

Pancytopenia in Secondary Hyperparathyroidism Due to End-Stage Renal Disease

To the Editor:

A 45-year-old man with a medical history of hypertension, diabetes mellitus, and polycystic kidney disease with end-stage renal disease on hemodialysis presents to the hospital with pneumonia. The patient was pancytopenic at presentation (white blood cell count 2.3, hemoglobin 10.3 g/dL, and platelets 85 KU/L), which persisted even after pneumonia resolution. He had no history of malignancy or exposure to marrow-suppressing agents. His liver function test result was normal except for a high alkaline phosphatase of 900 IU/L but normal gamma glutamyl transferase. Computed tomography of the abdomen showed polycystic kidney disease, stable splenomegaly, and diffuse osseous changes compatible with underlying renal osteodystrophy. His intact parathyroid hormone was 1786 pg/mL (normal 50-60 pg/mL), serum calcium was 7.2 mg/dL (normal 8.5-10.2 mg/dL), and phosphorous was 4.9 mg/dL (normal 2.5-4.5 mg/dL). Peripheral smear showed some tear drops, leukopenia, and lymphopenia. Bone marrow biopsy revealed fibrotic bone with bony remodeling, most consistent with renal osteodystrophy (**Figure 1**).

Secondary hyperparathyroidism is a frequent complication of chronic kidney disease, occurring in two thirds of patients with a glomerular filtration rate less than 60 mL/min. Progression of renal failure leading to decreased production of 1,25-dihydroxyvitamin D and phosphate retention results in parathyroid hyperplasia and secondary hyperparathyroidism resulting in osteodystrophy.

Increased parathyroid hormone is known to have a direct toxic effect on erythropoietin synthesis¹ and bone marrow erythroid progenitors. It is not known whether high parathyroid hormone also has a direct toxic effect on white blood cells and platelets, but myelofibrosis, in association with anemia, has been identified in studies with secondary hyperparathyroidism.² Secondary hyperparathyroidism in patients with chronic renal failure and bone

marrow fibrosis can cause anemia, thrombocytopenia, and eventually pancytopenia.³

High parathyroid hormone promotes the release of cytokines (interleukin-6 and tumor necrosis factor- α) that stimulate marrow fibroblasts, resulting in myelofibrosis.³ Myelofibrosis has been seen in primary hyperparathyroidism,¹ so uremic toxin and other factors associated with end-stage renal disease may play a minor role in marrow fibrosis.

Treatment of secondary hyperparathyroidism consists of tight control of phosphate and administration of active vitamin D, which inhibits parathyroid cell hyperplasia, suppresses parathyroid hormone, and increases calcium absorption. Despite medical therapy, up to 5% of patients with secondary hyperparathyroidism eventually require parathyroidectomy.⁴ Patients undergoing hemodialysis who have renal osteodystrophy show improvement of hematologic findings after parathyroidectomy.³ However, marrow fibrosis associated with secondary hyperparathyroidism in patients on dialysis may be irreversible.

Newer therapies, including calcitriol, calcium-based phosphate binders, high calcium dialysate, and substitution of acetate with bicarbonate in dialysate in patients with end-stage renal disease, have been reported to provide benefit in the medical treatment of secondary hyperparathyroidism. Therefore, secondary hyperparathyroidism leading to severe marrow fibrosis causing pancytopenia is rare these days. This is the first case report on pancytopenia due to marrow fibrosis caused by secondary hyperparathyroidism due to renal failure.

Only 2 case reports of pancytopenia due to hyperparathyroidism are described in the literature after the year

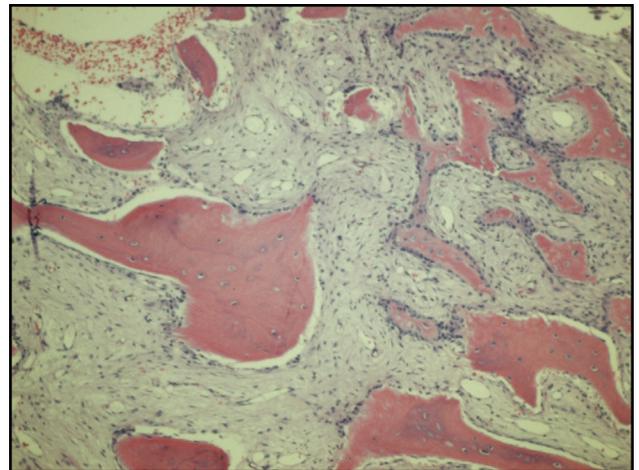


Figure 1 Bone marrow biopsy showing increased fibrous tissue with bony remodeling

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2000—one caused by primary hyperparathyroidism due to parathyroid adenoma⁵ and one caused by secondary hyperparathyroidism due to celiac disease.⁶

Our case stresses the importance of being vigilant of the rare complication of secondary hyperparathyroidism. Physicians dealing with pancytopenia in patients with chronic renal failure should consider bone marrow biopsy to rule out marrow fibrosis due to secondary hyperparathyroidism.

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