

**SERUM CALCIUM LEVELS AND RENAL CALCIUM HOMEOSTASIS IN  
PATIENTS WITH CHRONIC RENAL FAILURE**

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**Abstract**

Calcium homeostasis imbalances are typical in chronic renal failure and are the cause of mineral and bone disorders. **Objective:** To compare the serum calcium levels of patients with chronic renal failure with healthy control group. **Methods:** 60 patients with chronic renal failure and 30 healthy subjects were the participants of a cross-sectional study. Measurement of serum calcium was done through automated procedures. **Findings:** The serum calcium readings were also lower in CRF patients of all age and gender group; they were lower but statistically significantly not significant ( $p>0.05$ ). **Conclusion:** CKD is linked with a tendency of reduced serum calcium, which represents impaired renal calcium management.

**Keywords:** Serum calcium, chronic renal failure, calcium homeostasis, CKD-MBD.

**Introduction**

Calcium is an essential mineral that works in the bone structures, neuromuscular and intracellular signaling. Kidneys play an important role in calcium homeostasis through the reabsorption of filtered calcium and the excretion of calcium [1]. In chronic renal failure, active calcium reabsorption is impaired and calcium-phosphorus balance is disrupted by nephro-defective function, which leads to CKD-mineral and bone disorder (CKD-MBD) [2, 3].

The pathophysiology of calcium dysregulation in CKD involves secondary hyperparathyroidism and changes in the metabolism of vitamin D [4]. Nonetheless, the levels of serum calcium can be close to normal or exhibit only minor decreases because of the compensatory reactions. This current research examines the level of calcium in the serum of patients with chronic renal failure patients and also compares the levels of serum calcium to the healthy population in the local community.

**Materials and Methods**

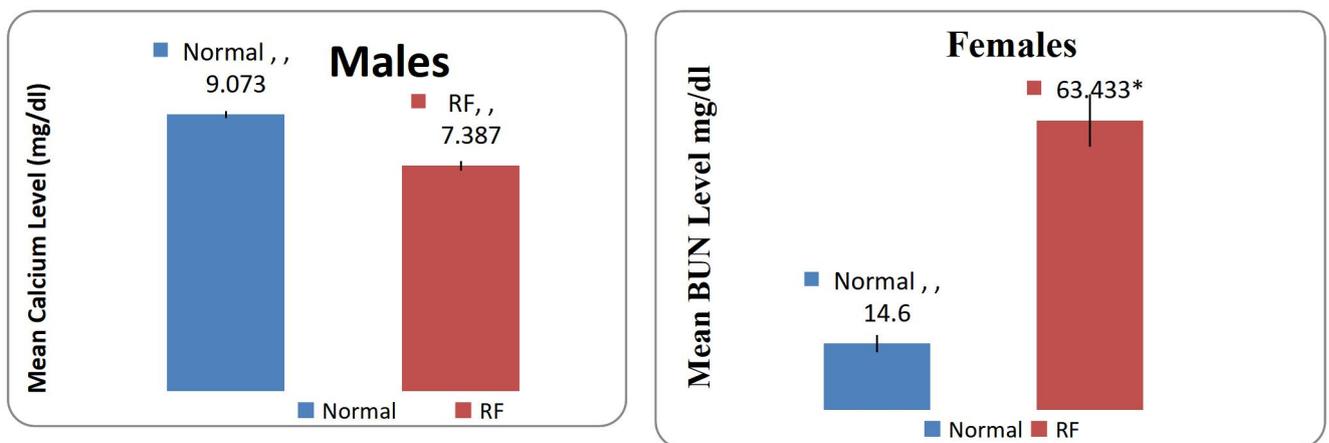
The study was done in 60 chronic renal failure patients and 30 healthy control subjects who were in hospitals in Lahore in a cross-sectional study. The informed consent was taken, and both sexes and representatives of different ages were included.

The venous blood samples were taken and serum calcium was determined using a chemistry autoanalyzer (Dimension RX-L, Dade Behring, USA) by o-cresolphthalein complex one. Analytical accuracy was made by daily quality control procedures.

The analysis was done with the help of SPSS. The serum calcium levels were presented in the mean  $\pm$  SEM and statistically compared with the Student t-test and considered significant when  $p < 0.05$ .

### Results

The average level of serum calcium was found to be low in patients of chronic renal failure than controls in all subgroups of ages and gender without statistical significance ( $p > 0.05$ ). The trend points to the disrupted calcium homeostasis among CRF patients.



### Discussion

This paper found that chronic renal failure patients had a steady reduction in serum calcium levels as compared to healthy controls. This trend, though not statistically significant, corresponds with those known disruptions of calcium-phosphorus metabolism in CKD and the pathogenesis of CKD-MBD [1].

Known chronic kidney disease also inhibits active synthesis of vitamin D and calcium reabsorption, and is frequently accompanied by compensatory rises in parathyroid hormone concentrations. These adaptatory processes can ensure that serum calcium remains within near-normal levels despite the existence of metabolic derangement [4, 5].

The clinical implications of mild variations in serum calcium are that bone demineralization, vascular calcification, and cardiovascular morbidity risk is a long-term condition in CKD patients [6]. Calcium level, as well as phosphorus, parathyroid hormone, and vitamin D levels, are supposed to be regularly monitored to prevent the development of CKD-MBD.

### Conclusion

Although the serum calcium level was low in patients with chronic renal failure than in the controls, the differences were not found to be significant. However, the tendency observed

indicates changes in calcium signaling related to chronic renal disease, which should be observed regularly.

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