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Skin autofluorescence and malnutrition as predictors of mortality in dialysis patients.

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Introduction: Skin autofluorescence (SAF), a measure of skin accumulation of advanced glycation end-products (AGEs), is associated with increased mortality in dialysis patients, but the mechanism underlying this association is not completely understood. AGEs are uremic toxins rapidly formed during oxidative stress which is linked with systemic inflammation. Oxidative stress and inflammation have been implicated in the development of malnutrition which has also been associated with higher mortality in the dialysis population but no studies have investigated malnutrition and SAF together. We aimed to investigate the prognostic value of SAF and malnutrition for predicting mortality in dialysis patients.

Methods: SAF was measured in 120 haemodialysis (HD) and 31 peritoneal dialysis patients using an Autofluorescence Reader. Detailed assessment of dietary intake and nutritional status was undertaken and included energy, protein and fat intake, handgrip strength (HGS), anthropometric measurements and Subjective Global Assessment (SGA). Routine biochemical variables were also measured. Survival time was defined as the number of days between the baseline assessment and the date of death, censoring due to kidney transplantation or 30 September 2018.

Results: Mean age and SAF were 64±14 years and 3.4±0.9 arbitrary units (AU), respectively. SGA identified 56 patients (37%) as malnourished and 95 as well-nourished (63%). Median survival time was 576 days (IQR 395 to 684 days) during which 33 patients died. At baseline, patients who died had significantly higher SAF levels (3.8±1.0 vs. 3.3±0.8 AU; p=0.001) and were more likely to be malnourished compared to those who did not die (58% vs. 31%; p=0.006). Additionally, 19 malnourished patients who died had higher SAF values than those who died but were well-nourished (4.2±1.1 vs. 3.3±0.7; p=0.007). Kaplan-Meier analysis showed that survival was significantly better in patients with a baseline SAF level below the median and in those well-nourished than in those with a baseline SAF level above the median and in malnourished patients, respectively (Figures 1 and 2). Univariable analysis identified malnutrition, no educational qualifications, higher SAF, chronological age and lower serum albumin, HGS and energy, protein and fat intake as significant determinants of higher mortality. Multivariable Cox proportional hazards analysis identified SAF (HR 1.44 95%CI: 1.05 to 1.97 per standard deviation [SD]; p=0.023), malnutrition (HR 2.35 95% CI: 1.16 to 4.78; p=0.018) and chronological age (HR 1.60 95%CI: 1.10 to 2.33 per SD; p=0.015) as independent predictors of mortality. There was no interaction between SAF and malnutrition.

Conclusion: Though malnutrition and higher SAF are potentially inter-related, we have found that they were independently associated with increased mortality in this dialysis population. These findings indicate that interventions to correct malnutrition and decrease SAF may improve survival in dialysis patients. Prospective studies are required to test these hypotheses.