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# Impact of the C-reactive Protein-Albumin-Lymphocyte (CALLY) Index on Predicting Vascular Calcification and Bone Mineral Density in Dialysis Patients

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**Objectives :** The C-reactive protein-albumin-lymphocyte (CALLY) index is a composite biomarker that reflects nutritional, immunological, and inflammatory status. This study aimed to evaluate the clinical significance of the CALLY index in predicting vascular calcification and bone mineral density (BMD) in dialysis patients.
**Methods :** This cross-sectional study analyzed baseline data from 17 multicenter prospective cohort of dialysis patients in Korea. Total 683 patients were stratified into tertiles based on CALLY index, calculated as (albumin × lymphocyte count) / C-reactive protein (CRP). Abdominal aortic calcification score (AACS) was assessed via lateral spine radiographs, with significant vascular calcification defined as AACS ≥4. Univariate and multivariate logistic regression were used to examine associations between CALLY index and both vascular calcification and osteoporosis.
**Results :** The mean age of participants was 59.3 ± 11.8 years, with a mean CALLY index of 5.9 ± 12.8. The highest CALLY index tertile had a lower proportion of males and a lower prevalence of diabetes. Compared to the lowest tertile, patients in the highest tertile had lower age, Charlson comorbidity index, fasting glucose, and intact parathyroid hormone levels but higher magnesium levels. AACS was significantly lower in the highest tertile ($p = 0.005$), while T-scores at L1-L4, femur neck, and total hip showed no significant differences across the groups. In univariate analysis, the highest CALLY index tertile was independently associated with a lower risk of significant vascular calcification (OR 0.492, 95% CI 0.339–0.715, $p < 0.001$). This association remained significant after fully adjusting for confounding factors in multivariate analysis (OR 0.580, 95% CI 0.342–0.984, $p = 0.043$). However, the CALLY index was not associated with osteoporosis in either univariate or multivariate models.
**Conclusions :** A higher CALLY index is independently associated with a reduced risk of significant vascular calcification in dialysis patients, suggesting its potential as a predictive biomarker.

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Beyond Challenges, Towards Healthier Kidney

Figure 1.png

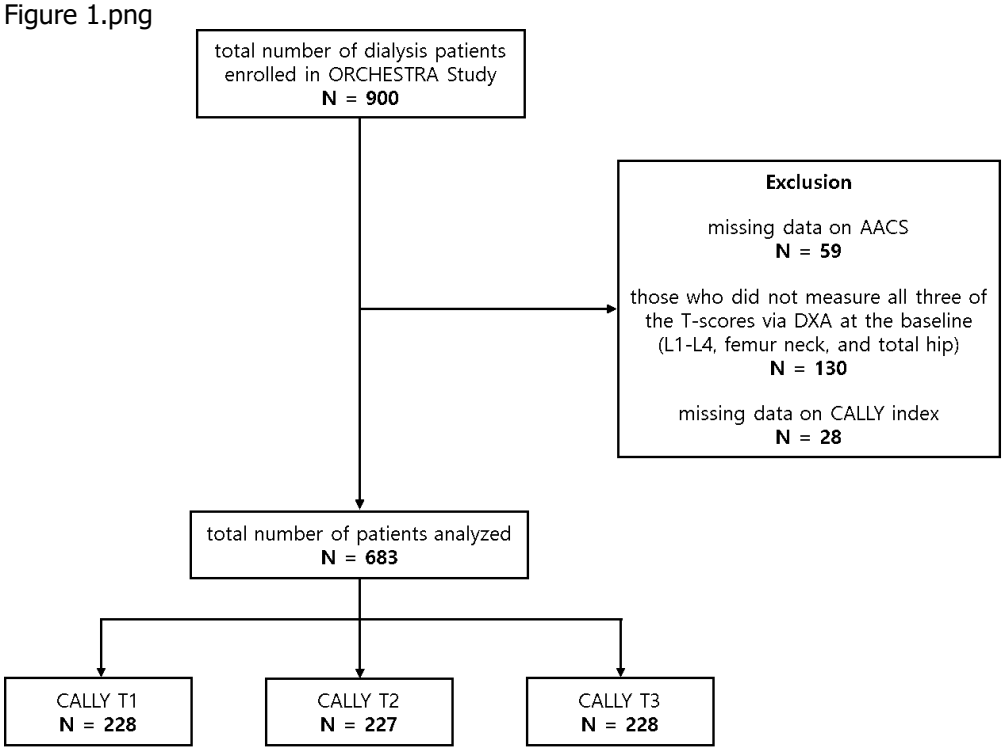


Figure 1.png

| Univariate and multivariate logistic regression for significant vascular calcification (AACS ≥4) according to CALLY index | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Crude | | Model 1 | | Model 2 | | Model 3 | |
| | **OR (95% CI)** | ***p*** | **OR (95% CI)** | ***p*** | **OR (95% CI)** | ***p*** | **OR (95% CI)** | ***p*** |
| **CALLY T1** | 1 (ref.) | - | 1 (ref.) | - | 1 (ref.) | - | 1 (ref.) | - |
| **CALLY T2** | 0.637 (0.439-0.922) | 0.017 | 0.637 (0.427-0.952) | 0.028 | 0.658 (0.396-1.095) | 0.107 | 0.623 (0.362-1.073) | 0.088 |
| **CALLY T3** | 0.492 (0.339-0.715) | <0.001 | 0.548 (0.366-0.821) | 0.004 | 0.577 (0.353-0.942) | 0.028 | 0.580 (0.342-0.984) | 0.043 |
| | | | | | | | | |
| **Univariate and multivariate logistic regression for osteoporosis according to CALLY index** | | | | | | | | |
| | Crude | | Model 1 | | Model 2 | | Model 3 | |
| | **OR (95% CI)** | ***p*** | **OR (95% CI)** | ***p*** | **OR (95% CI)** | ***p*** | **OR (95% CI)** | ***p*** |
| **CALLY T1** | 1 (ref.) | - | 1 (ref.) | - | 1 (ref.) | - | 1 (ref.) | - |
| **CALLY T2** | 0.986 (0.665-1.463) | 0.945 | 0.921 (0.604-1.405) | 0.703 | 0.803 (0.459-1.407) | 0.444 | 0.778 (0.423-1.429) | 0.419 |
| **CALLY T3** | 0.829 (0.555-1.237) | 0.358 | 0.773 (0.503-1.189) | 0.241 | 0.828 (0.483-1.420) | 0.494 | 0.982 (0.532-1.813) | 0.955 |