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In-center Nocturnal Hemodialysis leads to Improved Serum Phosphorus (PO₄) Levels

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Control of serum phosphorous remains a challenge in the hemodialysis patient despite increased choices in oral phosphate binders, as well as intensive dietary counseling. Elevated serum PO₄ levels contribute to secondary hyperparathyroidism, both directly, and by limiting the use of vitamin D analogs, and are associated with an increased mortality from cardiovascular disease. Delayed transfer from intracellular fluid stores to the extracellular fluid compartment limits the contribution of in-center conventional hemodialysis (ICHD) to phosphate balance. We postulated that in-center nocturnal hemodialysis (NHD), with its longer treatment times, would result in substantially greater PO₄ removal, resulting in a lower serum PO₄. 418 NHD patients were evaluated. We compared parameters of bone and mineral metabolism prior to their conversion to NHD (baseline, mean 4, 5 and 6 months before nocturnal treatment) to these same parameters following the start of NHD (final, mean 7, 8 and 9 months post modality change). The frequency of both ICHD and NHD was 3 sessions per week; the median ICHD session was 4 hrs vs. 7.6 hrs for NHD. Mean serum PO₄ levels decreased 0.67mg/dl during the first month of NHD and, by 9 months, had fallen from a mean (baseline) of 5.79 ± 0.03 to a mean (final) of 5.09 ± 0.03 ($p < 0.001$). Ca \times Phos decreased from a mean (baseline) of 52.91 ± 0.34 to a mean (final) of 46.72 ± 0.31 ($p < 0.001$). Paracalcitol administration increased from a mean (baseline) of 43.1 ± 0.9 μ g/patient/month to a mean (final) of 51.4 ± 1.0 μ g/patient/month ($p < 0.0001$). PTH fell from a mean (baseline) of 472.3 ± 10 pg/ml to 448.9 ± 10 pg/ml ($p = 0.10$), while calcium levels were unchanged. When compared to ICHD, NHD resulted in a lower serum PO₄ consistent with enhanced PO₄ removal as a result of the longer dialysis sessions with NHD. This lower phosphate level may have encouraged more aggressive use of paricalcitol to lower PTH. The decrease in serum PO₄ Ca \times Phos, and PTH may result in long-term cardiovascular benefits for the NHD patient.

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