

Image in Osteology

Osteopetrosis: characteristic radiological findings

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We present images corresponding to a 40-year-old woman evaluated in the Rheumatology Department with a diagnosis of osteopetrosis. She had a family history involving first-degree relatives (mother and two daughters). The diagnosis was established during adolescence, and since then she has suffered multiple bone fractures (metatarsals, ribs, left shoulder, and right femur).

Laboratory studies showed bone metabolism parameters within the normal range, including calcium 9.4 mg/dL (normal value: 9.0-10.5 mg/dL), phosphorus

3.6 mg/dL (2.7-4.5 mg/dL), alkaline phosphatase 82 U/L (40-120 U/L), 25-hydroxyvitamin D 42 ng/mL (30-100 ng/mL), and PTH 38 pg/mL (15-65 pg/mL). Complete blood count revealed anemia (Hb 9 g/dL; normal value: 12-16 g/dL). Genetic testing revealed a mutation in the CLCN7:C.857G > A p(Arg286Gln) gene.

Plain radiographs showed characteristic findings of osteopetrosis, such as diffuse increased bone density with loss of differentiation between cortical bone and bone marrow, trabecular thickening, and generalized sclerosis (Figs. 1 and 2).



Figure 1. Plain radiographs corresponding to a patient with autosomal dominant osteopetrosis type II. A. Anteroposterior radiograph of both knees: diffuse increase in bone density, with loss of differentiation between cortical bone and marrow. B. Anteroposterior radiograph of both hands: trabecular thickening and “bone within bone” sign. C. Anteroposterior pelvic radiograph: diffuse bone sclerosis involving the iliac bones, sacrum, and femoral metaphyses, with loss of cortical-medullary differentiation, characteristic of osteopetrosis. In the right proximal femur, an incomplete transverse fracture is identified, visible as a faint radiolucent line (arrow).

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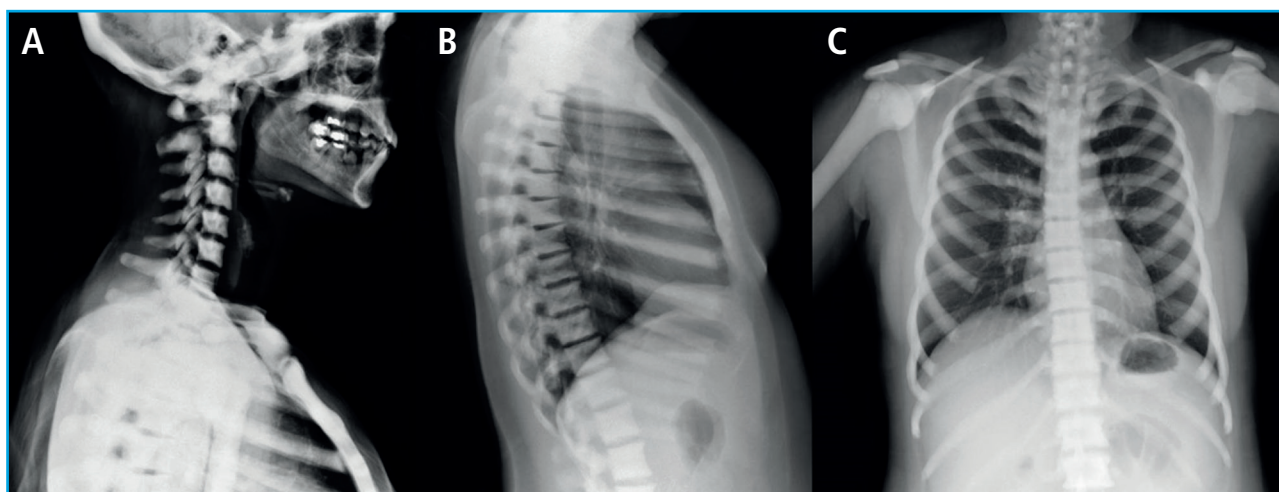


Figure 2. Plain radiographs corresponding to a patient with autosomal dominant osteopetrosis type II. A. Lateral cervical spine projection: note the thickening of the skull base. B. Lateral spine projection: sclerosis of the vertebral endplates is observed, giving the characteristic appearance of “sandwich” vertebrae. C. Anteroposterior projection of the thoracic spine and ribs: generalized bone sclerosis.

The case presented here is consistent with autosomal dominant osteopetrosis type II (also known as Albers-Schönberg disease). An evaluation of the anemia syndrome was performed, including complete blood count, reticulocyte count, peripheral blood smear, ferritin, serum iron and iron-binding capacity, vitamin B12, and folic acid, which revealed neither nutritional deficiencies nor evidence of hemolysis. Abdominal ultrasound demonstrated mild-to-moderate splenomegaly (14 cm), probably related to extramedullary hematopoiesis, a phenomenon described in osteopetrosis due to bone marrow involvement. However, no findings compatible with true hypersplenism were identified—including the absence of thrombocytopenia and a reticulocyte count within the low-normal range—and therefore this possibility was considered only as an unconfirmed clinical hypothesis.

Osteopetrosis, or “marble bone disease,” encompasses a group of rare genetic disorders, with an estimated incidence of 1 case per 250,000 births in the autosomal recessive forms and 1 per 20,000 in the dominant forms. It is characterized by an abnormal increase in bone density due to a defect in osteoclast differentiation or function, which alters bone remodeling and results in dense but fragile bones, with predisposition to fractures and bone marrow compromise.

Mutations in at least 10 implicated genes have been identified, accounting for approximately 70 % of cases. Inheritance may be autosomal recessive—more severe, with neonatal onset, presenting with fractures, hypocalcemia, compressive neuropathies, and bone marrow failure—, dominant—milder and

diagnosed during childhood or adolescence—, or X-linked, generally associated with complex multisystem syndromes.

Diagnosis is based on clinical presentation and characteristic radiological findings, such as the “bone within bone” sign and “sandwich” vertebrae and may be confirmed by genetic testing. Identification of the implicated gene allows refinement of prognosis, guidance of treatment, and assessment of the risk of familial recurrence.

Although treatment is usually symptomatic, in severe forms hematopoietic stem cell transplantation may correct the osteoclastic defect and improve survival. Severe untreated infantile forms have a limited life expectancy, whereas adult-onset forms usually follow a benign course.

REFERENCES

1. Spinnato P, Pedrini E, Petrera MR, Zarantonello P, Trisolino G, Sangiorgi L, et al. Spectrum of skeletal imaging features in osteopetrosis: inheritance pattern and radiological associations. *Genes* 2022;13(11):1965. DOI: 10.3390/genes13111965
2. Wu CC, Econs MJ, DiMeglio LA, Insogna KL, Levine MA, Orchard PJ, et al. Diagnosis and management of osteopetrosis: consensus guidelines from the osteopetrosis working group. *J Clin Endocrinol Metab* 2017;102(9):3111-23. DOI: 10.1210/je.2017-01127
3. Essabar L, Meskini T, Ettair S, Erreimi N, Mouane N. Malignant infantile osteopetrosis: case report with review of literature. *Pan Afr Med J* 2014;17:63. DOI: 10.11604/pamj.2014.17.63.3759
4. Stark Z, Savarirayan R. Osteopetrosis. *Orphanet J Rare Dis* 2009;4:5. DOI: 10.1186/1750-1172-4-5