lin,[1] Yu-Chuan Li,[3] Pauling Chu,[1] Yuh-Feng Lin,[1] Chee-Fah Chong.[4] [1]*Division of Nephrology, Department of Medicine, Tri-Service General Hospital, National Defense Medical Center, Taipei City, Taiwan;* [2]*Department of Nuclear Medicine, Buddhist Dalin Tzu Chi General Hospital, Chiayi County, Taiwan;* [3]*Graduate Institute of Medical Informatics, Taipei Medical University, Taipei City, Taiwan;* [4]*Emergency Department, Shin Kong Wu Ho-Su Memorial Hospital, Taipei City, Taiwan.*

Estimating total body water (TBW) is essential to determine dialysis dose for hemodialysis (HD) patients. Several anthropometrical equations (AE) to predict TBW have been recommended but largely based on Western subjects. We developed an artificial neural network (ANN) compared with 4 AE using multifrequency bioelectrical impedance (BI) as reference method to predict TBW in Taiwanese HD patients.

Two groups (46 healthy controls and 54 HD patients) were enrolled. Four AE including 58% of actual body weight (58-TBW), Watson formula (W-TBW), Hume formula (H-TBW) and Chertow formula (C-TBW) were evaluated. The same demographic and anthropometric parameters were used as predictors and TBW was measured by BI (BI-TBW) as outcome variable in ANN models. All cases were randomized with bootstrap resampling and final selection (ANN-TBW) was assessed by ratio of standard deviation (SDR).

BI-TBW was 31.85±5.86 L in healthy controls and 31.34±6.03 L in HD patients. The final best ANN model was generalized regression neural network (5 input nodes, 2 hidden layers and 1 output node) using kernel-based approximation (SDR = 0.41). Comparison between all methods (table 1), ANN-TBW had highest correlation (0.91 and 0.96, p < 0.01), lowest mean error (ME) and root mean square error (RMSE) and best centralization over zero with shortest tails in Mountain plot.

Although 4 AE overestimate TBW, ANN provides the most accurate prediction with least bias in both Taiwanese groups.

Table 1. Comparison between 4 AE and ANN with BI-TBW

	58-TBW	W-TBW	H-TBW	C-TBW	ANN-TBW
Healthy controls					
ME	-4.82	-1.68	-1.72	-1.06	0.19
RMSE	5.69	2.32	2.36	2.11	1.57
HD patients					
ME	-4.52	-2.53	-3.21	-1.75	0.50
RMSE	6.41	3.69	4.20	3.21	2.64

SU-PO267

Metabolic Studies: Nutrition and Fluid Regulation in Short Daily Hemodialysis. Jules Traeger,[1] Roula Galland,[1] Nguyen-Khoa Man.[2] [1]*Association Utilisation du Rein Artificiel, AURAL, Lyon, France;* [2]*Inserm, U 507, Paris, France.*

Short daily hemodialysis 2 hr 6 times/week (sDHD) leads to a more stable «milieu interieur» than standard hemodialysis 4 hr 3 times /week (SHD). Better metabolic function could be expected. We investigate nutrition and volume regulation which may explain better cardiovascular status.

In 6 patients, age 39.5 ± 14 yrs converted from SHD to sDHD, we studied the behavior of urea quantification and protein intake over one week on SHD and at the 4th week on sDHD, pre and postdialysis blood samples were withdrawn at each session. Quantification of urea and creatinin removal was performed by collecting total dialysate and ultrafiltrate at each session. Daily protein intake (DPI) was done using food record data over the week.

Results were expressed as Mean ± SD, and statistical analysis was performed by using adjusted paired t-tests.

	SHD	sDHD	P
Weight (kg)	56.6 ± 4.0	57.2 ± 4.0	0.08
Interdialytic weight gain (kg)	2.6 ± 0.76	1.3 ± 0.28	0.001
Urea TAC (mmol/L)	14.1 ± 3.0	15.4 ± 3.7	0.06
Urea TAD (mmol/L)	3.9 ± 0.9	2.7 ± 0.6	0.01
Albumin (g/L)	40.2 ± 2.4	42.2 ± 3.7	0.18
Prealbumin (mg/L)	277 ± 40	385 ± 79	0.004
DPI (g/kg)	1.02 ± 0.204	1.18 ± 0.18	0.018
Urea generation (mg/kg/d)	249 ± 40	296 ± 59	0.0081
Creatinin generation (mg/kg/d)	13.6 ± 1.7	13.5 ± 1.8	0.953
Protein intake / Urea removal	4.15 ± 0.61	4.08 ± 0.74	0.70

There is a spontaneous increase in protein intake which goes along with an increase in body weight, serum albumin and prealbumin concentration. Urea TAC increases by +9% whereas Urea TAD decreases by -29.4%. Urea generation rate increases by +18.9% and the Protein intake/Urea removal Ratio show a decrease tendancy. Brain Natriuretic Peptide (BNP) levels are reduced by 62.5% as interdialytic fluid overload is reduced by half.

We conclude that during sDHD : improvement of nutrition indexes is due to important increase in protein ingestion and probably better yield of protein intake; decrease of BNP levels is consecutive to better body fluid regulation which explain the improvement of cardiovascular status.