Clinical Problem Solving | PATHOLOGY

Tumor of Maxilla in a Patient With Hypercalcemia

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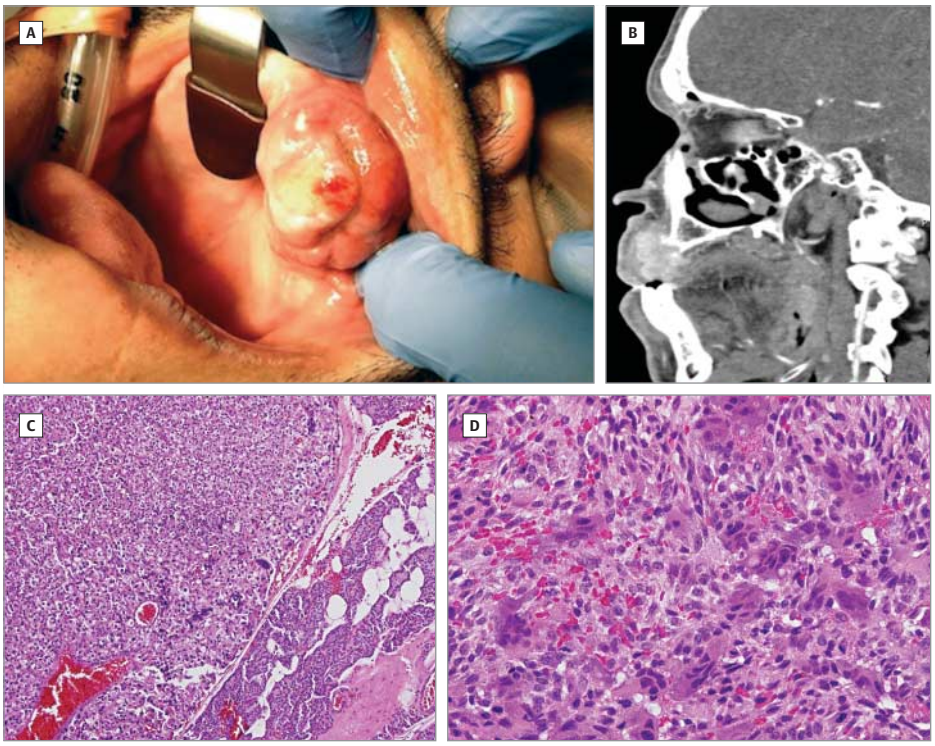

Figure.

A 43-year-old man was referred to the head and neck clinic with a 6-month history of a slowly growing maxillary mass. He also reported a 7-year history of right hip pain radiating down to his lower extremity. He was a heavy alcohol user and smoked 5 cigarettes per day, and was once hospitalized for kidney stones. The rest of his medical history was unremarkable. Examination of the oral cavity demonstrated an edentulous maxilla with a firm, nonfluctuant, mildly tender, ulcerated mass arising from the left anterior aspect (**Figure**, A). The rest of his physical examination was unremarkable.

Further workup for his hip pain revealed an elevated serum calcium level of 11.7 mg/dL (reference range, 8.5-10.3 mg/dL) and a parathyroid hormone (PTH) level of 664 pg/mL (reference range, 10-55 pg/mL). (To convert calcium to millimoles per liter, multiply by 0.25; to convert PTH to nanograms per liter, multiply by 1.) A facial computed tomographic (CT) scan revealed a hyperdense, homogeneous solid mass involving the left alveolar ridge with bony erosions of both the outer and inner cortices (Figure, B). A whole-body positron emission tomography scan showed intense, focal uptake in the left upper alveolar ridge and the right iliac bone. A sestamibi parathyroid scan revealed focal uptake in the right neck. The patient was taken to the operating room to undergo a biopsy of his maxillary lesion and a parathyroidectomy. Histologic examination of the parathyroid lesion (hematoxylin-eosin, original magnification ×100) demonstrates hypercellular parathyroid tissue (Figure, C, left side) adjacent to a compressed rim of normocellular parathyroid tissue (Figure, C, right side). The maxillary lesion shows scattered osteoclast-type, multinucleated giant cells within a vascular and proliferative fibroblastic background. Evidence of old and recent hemorrhage can be seen as indicated by the presence of hemosiderin-laden macrophages (not shown) and extravasated red blood cells (Figure, D).

What is your diagnosis?

Diagnosis

Brown tumor of primary hyperparathyroidism.

Discussion

Under normal physiologic conditions, serum calcium levels are strictly regulated by the antagonistic actions of calcitonin and PTH. Calcitonin is released from parafollicular cells within the thyroid gland, which acts to reduce calcium concentrations by promoting bone production and inhibiting calcium absorption through the small intestine and calcium reabsorption through proximal renal tubules of the kidney nephrons.[1] Parathyroid hormones are released from the parathyroid gland when calcium levels drop below 2.1 to 2.9 mmol/L (reference range, 2.2-2.6 mmol/L). Parathyroid hormones act at the level of osteoclasts to increase bone resorption and at the level of small intestine and kidneys to facilitate calcium absorption and reabsorption respectively.[1-3]

Primary hyperparathyroidism is characterized by excessive secretion of PTH most commonly by an autonomous parathyroid gland resulting in hypercalcemia.[4] In addition, hyperparathyroidism can frequently be secondary to renal failure, as vitamin D fails to become converted to its active form, 1,25-dihydroxy vitamin D, by the kidney, leading to reduced serum calcium levels.[4-6] In some cases of hyperparathyroidism, uncontrolled accelerated bone resorption leads to bony lesions concentrated in focal points in the pelvis, ribs, clavicles, and the facial bones, and most frequently the maxilla and mandible. Such lesions are known as osteitis fibrosa cystica, otherwise known as brown tumors. The name "brown tumor" refers to the brown appearance of the lesion as a consequence of local hemorrhage following unregulated accelerated bone resorption.[7,8]

Brown tumors may be mistaken for giant cell reparative granuloma or giant cell tumors. The histologic appearance of giant cell reparative granuloma is indistinguishable from the brown tumor of hyperparathyroidism. The distinction between the 2 requires correlation with serum calcium and PTH levels, which would be elevated in the latter. In this particular case, the abnormally high levels of serum calcium and PTH, in addition to the histologic appearance of the tumor, is supportive of the diagnosis of a brown tumor.[7,9] Giant cell tumor is another differential diagnostic consideration that should be distinguished from the brown tumor of hyperparathyroidism. The former rarely arises in the craniofacial bones and is characterized histologically by a hypercellular mononuclear cell proliferation with evenly distributed, scattered multinucleated giant cells that have the same nuclei as the background mononuclear cells. The presence of a fibroblastic background, as well as the focality of the giant cells, is more supportive of a diagnosis of brown tumor of hyperparathyroidism and argues against giant cell tumor. The treatment of brown tumors is centered on management of the hyperparathyroidism and by simple excision if the lesion is noted to persist. Recurrence is unlikely if the hyperparathyroidism is treated.[10]

ARTICLE INFORMATION

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Conflict of Interest Disclosures: None reported.

Section Editor: Edward B. Stelow, MD.

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