

Fiona J. Kirkham, F. Abel, J. C. Gavlak, K. Russo, A. Lavery, Fenella J. Kirkham. Nocturnal desaturation and proteinuria in children with sickle cell anaemia. Br J Haem 2015; 169 (suppl 1): 22 (abstract 40).

Background: Sickle cell disease patients are at an increased risk of developing chronic kidney disease based, in part, on their lower oxygen levels in the blood causing cells to sickle. The kidneys are particularly vulnerable to this due to the naturally hypoxic medulla. Proteinuria and albuminuria are indicators for renal damage and serial measures can be used to indicate progression of disease. The aim of this study was to compare polysomnography data from the Sleep Asthma cohort with markers of kidney function, specifically protein:creatinine ratio and glomerular filtration rate.

Methods: Using the Sleep Asthma cohort (SAC), polysomnography study data for 43 children were compared with their urine protein:creatinine and albumin:creatinine ratios at any time and glomerular filtration rate (GFR) calculated from contemporaneous height and serum creatinine data using the Kruskal-Wallis test. SAC polysomnography data included the obstructive apnoea hypopnoea index (OAH), central apnoea index (CAI), minimum overnight peripheral oxygen saturation (SpO₂), mean overnight SpO₂ and % of the night with an SpO₂ <95%.

Results: Forty-three patients with SCD (median age 10; range 4-18 years; 21 boys) of the 92 enrolled in SAC had urine protein:creatinine ratio data available and in 11, GFR could be calculated. Higher CAI, lower minimum SpO₂ and a greater percentage of the night with an SpO₂ of <95% were significantly associated with increased protein:creatinine. Trend level significance was found between increased OAH and protein:creatinine ratio. OAH was higher in those with high GFR but this was not statistically significant.

Conclusion: Our results suggest that children with SCD and sleep disordered breathing and/or oxygen desaturations also show higher protein:creatinine ratios consistent with increased kidney damage. It is not clear from these results whether it is the decreased oxygen availability to the kidneys that is causing the decline or whether the decline is responsible for the breathing and saturation changes observed within these children. Further research may establish the order of the two phenomena or potentially another factor which provides the causal link observed in this data. The use of non-invasive overnight respiratory support might improve kidney function.