



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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Standardization of Optimal Serum Calcium Levels to Prevent Vascular Calcification in CKD Patients

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Objectives : Due to mineral metabolism disorders, ESKD patients face a high risk of vascular smooth muscle cell calcification, a major driver of cardiovascular mortality. This study investigates the impact of the dialysate-to-blood calcium gradient on bone and vascular health to establish an optimal serum calcium range. By minimizing calcification progression, this research aims to propose standardized clinical guidelines that enhance patient survival rates.

Methods : This study is conducting a retrospective cohort analysis of patients with Chronic Kidney Disease (CKD) over the past five years. We regularly monitor patients' serum calcium (Ca), phosphorus (P), and parathyroid hormone (PTH) levels, while assessing their vascular health status through follow-up evaluations of the Coronary Artery Calcium Score (CACS) and abdominal aortic calcification.

Results : This study is currently ongoing, and interim results indicate that the group maintaining serum calcium levels within the range of 8.5–9.5 mg/dL shows a significantly lower rate of vascular calcification progression compared to groups outside this range, particularly those exceeding 10.2 mg/dL. We are further investigating whether even more significant clinical outcomes will be observed in the group with calcium levels below 8.5 mg/dL.

Conclusions : To prevent vascular calcification in CKD patients, it is essential to establish strict standardization of calcium levels that considers individual calcification risks, moving beyond simply adhering to general guidelines. Such standardized levels can serve as a critical indicator for ensuring long-term cardiovascular safety. Future research is needed to integrate these standardized values with real-time monitoring systems for enhanced clinical management.

Table 1. Analysis of Vascular Health Indicators by Serum Calcium levels.jpg



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Table 1. Interim Analysis of Vascular Health Indicators by Serum Calcium Levels

Serum Calcium Level (mg/dL)	Group Category	Coronary Artery Calcium Score (CACS)	Abdominal Aortic Calcification (AAC)	Status / Notes
8.5 – 9.5	Optimal Range	Slowest progression (Minimal interval change)	Stable (Low deposition rate)	Confirmed clinical benefit
> 10.2	High Calcium	Rapid increase in calcium score	Significant progression observed	Increased risk of arterial stiffness
< 8.5	Low Calcium	Evaluating trend	Monitoring deposition patterns	Further investigation ongoing