Image Diagnosis: Disappearing Digits: Metabolic Bone Disease in End-Stage Renal Disease

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CASE PRESENTATION

A 32-year-old man with end-stage renal disease on hemodialysis since 2009 presented with reports of a "disappearing finger nail." He denied bone pain and muscle weakness but confirmed dry skin and pruritus. He was noncompliant with his prescribed cinacalcet and sevelamer. On examination, he was noted to have loss of lunula in the left index finger with shortening of the distal phalanx (Figure 1). Laboratory test results showed a phosphorus level of 7.0 mg/dL and an intact parathyroid (PTH) level of 2380 pg/mL. Radiographic imaging of his hands showed severe generalized bone resorption (the left hand is shown in Figure 2). His PTH scan showed retention of Tc-99m methoxyisobutylisonitrile in the left lower pole and right upper pole, which was discordant with Tc-99m pertechnetate uptake. The scan findings were consistent with nodular PTH hyperplasia, and he was referred for parathyroidectomy.

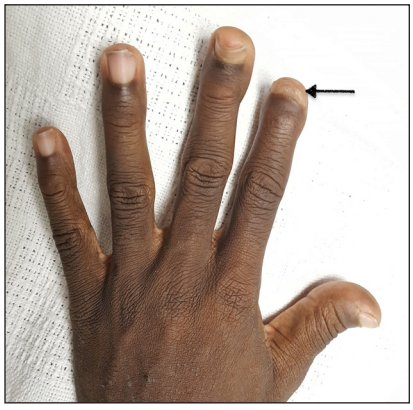

Figure 1. Gross appearance of the left hand showing shortened finger length and loss of lunula in the left index finger.

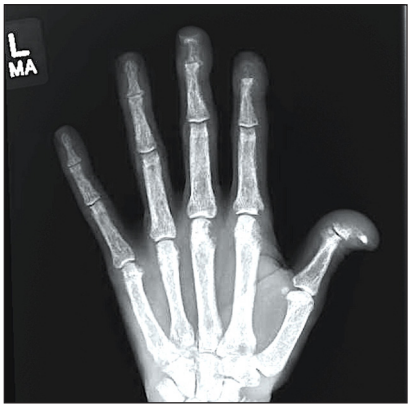

Figure 2. Plain radiograph of the left hand showing near complete osteolysis of the distal phalanx of the index finger and similar changes involving nearly all bones of the hand.

DISCUSSION

Metabolic bone disease is a common complication in chronic kidney disease. In the past decade, a number of mechanisms for unchecked PTH level elevations have been identified. Low vitamin D levels, resistance of PTH-sensing receptors, and dysregulation of the fibroblast growth factor 23PTH axis can all lead to prolonged excessive synthesis and secretion of PTH, eventually leading to the development of metabolic bone disease.[1,2] Current treatment options include correcting vitamin D deficiency, controlling dietary phosphorus intake, and prescribing phosphate binders and calcimimetics (cinacalcet). Recommendations include use of non-calcium-containing phosphate binders such as lanthanum and sevelamer.

The Kidney Disease Improving Global Outcomes guidelines recommend parathyroidectomy in patients with stage G5D with severe hyperparathyroidism who fail to respond to medical or pharmacological therapy (grade 2B). Historically, a PTH level greater than 800 pg/mL despite medical treatment would lead to a referral for parathyroidectomy (> 9 × the upper limit of a normal assay).[3] There are data to suggest that hyperparathyroidism caused by nodular hyperplasia, along with cases where the ultrasonography of the PTH glands shows volume greater than 500 mm^3 or the largest diameter is greater than 1 cm, may be resistant to medical treatment.[4] There is a paucity of clinical trials comparing medical therapy with surgical parathyroidectomy in this patient population.

Cruzado et al[5] studied the effect of cinacalcet and compared it with parathyroidectomy in renal transplant patients with a glomerular filtration rate greater than 30 mL/kg/min. Parathyroidectomy led to a statistically significant reduction in PTH levels starting at 3 months and the effect was even more pronounced at 12 months.[5] ❖

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

How to Cite this Article

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