NEAR SUBJECT MEASUREMENT OF LONGITUDINAL BODY COMPOSITION CHANGES IN PERITONEAL DIALYSIS PATIENTS COMPARED TO HEALTHY CONTROLS

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PROBLEM Disease, ageing and lifestyle changes involving diet and activity level, can cause significant changes in an individual's muscle, fat, bone and both the quantity and distribution of body water. The ability to measure changes in these components of body composition longitudinally, both accurately and with ease in the clinical situation is, therefore, highly desirable.

PURPOSE To establish how a combination of near-subject methods may be used to detect changes in body composition over the course of a year in 7 males receiving peritoneal dialysis (PD) and 10 healthy male controls

DESIGN Total body water (TBW) was measured by deuterium dilution using an online flowing afterglow mass spectrometry (FAMS) breath test that enables immediate and accurate determination of TBW, following deuterium ingestion, from single exhalations. Multifrequency bioimpedance BIA (Xitron) was also used to estimate TBW. % body fat was calculated from taking skinfolds at 4 sites. Weight was measured and Subjective global assessment (SGA) was undertaken.

FINDINGS All subjects were well nourished as defined by an SGA of 'A'. The groups were not matched and there was a difference in the mean age which was not significant; controls 66 (SD 15) yrs, PD 56 (SD 6) yrs p = 0.13. Table 1:There were no significant changes in the control group over the year. The overall weight change was significantly increased in the PD group when compared with the control p = 0.015. There were significant increases in total weight , TBW measured by FAMS and BIA and an increase in body fat in the PD patients (p = 0.02 wilcoxon signed rank). Fat free mass calculated from [total weight change – fat mass change] correlated with the change in body water measured by FAMS and BIA (r = 0.86, p = 0.01; r = -.79, p = 0.036 - respectively). Change in TBW measured by BIA correlated with the change measured by FAMS; r = 0.75 p = 0.052. BIA showed a tendency for the extracellular fluid (ECF) to increase in PD patients over time p = 0.075 rather than the intracellular fluid (ICF); p = 0.3.

CONCLUSIONS These near subject methods were able to detect significant increases in body fat and body water over the course of a year in well nourished, adequately dialysed PD patients. The gain in body water tended to be due to an increase in the ECF space. Although the sample size was small the simple 'bedside' techniques of BIA and skinfolds correlated with the changes measured by FAMS.

RELEVANCE Accumulation of excessive amounts of body fat and extracellular water will have a negative impact on morbidity and mortality of PD patients. The simple techniques described above may be used to aid the clinician to determine the nature of the body composition changes taking place.

Table 1	**10 healthy controls**		**7 PD PATIENTS**	
	Baseline Mean (SD)	**1 year** Mean (SD)	**Baseline** Mean (SD)	**1 year** Mean (SD)
Weight kg	84.35(16.16)	85.05 (18.22)	82.01 (19.51)	86.95 (20.75)*
TBW FAMS kg	46.06 (6.70)	46.71 (6.92)	43.44 (7.7)	47.83(8.74)*
TBW BIA kg	43.97 (9.48)	44.93 (9.40)	40.43 (7.31)	42.68 (7.33)*
ECF kg	19.68 (3.52)	19.93 (3.11)	18.32 (2.93)	19.44 (3.32)$
ICF kg	24.28 (6.31)	25.01(6.58)	22.12 (4.61)	23.17 (4.66)
Body fat kg	24.59 (7.35)	23.95 (9.35)	25.59 (12.09)	27.84 (13.51)*

* p = 0.02 $p = 0.075