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Editorial

The parathyroid glands; small glands with big effect

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In healthy person bone tissue is continuously remodeled and rebuilt. Vitamin D from absorbed sunlight and food is handled by kidneys. The kidney through its job of balancing blood levels of calcium and phosphorus maintain healthy bone mass and structure. The parathyroid gland plays a key role in mineral homeostasis by bridging between kidney and bone (1). When kidneys are affected and has been failed to maintain proper levels of calcium and phosphorus in blood there occurs activation of both, bone and parathyroid. Initially, Albright reported in 1937, parathyroid hyperplasia and osteitis fibrosa cystica in association of chronic kidney disease (CKD) (1). From that report till now (during these years) remarkable advances have been made in the understanding and management of parathyroid diseases in CKD. Parathyroid hormone essay introduced in 1969 by Reiss that leads towards evidence to hypothetical approach (2). The 'trade-off hypothesis' proposed by Bricker suggested that in CKD there is retention of phosphorus which causes reduction in ionized calcium which in turn stimulates parathyroid gland giving rise hyper secretion of hormone (3). However, some studies reported that hypocalcaemia and hyperphosphatemia were not present in patients with CKD where PTH already elevated (4,5). It has also been reported that calcitriol production is decreased in CKD and studies have shown hypersecretion of PTH in response to low calcitriol (6-8). The production of calcitriol also has been affected with hyper phosphatemia.

Later in beginning of this century, fibroblastic growth factor 23 (FGF23), a bone derived hormone identified as playing role in regulation of mineral homeostasis (9). This hormone mainly regulates phosphate excretion in urine and renal 1,25 $(OH)_2D$ production and also exerts a direct effect on parathyroid gland to suppress secretion of PTH (10). FGF23 also suppresses calcitriol production by decreasing mRNA for 25-hydroxyvitamin D-1-α-hydroxylase (11). In patients with CKD, serum FGF23 levels gradually increase, it occurs even before the rise in serum phosphorus levels (12-14).

With global rise in number of CKD, there are increased concerns about problems related to this condition and one is related to parathyroid hormone hyper expression. The conventional therapies for treating secondary hyperparathyroidism are very limited and aimed for firstly, phosphate binding and reducing circulating phosphorus levels, these could be calcium based or calcium free. Secondly, targeting stimulation of calcium absorption and thus suppressing parathyroid hormone, vitamin D and its analogues used for this purpose. Aims could hardly achieve by these measures, as main problem with phosphate binders is compliance with required dosage of drugs, while high doses of vitamin D may contribute to vascular calcifications (12-14).

Then calcimimetics were introduced that increase sensitivity of parathyroid gland calcium sensing receptors (CaR) to circulating calcium thus can reduce parathyroid secretion (15). Cinacalcet is first approved calcimimetics administered in CKD stage 5 patients, reported to be well tolerated and effectively reduce serum phosphorus and Ca×P (calcium phosphorus product) (15,16).

Studies have shown increase mortality, all causes and cardiac in patients of CKD with hyperparathyroidism (17), thus problem should be addressed timely in all CKD patients. Calcimimetics should be used in collaboration with phosphate binders and vitamin D analogues to achieve perfect desired goal. Still some cases that do not tolerate these agents or do not respond may require surgical intervention and partial removal of glands (16,17).

Implication for health policy/practice/research/medical education

Cinacalcet is the first approved calcimimetics administered in chronic kidney disease stage 5 patients, reported to be well tolerated and effectively reduce serum phosphorus and Ca×P (calcium phosphorus product).

Keywords: Parathyroid glands, Parathormone, Calcimimetics, Chronic kidney disease

Author's contribution

RN is the single author of the manuscript.

Conflicts of interest

The author declared no competing interests.

Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the author.

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