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Synopsis from the article: [Tang SC, Lam B, Ku PP, Leung WS, Chu CM, Ho YW, Ip MS, Lai KN. Alleviation of sleep apnea in patients with chronic renal failure by nocturnal cycler-assisted peritoneal dialysis compared with conventional ambulatory peritoneal dialysis. *J Am Soc Nephrol* 2006;17:2607-16.](#)

Sleep-related disorders, including sleep apnea, are highly prevalent among dialysis subjects. We performed a two-phased study to investigate whether nocturnal peritoneal dialysis (NPD) may be associated with improvement in sleep apnea compared with continuous ambulatory peritoneal dialysis (CAPD). In the first phase, overnight polysomnography (PSG) was performed in 23 NPD subjects from a single center, and in stable prevalent CAPD patients matched for demographic characteristics, co-morbid conditions, peritoneal transport properties, body mass index and dialysis adequacy. Using an apnea-hypopnea index (AHI, based on the frequency of events per hour of sleep) of 15 or more as cutoff, significantly more CAPD than NPD patients had sleep apnea (91% vs 52%; $P = 0.007$). The mean AHI was also higher in the CAPD group (31.6 vs 50.9, $P = 0.025$). In the second phase, PSG was performed in 24 incident patients whilst they were on intermittent NPD awaiting CAPD training, and repeated after these same subjects had been established on stable CAPD. The prevalence of sleep apnea was significantly lower during NPD than during CAPD. Mean AHI was 3.4 during NPD and 14.0 during CAPD ($P < 0.001$). Bioelectrical impedance analysis performed in 15 subjects revealed that total body water (TBW) content was significantly lower during NPD than during CAPD (32.8 L vs 35.1 L; $P = 0.004$). The decline in TBW and hydration fraction (percentage of water in body mass) during sleep while patients were on NPD exceeded that while on CAPD (declines of 2.81 L vs 1.34 L; $P = 0.015$ and 3.63% vs 0.71%; $P = 0.005$). There was no significant change in respiratory mechanics during each mode of PD. Thus, NPD might provide better time-averaged volume control than CAPD during sleep, and alleviate airway edema in the supine position, which in turn could lead to a lower prevalence and reduced severity of sleep apnea associated with end-stage renal disease.

Commentary by Todd S. Ing, MD

Sleep apnea can bring about daytime sleepiness, decreased mental acuity, impaired cognitive function and poor work performance.¹ Dr. Tang and his colleagues in Hong Kong have shown that nocturnal cycler-assisted peritoneal dialysis is superior to conventional continuous ambulatory peritoneal dialysis for alleviating sleep apnea. The superior effects are believed to be related to the better control of body volumes and the resultant reduction in airway edema. Long-session nocturnal hemodialysis treatments have also been found to bring about improvement of sleep disorders,^{2,3} possibly also as a result of better volume control. Indeed, Hanly and Pierratos have demonstrated that long-session nocturnal hemodialysis could correct sleep apnea and reduce the severity of both obstructive and central apneas in patients previously receiving conventional hemodialysis.² Tang's data are consistent with the notion that, to reduce morbidity and mortality in both peritoneal dialysis and hemodialysis patients, it is crucial to control body volumes and blood pressure properly by employing sodium restriction, diuretic therapy and effective ultrafiltration techniques.^{1,4-6} As a corollary to Tang's findings, it is conceivable that should one be able to achieve in CAPD patients a measure of fluid control comparable to that observed in patients treated with nocturnal cycler-assisted peritoneal dialysis, the resultant improvements in sleep apnea in these two groups might not turn out to be vastly different. Further studies are needed to bring more light to this exciting area of dialytic therapy.

References:

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