

Impact of a medium cut-off dialyzer on skin autofluorescence in haemodialysis patients

Dr. Daniela Viramontes Horner¹, Dr. Nitin Kolhe², Dr. Janson Leung², Dr. Richard Fluck², Dr. Nicholas Selby^{1,2}, Prof. Maarten Taal^{1,2}

¹University of Nottingham, Derby, United Kingdom, ²Royal Derby Hospital, Derby, United Kingdom

Introduction: Advanced glycation end-products (AGEs) are middle-sized uraemic toxins that accumulate in haemodialysis (HD) patients due to increased production, impaired excretion and insufficient removal. Previous studies have reported that the use of a medium cut-off (MCO) dialyzer promotes a greater removal of larger middle molecules (such as AGEs) than conventional high-flux HD and haemodiafiltration. However, to our knowledge, there is no published evidence regarding the effect of an MCO dialyzer on skin autofluorescence (SAF), a measure of long-term tissue AGE accumulation and independent risk factor for mortality in the HD population. We aimed to investigate the impact of using an MCO dialyzer on change in SAF over time in HD patients.

Methods: HD patients were enrolled in a prospective observational study. SAF was measured using a validated Autofluorescence Reader at baseline, 12 and 24 months. During the initial 12 months patients dialysed using high-flux polysulphone, polyarylethersulfone or polyvinylpyrrolidone dialyzers. At a variable time after 12 months patients were switched to an MCO dialyzer (Theranova; Baxter®). Forty patients who had been using the MCO dialyzer for at least 3 months were included in this analysis.

Results: Mean age, baseline SAF levels and time on MCO dialyzer were 63±13 years, 3.5±0.9 arbitrary units (AU) and 124±49 days, respectively. SAF increased significantly from baseline to 12 months (3.5±0.9 vs. 3.9±1.1 AU; p<0.0001) but tended to decrease between 12 and 24 months, after conversion to an MCO dialyzer (3.9±1.1 vs. 3.7±0.7 AU; p=0.06). Additionally, mean ΔSAF from baseline to 12 months was positive (0.41±0.68 AU) whereas ΔSAF from 12 to 24 months was negative (-0.18±0.76 AU; p=0.002 for comparison). Furthermore, SAF at 24 months correlated negatively and significantly with time on MCO dialyzer (r= -0.384; p=0.01) though second year ΔSAF (delta from 12 to 24 months) did not (r= 0.061; p=0.7).

Conclusion: We found in this observational study that SAF levels decreased/stabilised in HD patients after switching to an MCO dialyzer compared to the time when patients were using conventional high-flux HD and haemodiafiltration, during which SAF levels increased. Future prospective and interventional studies with larger sample sizes and longer follow-up are needed to confirm these findings and to evaluate the impact of using an MCO dialyzer on long-term outcomes, including survival.