

Interdialytic Weight Gain and Cardiovascular Outcome in Incident Hemodialysis Patients

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Commentary

By Professor Richard Glasscock

It has been known for some time that high weight gain in the interval between hemodialysis sessions (IDWG) is associated with increased unfavorable outcomes, mainly death from cardiovascular (CV) disease and repeated hospitalizations. However, the origins of this association are complex and not very well understood. In some patients it may be a reflection of excessive intra-dialytic ultrafiltration leading to hypovolemia at the end of dialysis with an attendant increase in post-dialysis thirst and fluid intake. Alternatively, high IDWG could be a manifestation of poor compliance and voluntary excessive fluid intake generating hypervolemia, requiring a high ultrafiltration rate (UFR) during dialysis, especially with short duration of the dialysis session. To confound the picture further a high IDWG may be accompanied by higher intake of nutrients and therefore be a marker of a better nutritional state. These complexities have been explored by a prospective study of incident hemodialysis patients in Korea by Lee and co-workers. IDWG was assessed as a % of 'dry weight' and divided into 5 groups: <1, 1–1.9, 2–2.9, 3–3.9 and $\geq 4\%$. Higher IDWG was observed in diabetic subjects and those with an increased pre-dialysis systolic blood pressure, serum glucose and phosphate, and with lower values for urine volume, hemoglobin, serum albumin, calcium, and sodium. An IDWG of $\geq 4\%$ (about 2.8 kg for a 70-kg patient) was strongly associated with an increased risk of major adverse CV events after adjustment for co-morbidity, nutrition, residual renal

function and urine volume. This study is compatible with the notion that high IDWG is not a marker of better nutrition. Unfortunately, follow-on studies of left ventricular hypertrophy or direct measurements of volume (such as bio-electrical impedance) were not undertaken. One cannot conclude that high IDWG was detrimental to cardiac remodeling, but high IDWG was strongly correlated with elevated pre-dialysis systolic blood pressure, implying greater myocardial afterload stress. Despite its limitations, this study supports the notion that excessive IDWG ($\geq 4\%$ of body weight) predicts a poor outcome. What is needed now is a randomized controlled trial comparing 'good' vs. 'poor' control of IDWG, which includes measurements of intra- and inter-dialytic extracellular volume to better define the pathophysiology underlying the causal linkage of IDWG and major CV events.

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