

Parathyroid Hormone: Effects on Glucose Homeostasis and Insulin Sensitivity in Chronic Renal Failure Patients on Regular Hemodialysis

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Abstract

Objective

To look into the relation between parathyroid hormone and abnormal glucose homeostasis in chronic renal failure patients on regular hemodialysis.

Methods

41 subjects, with chronic renal failure, and on regular hemodialysis (28 male, 13 female; age range 19-64 years). Full history and clinical examination were taken for every patient. In addition, ten age and sex matched healthy persons were selected randomly as control group. Informed consent was obtained. All patients were investigated to determine serum creatinine, calcium, phosphorus, alkaline phosphatase, parathyroid hormone, fasting glucose, and fasting insulin. Homeostasis module assessment of insulin resistance was calculated as a measure of insulin resistance, Homeostasis module assessment of beta cell was calculated as a measure of pancreatic beta cell function. The uremic patients were classified into two groups: group A included 24 patients with plasma parathyroid hormone levels < 450 pg/ ml and group B included 17 patients with plasma parathyroid hormone level >450 pg/ml.

Results

There is a marked increase in fasting insulin level in all patients versus control associated with increased homeostasis module assessment of insulin resistance, an index for insulin resistance. Significant negative correlation is found between parathyroid hormone and fasting insulin and homeostasis module assessment of insulin resistance in uremic patients. Patients with severe hyperparathyroidism have relatively more impaired pancreatic beta cell function in comparison to those with mild hyperparathyroidism. The pulsed dose of intravenous 1-cholecalciferol is associated with low parathormone level and high serum calcium.

Conclusion

Insulin resistance is a constant feature of chronic renal failure patients under hemodialysis therapy, while secondary hyperparathyroidism is linked negatively to beta cell function. Intermittent pulsed intravenous alphacalcidol is an effective method of lowering high serum parathyroid hormone and is associated with improvement of beta cell function without significant effect on insulin resistance.

Key words: Secondary hyperparathyroidism, one alpha therapy, parathormone, insulin sensitivity, hemodialysis