

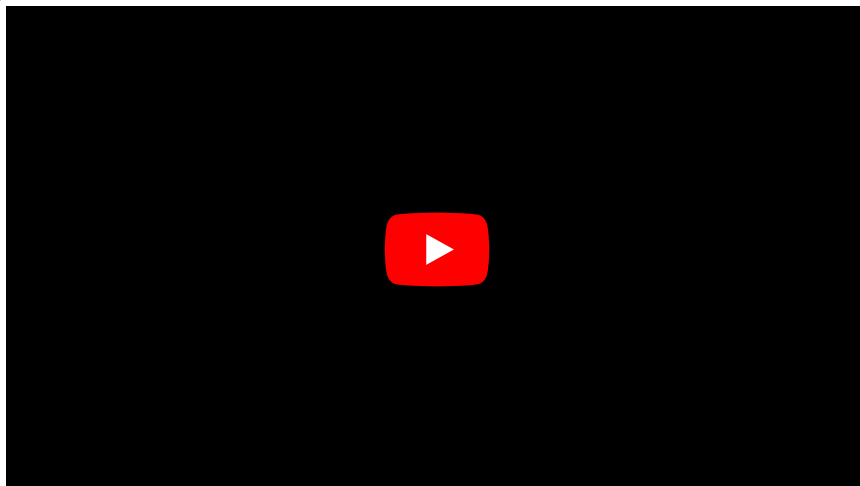
Renal osteopathy

Renal osteopathy (renal osteodystrophy) is a collective name for skeletal changes within a complex **disorder of phosphocalcium metabolism** that occur in chronic kidney disease. Today it is classified among the three components of CKD-MBD (bone and mineral disorder in chronic kidney disease). The clinical picture is very multifaceted due to the fact that individual factors apply to each patient at a given time in different intensity. Manifestations include osteopenia, osteomalacia, secondary hyperparathyroidism and growth retardation.

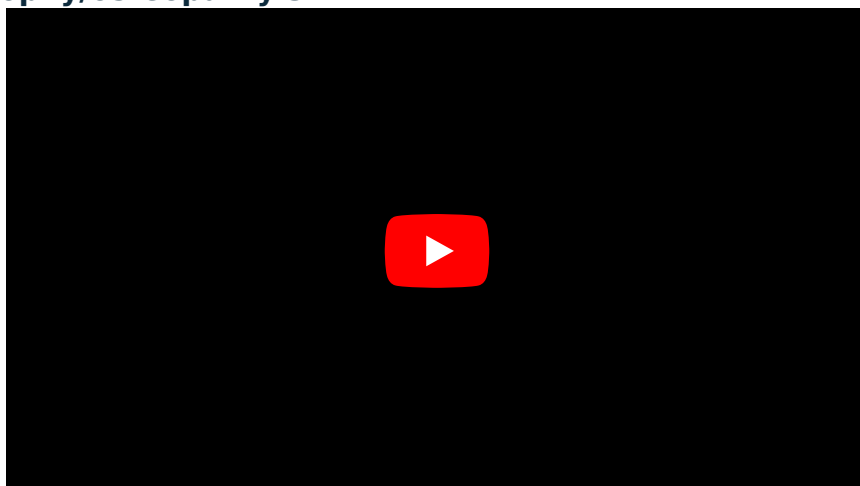
Renal osteopathy:



Renal osteopathy 2:



Renal osteodystrophy/osteopathy 3:



Pathogenesis

Skeletal changes are caused in renal failure by three mechanisms:

Tubular dysfunction

Low pH due to renal acidosis unbinds calcium and phosphorus ions from the hydroxyapatite structure. This results in demineralization of the bone matrix and osteomalacia.

Generalized renal failure

It leads to a decrease in phosphate excretion due to insufficient renal elimination, thus resulting in chronic hyperphosphatemia. Hyperphosphatemia stimulates parathyroid glands, contributing to secondary hyperparathyroidism.

Reduced production of enzymes and growth factors

The kidneys secrete an enzyme (1-hydroxylase) that converts vitamin D into an active form and also secrete the protein BMP-7. A decrease in active vitamin D3 (calcitriol) leads to hypocalcemia and contributes to secondary hyperparathyroidism. A lack of calcitriol increases the secretion parathormone (PTH), which activates 1-hydroxylase, thereby adjusting the level of calcitriol in the blood, but hyperparathyroidism occurs. However, with progressive failure, this compensatory mechanism is insufficient and hypocalcemia occurs. BMP-7 produced by renal tubular cells induces osteoblast proliferation and differentiation . Its reduced production thus leads to osteopenia.

Links

Related articles

- Renal failure
- Hyperparathyroidism
- Osteopenia
- Osteomalacia
- Hyperphosphatemia

Bibliography

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- VIKRANT, Sanjay. Prevalence and severity of disordered mineral metabolism in patients with chronic kidney disease: A study from a tertiary care hospital in India. *Indian J Endocrinol Metab* [online]. 2016 Jul-Aug, vol. 20, no. 4, p. 460-7, Available from <<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4911834/?tool=pubmed>>. ISSN 2230-9500 (print), 2230-8210.