Utility of Phase Angle to Identify Cachexia and Assess Mortality in End-Stage Renal Disease

David Seres,[1] Clare Mckeaveney,[2] Gary Adamson,[3] Andrew Davenport,[4] Ken Farrington,[5] Denis Fouque,[6] Kamyar Kalanter-Zadeh,[7] John Mallett,[3] Peter Maxwell,[8] Robert Mullan,[9] Helen Nobel,[2] Donal O'Donoghue,[10] Sam Porter,[11] Joanne Shields,[12] Adrian Slee,[13] Miles Witham,[14] and Joanne Reid[15]

[1]Columbia University Irving Medical Center; [2]Queen's University Belfast, UK; [3]Ulster University, Coleraine, UK; [4]University College London, United Kingdom; [5]University of Hertfordshire, Hatfield, UK; [6]University of Lyon, France; [7]University of California, Irvine; [8]Queens University Belfast & Regional Nephrology Unit, Belfast City Hospital, Belfast, UK; [9]Nephrology Department, Northern Health & Social Care Trust, UK; [10]Manchester University, UK; [11]University of Bournemouth; [12]Regional Nephrology Unit, Belfast City Hospital; [13]University College London; [14]NIHR Newcastle Biomedical Research Centre; and [15]Queen's University Belfast

Objectives: This cross-sectional analysis sought to identify cachexia and assess survival using phase angle (PA) in patients with end-stage renal disease (ESRD) receiving haemodialysis.

Methods: Patients receiving haemodialysis ($n = 87$, mean age 65.9 $+/-$ 13.0) completed a Phase Angle (PA; 50 khz) measurement using bioelectrical impedance analysis. Cachexia variables were recorded according to Evans et al. definition (2008) including nutritional and functional measures (weight, Body Mass Index (BMI), Hand Grip Strength (HGS), Lean Tissue Mass (LTM), C-Reative Protein (CRP), serum albumin, haemoglobin, appetite (Functional Assessment of Anorexia/Cachexia Treatment (FAACT)) and fatigue (Functional Assessment of Chronic Illness Therapy (FACIT)). Survival was assessed at 12 months. Mann Whitney-U and Spearman correlation coefficient were conducted.

Results: The majority of patients completed follow up ($n = 76$). Eleven patients had died. Mean PA was not statistically different between those identified as cachectic and non-cachectic according to Evans et al. (2008) definition or between those patients that survived and died. However, patients that survived had better mean scores of weight, BMI, HGS, CRP, serum albumin and fatigue (FACIT). In addition, LTM scores were significantly better in patients that survived ($P < .01$). Appetite scores were also significantly better in patients that survived ($P < .01$) and those without cachexia ($P = .01$).

Conclusions: This study was part of a larger effort to clarity a phenotype of cachexia in ESRD. Unlike previous research, this study did not find PA useful in identifying patients at a higher risk of cachexia or death. However overall these patients had a very low mean PA. FAACT did discriminate between groups indicating self-reporting measurement tools of nutritional status were useful in identifying patients at a higher risk of cachexia and death. A larger sample and longer follow up is required to balance the limitations of this small study. Timing the administration of PA also requires consideration in future studies.