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Sleep Apnea Severity is significantly associated with Volume Overload and Mortality in Patients with Peritoneal Dialysis; Prospective Cohort study

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Objectives: Both of fluid overload and sleep apnea (SA) are known to serious risk factors of mortality in dialysis patients. Recent study reported that fluid overload influences overnight rostral fluid shift and SA severity in patients with hemodialysis (HD). However, there are few published data about associations of SA severity with volume status and mortality in patients with peritoneal dialysis (PD).

Methods: 103 prevalent PD patients were followed for a median 70 months. They underwent in-home polysomnography (PSG), bioelectrical impedance analysis, and urea kinetics at baseline. SA was defined as apnea/hypopnea index (AHI) >15 events/hour. All cause and cause-specific deaths were registered during follow-up.

Results: SA was diagnosed in 57 (55.3%) subjects (SA group). The SA group was older and more likely to have diabetes and previous CVD. The SA group had significantly lower hemoglobin and lower residual renal function (RRF) ($p < 0.05$). The SA group had a significantly higher numbers of wakes and higher prevalence of nocturnal hypoxemia (54.4% vs. 10.9%, $p < 0.001$). AHI severity was significantly associated with RRF ($\beta = -0.19$, $p = 0.042$) and total body ECW volume ($\beta = 0.26$, $p = 0.027$) in multivariate regression analysis. During the follow-up period, 2 patients in non-SA group vs 17 patients in SA group had died, and the all-cause mortality was 4.3 vs 29.8%, respectively ($p = 0.001$). SA was a significant predictor of mortality in the adjusted multivariable Cox regression models. The fully adjusted hazard ratio of SA was 5.48 (95% CI; 1.13-25.57, $p = 0.035$). The hazard ratio for every unit increase in AHI by 1 episode/h was 1.04 (95% CI; 1.01-1.07, $p = 0.008$).

Conclusions:

SA was common among prevalent PD patients and was significantly associated with RRF and extracellular fluid overload. SA was a novel risk predictor of death in patients receiving PD. Further study is needed whether preserving residual renal function and effective volume control could improve SA severity.