

Agar JW, Pierratos A.

Changes in hemoglobin and albumin concentration during nocturnal home hemodialysis. *Hemodial Int.* 2007 Jul;11(3):303-8.

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The hemoglobin (Hb) and the serum albumin (S.Alb) concentration commonly rise during seated, conventional thrice-weekly 4 to 4.5 hr hemodialysis (CHD) as a result of rapid fluid removal from the intravascular compartment. Conversely, in long, slow, recumbent nocturnal home hemodialysis (NHHD), the intra-dialytic S.Alb concentration has been shown to fall. In normal human physiology, plasma volume expansion rapidly follows recumbency and is sustained until a resumption of an upright position re-induces plasma volume contraction. The plasma protein dilution of recumbency has been suggested as the mechanism behind this finding in NHHD. Our retrospective analysis of 585 consecutive measurements of predialysis and postdialysis S.Alb and Hb taken from 71 NHHD patients confirmed an intra-dialytic fall in S.Alb (0.99% in alternate night NHHD and 1.4% in 6 nights/week NHHD) compared with an 8.4% rise in a control group of 104 CHD patients ($p < 0.001$). Although the NHHD intra-dialytic Hb rose (3.8% in alternate night NHHD and 2.6% in 6 nights/week NHHD), this rise was significantly greater (8%) in CHD patients ($p < 0.001$), and as physiological data confirm that recumbent dilution for albumin is greater than that for Hb, this may provide the explanation. We conclude that NHHD provides a more physiological volume milieu with the normal physiological dilution mechanisms of recumbency still operating despite the slow, steady volume reduction that accompanied longer hour and more frequent dialysis. These mechanisms are subverted, however, in CHD by the more-aggressive plasma contraction needed to attain adequate control of the intravascular volume in the face of shorter hour, less-frequent dialysis.

Commentary by Todd S. Ing, MD

Drs. Agar and Pierratos found that serum levels of albumin fell during long recumbent nocturnal hemodialysis-but rose during conventional, seated, thrice weekly (4-4.5 hours per session) hemodialysis. In addition, blood hemoglobin values rose to a lesser extent during the former dialytic approach than the latter. These findings are believed to be related to the expansion of the plasma volume that normally occurs as a result of recumbency. This plasma volume expansion will certainly facilitate removal of excess fluid via ultrafiltration during long recumbent nocturnal treatments. As a corollary, it would seem prudent to perform conventional thrice weekly dialysis in the recumbent posture if one wishes to promote more symptom-free excess fluid removal. Such a recumbent approach is being practiced now during conventional thrice weekly dialysis in a number of centers in Asia.