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Synopsis from the article: Katzarski KS, Divino Filho JC, Bergstrom J. Extracellular Volume Changes and Blood Pressure Levels in Hemodialysis Patients. *Hemodialysis International* 2003;7:135-42.

Background: Despite administration of potent antihypertensive medications (AHM), blood pressure (BP) control has been found to be tremendously inadequate in a predominant portion of the hemodialysis (HD) population. The vast majority of these hypertensive patients demonstrate no decrease in nocturnal blood pressure. Elevation of the latter pressure has been correlated with the development of left ventricular hypertrophy. The purpose of the present investigation was to examine the effect of excess fluid removal on BP by monitoring the ambulatory BP values for a two-day period in 16 hypertensive HD patients who were receiving AHM.

Over a duration of 3-4 months, the post-dialysis BW was gradually decreased to the maximally tolerable level by judiciously raising the ultrafiltration volume obtained during each treatment. The dialysate sodium value was also lowered from 143-141 to 139-138 mM. Extracellular volume (ECV) was determined using a multiple-frequency bioimpedance device. In accordance with ECV changes, patients were separated into two groups: group 1 with a fall in ECV (n=10), and group 2 with no fall (n=6). At the beginning of the investigation, in both groups, BW, BP and AHM were similar.

Data: Group 1 demonstrated a significant fall in systolic (156 ± 16 vs 140 ± 14 mmHg, p=0.030) and diastolic BP (97 ± 12 vs 87 ± 9 mmHg, p=0.026) as well as in mean arterial pressure (117 ± 13 vs 105 ± 10 mmHg, p=0.027). This lowering was more pronounced during the night than during the day (systolic BP 156 ± 15 vs 138 ± 14 mmHg, p=0.007, diastolic BP 97 ± 12 vs 85 ± 9 mmHg, p=0.009). A substantial fall in systolic load took place, too, during the whole 2 days (76 ± 24 vs 46 ± 28%, p=0.043). Reductions in night systolic load (75 ± 21 vs 41 ± 30%, p=0.015) and in night diastolic load (67 ± 32 vs 39 ± 31%, p=0.030) were also found. Administration of anti-hypertensive drugs was discontinued in 8 and curtailed in 2 patients. No appreciable falls in BP and AHM use were noted in patients of group 2.

Conclusion: In hypertensive hemodialysis patients, excess fluid removal is essential for proper BP control, especially for the control of nocturnal BP.

Commentary by Todd S. Ing, MD
By removing more excess fluid and reducing dialysate sodium level from 143-141 to 139-138 mM, Dr. Katzarski and colleagues were able to obtain a better control of blood pressure in a small group of hypertensive hemodialysis patients. These results lend strong support to those presented previously by Velasquez M, et al[1]. The latter authors demonstrated that control of hypertension in dialysis patients could be derived by performing adequate ultrafiltration.

Reference:

1. Velasquez M, von Albertini B, Lew S, Mishkin G, Bosch J. Equal levels of blood pressure control in ESRD patients receiving high-efficiency hemodialysis and conventional hemodialysis. *Am J Kidney Dis* 1998:31(Suppl 4):618-23.