

# **The Effect of Different Dialysate Calcium Concentrations on Parathyroid Hormone Levels in End Stage Renal Disease Patients on Regular Hemodialysis**

*Thesis*

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# SUMMARY

Cardiovascular stability, Renal bone disease , vascular and valvular calcification are main issues regarding the role of calcium in hemodialysis patients so the choice of dialysate calcium concentration is able to influence many of the most important factors in the successful management of chronic HD patients.

In current practice, little attention is paid to the dialysate calcium concentration, On the contrary, it should be viewed as part of the integrated therapeutic regimen to control renal osteodystrophy and maintain normal mineral metabolism.

The goals of this integrated approach are to keep the patient in a mild positive Ca mass balance, to maintain normal serum Ca levels, to control plasma parathyroid hormone (PTH) values from two to three times above normal levels, and to avoid soft-tissue calcifications.

Accordingly, the present study was designed to investigate the relative role of Different Dialysate Calcium Concentrations on Parathyroid Hormone Levels and Cardiovascular stability in ESRD patients on regular hemodialysis.

The study was conducted from on 80 chronic renal failure patients on regular haemodialysis for more than 1 year, were divided into 2 groups : Group (A) : consists of 40 patients who were dialyzed with low calcium dialysate (1.25mmol/l ) and Group (B) : consists of other 40 patients who were dialyzed with high calcium dialysate (1.75 mmol/l ) , All patients were thoroughly interrogated and examined clinically and were subjected to Kidney function tests, Complete blood count, Ionized Calcium , Total Serum calcium ,Serum phosphorus ,Serum

albumin, Serum alkaline phosphatase, Serum parathormone level, ECG and transthoracic echocardiography then Data were collected and statistically analysed.

This study demonstrated that the mean serum Calcium of Group A was significantly lower than that of Group B ( $p < 0.05$ ), mean ionized calcium of Group A was significantly lower than that of Group B ( $p < 0.05$ ), mean serum parathyroid Hormone of Group A was higher than that of Group B but with no statistical significance ( $p : 0.07$ ), also mean calcium supplement dose required daily by Group A grams was significantly Higher than that needed By Group B ( $p < 0.05$ ).

Regarding hemodynamic stability during sessions: Intradialytic Hypotension was observed more in Group A than Group B (22.5% versus 15%) ( $p > 0.05$ ).

Regarding cardiac valves calcification: Aortic valve calcification was present more in Group B than Group A (42.5.5% versus 22.5 %) ( $P:0.065$ ), also Mitral valve calcification was present more in Group B than Group A (42.5.5% versus 25 %) ( $P:0.09$ ), Both valve calcification were present more in Group B than Group A (17.5% versus 7.5 %) ( $P:0.176$ ) while No valve calcification was observed more in Group A than Group B (60% versus 32.5% ) ( $p < 0.05$ ).

Duration of hemodialysis, Phosphorus level and The Calcium Phosphorus product had a Positive correlation with the valvular calcification .

In Both Groups: Patients with valvular calcification have a longer hemodialysis duration Than those without valvular calcification Also have a higher calcium, ionized calcium, PTH, Phosphorus and Calcium Phosphorus product.

There were no significant correlations between Level of serum Calcium, ionized calcium and valvular calcification.

Therefore, our results suggest that Patients using calcium carbonate or calcium acetate as phosphorus binders either should be dialysed initially against 1.25 mmol/l and PTH should be followed carefully or they should be dialysed initially against 1.75 mmol/l, and the dialysate calcium reduced to 1.25mmol/l, if hypercalcaemia develops but this approach will probably increase the risk of coronary and other soft tissue calcifications.

But Patients taking no phosphorus binder, or a calcium-free binder, should be dialysed against 1.75 mmol/l calcium or be dialysed against 1.25 mmol/l calcium and given an oral calcium supplement.

Further studies on a larger number of patients and for a longer period of time are required to evaluate the potential use of dialysate calcium profiling in the successful management of chronic HD patients.