Simple Nutritional Score Predicts Survival in Hemodialysis Patients

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Introduction and Aims

Dialysis patients have a high risk for inadequate nutrition, and malnutrition is associated with adverse outcomes. One-dimensional nutritional assessment (e.g. based on serum albumin alone) is inherently flawed. We developed a multidimensional yet simple nutritional score based on routinely available data elements and investigated its association with hemodialysis (HD) patient survival.

Methods

We performed a retrospective cohort study in incident HD patients who started HD between 2006 and 2011. Monthly averages of serum albumin, creatinine, phosphate, equilibrated normalized protein catabolic rate and interdialytic weight gain were obtained and statistically standardized (z transformed) across all months and patients. For each patient and month, the 5 standardized parameters were added and the result z transformed again to create a composite nutritional score. This nutritional score was then converted to percentiles according to the probability density function of the standard normal distribution for more intuitive interpretation. Kaplan-Meier survival analysis was conducted for a follow-up time of 4 years, stratified by nutritional score percentile obtained in month 1, 2, 3 and 4, respectively, on HD. Five equally spaced categories of nutritional score percentile were chosen for stratification: (0,20], (20,40], (40,60], (60,80], (80,100].

Results

The original patient cohort comprised 126,964 incident HD patients. Patient numbers in the final analysis cohorts ranged, depending on the month in which the nutritional score was obtained, from 77,368 to 92,035.

Results (continued)

There was a highly statistically significant relationship between nutritional score percentile and survival, with higher nutritional scores conferring a survival benefit (P<0.0001, log rank test). This was true for scores obtained from any of the first 4 months on HD. Figure 1 shows the Kaplan-Meier plot stratified by nutritional scores obtained in month 3 on dialysis. Analyses for months 1, 2 and 4 looked materially identical.

Conclusion

The presented composite nutritional score is highly predictive of subsequent patient survival. Of note, even an assessment in the very first month on HD using this score is a powerful predictor of subsequent mortality. This simple score lends itself to routine, automated use, not only for risk stratification but possibly for allocation of nutritional supplement interventions to those patients who may likely benefit from them the most. One presumed benefit of this score is its multidimensionality, combining several parameters that share a nutritional connection, thereby rendering the score more specific to nutritional status than each measure alone.
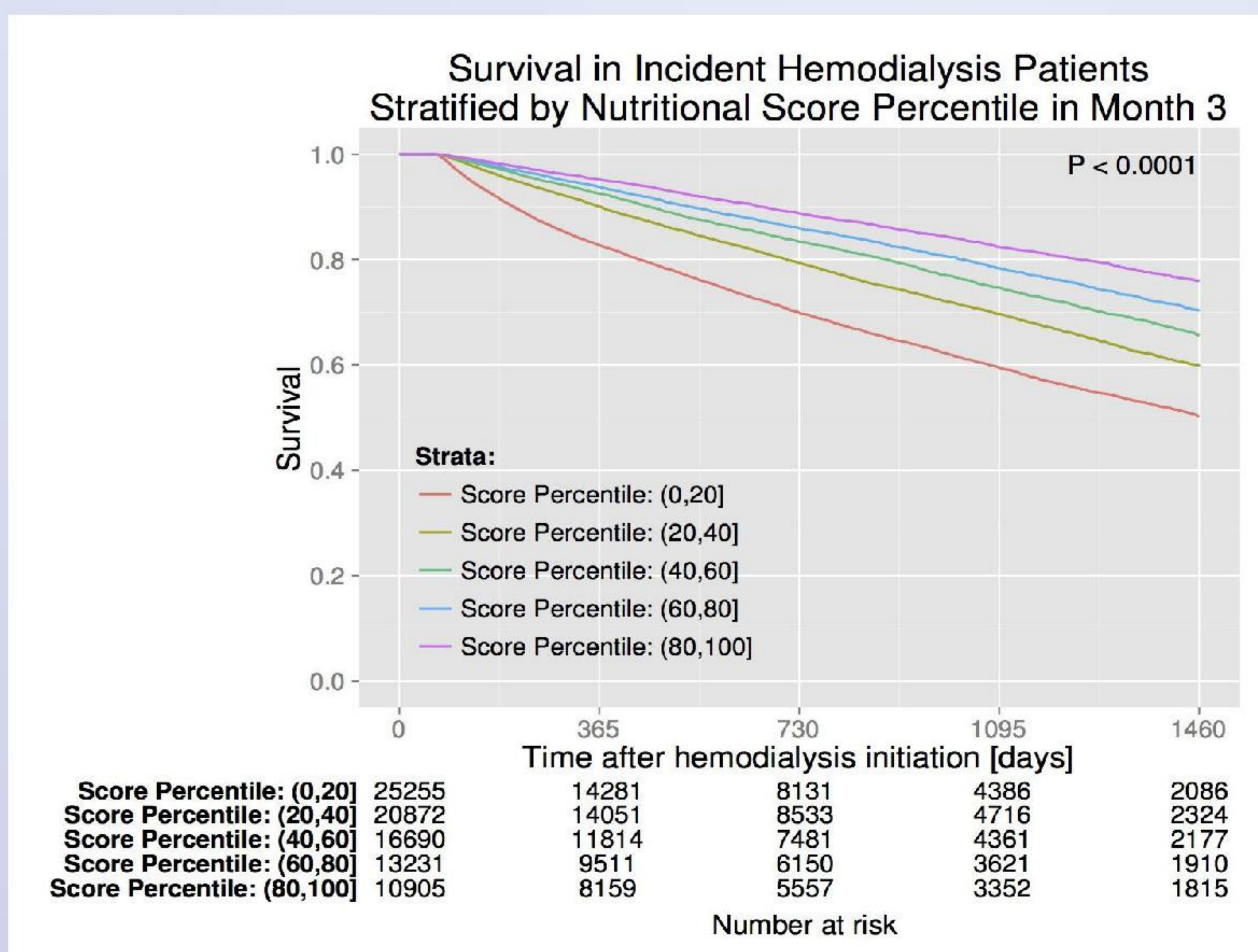

Figure 1. Kaplan-Meier survival analysis in incident HD patients over a follow-up time of up to years, stratified by category of nutritional score percentile in month 3 on HD. The table below the plot shows the number of patients at risk in 1-year intervals.