

Brief Note on Renal Osteodystrophy

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DESCRIPTION

Renal osteodystrophy is a bone disease that arises when the kidneys fail to keep calcium and phosphorus levels in the blood at normal ranges. It affects the majority of dialysis patients and is common in people with kidney disease. Renal osteodystrophy is the only term that should be used to describe changes in bone shape caused by Chronic Kidney Disease (CKD). Renal Osteodystrophy is a type of metabolic bone disease characterised by a lack of bone mineralization related to electrolyte and endocrine problems in patients with chronic renal failure. The consequences of high levels of Parathyroid Hormone (PTH) on bone manifest as Osteitis fibrosa, which is associated with a high rate of bone turnover. Adynamic bone disease is characterized by an extremely low bone turnover, as is osteomalacia of aluminium accumulation. Adynamic bone disease is associated with low levels of circulating PTH. These two forms of bone abnormalities may occur together, leading to a condition called mixed renal osteodystrophy.

Symptoms of renal osteodystrophy

The symptoms do not appear until a patient has been on dialysis for a few years, renal osteodystrophy is known as the "silent crippler." Typical signs and symptoms include:

- Bone ache
- Joint discomfort
- Deformation of the bones
- Fractures of the bones
- Mobility issues

High phosphorus and/or PTH levels, red eyes, itching, and sores from calcium-phosphorus deposits are all early signs of renal osteodystrophy. Renal osteodystrophy can be especially harmful to children with kidney illness because their bones are still growing.

CLASSIFICATION

Renal bone disease with high turnover (high PTH disease)

- Hyperphosphatemia decreases serum, Ca^{2+} , promoting Parathyroid Hormone (PTH).

- Phosphorus hinders renal 1-hydroxylase, vitamin D^3 production.
- Hyperplasia of parathyroid gland principal cells.
- Phosphorus retention stimulates PTH synthesis directly.
- Lower calcium, higher serum phosphate, higher alkaline phosphate, higher parathyroid hormone.

Normal PTH illness (low turnover renal bone disease)

- Lack of secondary hyperparathyroidism.
- Normal PTH levels with typical bone lesions indicated by low amounts of bone formation.
- Excessive aluminium deposition in bone has an effect on bone mineralization.
- Inhibits precursor differentiation into osteoblasts and osteoblast proliferation.
- Inhibits parathyroid gland PTH secretion.

Testing for renal osteodystrophy

Renal osteodystrophy is diagnosed by collecting a blood sample and measuring calcium, phosphorus, and PTH levels. Calcium and phosphorus tests are done on a monthly basis if a person is on dialysis (or sometimes more frequently). Most patients have their PTH checked every three months, though testing may be done more frequently for persons who are just starting vitamin D therapy or those who have severe bone disease while their healthcare team determines the proper vitamin D dosage. The renal dietician will go through the test results with you and suggest dietary adjustments or a change in your phosphorus binder prescription.

Renal osteodystrophy treatment

Treatment of osteodystrophy in patients with kidney failure has four goals-

- Maintain blood calcium and phosphorus levels as close to normal as possible.
- Prevent the development of parathyroid hyperplasia or, if SH has already developed, suppressing the secretion of PTH.
- Prevent extra skeletal calcium deposition.
- Prevent or reverse the accumulation of substances such as aluminium and iron that can harm the skeleton.

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