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Time-specific effects of predialytic factors on systolic blood pressure changes during hemodialysis

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Objectives:
Intradialytic blood pressure changes are affected by pre-hemodialysis (HD) factors. However, the specific time point at which these factors predominantly affect blood pressure during the intradialytic period is unknown.

Methods: Demographic, laboratory, and HD data were collected from October 2015 to December 2016 in 97 patients who were receiving maintenance HD. Diabetes mellitus (DM) status; abdominal aortic calcification (AAC) score; amount of ultrafiltration (UF); mean serum hemoglobin (Hb), sodium (Na), osmolality (Osm), and albumin levels were used as possible pre-HD factors. The patients were categorized according to AAC score (high: >8 and low: ≤8), quartile groups of mean Osm, and DM status. Intradialytic blood pressure changes were assessed on the basis of hourly systolic blood pressure changes (ΔSBP) during each HD session (ΔSBP₁: between 0 and 1 hour of HD [SBP₀-SBP₁], ΔSBP₂: between 1 and 2 hours [SBP₁-SBP₂], ΔSBP₃: between 2 and 3 hours [SBP₂-SBP₃], ΔSBP₄: between 3 and 4 hours [SBP₃-SBP₄]). Linear mixed regression analysis was used to identify pre-HD factors associated with ΔSBP₁, ΔSBP₂, ΔSBP₃, and ΔSBP₄, respectively.

Results: The subjects’ characteristics were as follows: female, 45; DM, 49; high AAC, 42; mean age, 59±15 years; HD duration, 69±64 months; and AAC score, 8.0±7.7 (median, 6.0). The mean serum Hb and albumin levels were 10.2±6.4 and 3.9±0.3 g/dL, respectively. The mean serum osmolality was 311.9±7.4 mOsm/kg. UF was a factor for increased ΔSBP₁, ΔSBP₂, ΔSBP₃, and ΔSBP₄ (β=1.18, p=0.002). The other factors for ΔSBP₁ were DM (β=7.74, p=0.003) and mean Hb level (β=4.58, p=0.016); for ΔSBP₂, high AAC (β=4.23, p=0.011) and Osm4 (vs. Osm3; β=4.97, p=0.03); for ΔSBP₃, high AAC (β=2.12, p=0.045) and mean albumin level (β=−4.14, p=0.048); and for ΔSBP₄, mean Hb level (β=−2.76, p=0.011).

Conclusions:
The pre-HD factors for intradialytic SBP changes may have their own predominant period during HD session.