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Brown Tumor: Simulation of Bone Metastases due to Primary Hyperparathyroidism

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Abstract

Bone metastasis is typically associated with multiple osteolytic lesions. However, brown tumor ought to be included in the list of possibilities. In patients with uncontrolled primary or secondary hyperparathyroidism, brown tumors are uncommon benign lesions of the skeletal system. For our situation report, we present a 35-year-old female with multifocal earthy colored cancer that difficultiy in differential determination of metastasis of threatening parathyroid. Following a parathyroidectomy, treatment and follow-up are also emphasized.

Keywords: Brown tumor; Primary hyperparathyroidism; Bone metastases

Introduction

Brown tumor (BT) is a rare benign bony lesion caused by uncontrolled primary or secondary hyperparathyroidism (HPT) and excessive osteoclast activity and hemosiderin deposition. This growth like sore can be multifocal and situated in any piece of the skeleton, yet most often emerges in the jaws, ribs, clavicles, limits, and pelvic support. On scintigraphy, a highly sensitive screening tool utilized frequently in oncology, the tumor exhibits characteristics comparable to those of bone cancer metastases [1]. In contrast to the 13% of BT with secondary HPT (SHPT), the presence of multiple brown tumors is a very rare complication of primary HPT (PHPT), with a recent incidence of 1%. We describe a 35-year-old woman who had multifocal BTs that looked like bone metastases and were caused by PHPT. Additionally, she had early HPT symptoms that were overlooked, resulting in a delayed diagnosis. The significance of PHPT in the diagnosis of patients with bone symptoms, particularly multiple lytic bone lesions, is emphasized in this report [2].

A 35-year-old woman presented to a nearby hospital with persistent iliac bone pain for six months. She needed help walking because the pain had gradually increased to VAS 8/10. Her medical history revealed that she had undergone extracorporeal shock wave lithotripsy (ESWL) for bilateral kidney stones two years prior and had broken her left tibia in a minor traffic accident one year prior. She did not have a history of substance abuse, family history, or psychosocial history. A 1 to 2 cm mass was discovered during a physical examination at the lower pole of the left thyroid lobe [3]. An 18- to 23-millimeter hypoechoic thyroid mass with inner calcification was found next to the left thyroid lobe's lower pole on an ultrasound of the neck. Multiple myeloma and primary cancer screenings at other sites were negative. The laboratory test was looked at because there was a tumor in the parathyroid. Tests in the lab revealed hypercalcemia (total calcium: 3.57 mmol/l, range normal: 2.15–2.55 mmol/l) and low phosphatase levels (0.51 mmol/l, normal range: 0.81–1.45 mmol/l) [4]. PTH was still present at 1497.4 pg/ml (normal range: Alkaline phosphatase (ALP) was 339 IU/l (normal range: 35–104 IU/l), and the concentration ranged from 15 to 68.3 pg/ml. Tests for FT3, FT4, FSH, and kidney and liver function were within normal ranges. Multiple osteolytic lesions in the iliac bone and 1/3 of the upper left femur were discovered during a pelvic MRI scan. 99mTcMDP skeletal scintigraphy revealed increased radiotracer uptake in the skull, pelvis, bilateral femurs, and tibias. Small bilateral kidney stones were identified by abdominal ultrasound.

We were able to distinguish between an adenoma and a brown tumor due to the patient's multiple bone metastases, which led us to the diagnosis of prostate cancer. The proposed operation was approved by the patient. The parathyroid gland, along with the lower portion of the left lobe of the thyroid gland, was then removed by pathologists, who discovered a parathyroid adenoma. At the beginning of the procedure, a blood test for baseline PTH was done, and the result was 1527 pg/mL. Ten minutes after the tumor was removed, PTH levels dropped to 424 pg/mL, which led us to decide to finish the surgery [5].

The patient experienced numbness and tingling in her fingers and toes three days after the procedure. Serum phosphate was 0.81 mmol/l, and serum calcium was 2.06 mmol/l. It was determined that the patient had hungry bone syndrome. Calcium gluconate intravenous infusion was used for acute management, and symptoms gradually improved. On the fifth day following the operation, the patient was given 1000 mg of calcium chloride and 1.5 g of calcitriol per day. Three months of follow-up have been conducted on the patient. Blood calcium and PTH levels are both normal. The initial brown tumor lesions do not appear to have progressed in the imaging manifestation. The patient is back to living a normal life.

Clinical discussion

With an incidence of one percent in the PHPT group, BT is a very uncommon manifestation of HPT that has not been investigated in recent years. It results from the abnormal elevation of PTH, which causes rapid osteoclastic turnover of bone. The position of hemosiderin is the cause of the brown color. In most cases, the tumors are isolated, but a few cases have been reported with multiple lesions. The presence of BT should be considered in the differential diagnosis of metastases of a malignant parathyroid in patients who present with multiple lytic bone lesions. The skull, pelvis, ribs, and femur all show signs of BT and bone metastases. Similarities include elevated radiotracer uptake foci

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on skeleton scintigraphy, urolithiasis, and serum Ca and intact PTH levels.

Even though a biopsy is regarded as the most reliable method of diagnosis, it may not always be successful. As a result, distinguishing between BT and malignant metastases is extremely challenging. 85 percent of PHPT cases are caused by parathyroid adenoma, 10 to 15 percent by parathyroid hyperplasia, and 1 to 5 percent by carcinoma. Bone pain, bone fractures, nephrolithiasis, abdominal grunts, psychic grunts, and even severe complications like cardiac arrhythmia or coma are common signs of hypercalcemia in PHPT patients [6].

In created nations, PHPT is generally analyzed by schedule biochemical screening without clinical signs proposing the disease, so the old style signs of PHPT are extremely exceptional. However, these manifestations persist in other nations, particularly developing nations, as demonstrated by our case. Our young patient had bilateral kidney stones several years before she was diagnosed with PHPT, and she had a left tibia fracture from a minor traffic accident. Adenoma and carcinoma typically present as a single mass, whereas parathyroid hyperplasia typically affects all four glands. On physical examination and ultrasound, a single neck tumor indicated a carcinoma with multiple bone metastases rather than a benign lesion in this patient. However, the pathology report revealed an adenoma following examination of a surgical specimen. This suggests that ultrasound, clinical symptoms, and laboratory tests cannot differentiate between benign and malignant parathyroid gland tumors.

Discussion

Resection of the hyperfunctioning parathyroid gland, which has a high recovery rate and low complications rate, is the primary treatment for BT caused by PHPT. Hematomas, recurrent laryngeal nerve injury, and hypocalcemia are the most common complications of parathyroidectomy. Hypocalcemia is a serious problem that can lead to more patient morbidity and more money spent on healthcare. Our patient's symptoms, which were investigated, met the criteria for hungry bone syndrome three days after the operation. The imbalance between osteoblast-mediated bone formation and osteoclast-mediated bone resorption caused by prolonged HPT and sudden withdrawal of PTH in patients with high bone turnover is the cause of this phenomenon. Calcium and vitamin D supplements can treat this syndrome.

Conclusion

While bone metastases and multiple myeloma should still be considered first, this case report emphasizes that brown tumors are an important differential diagnosis for patients presenting with multiple osteolytic bone lesions. In addition, even though it is uncommon, a thorough understanding of the classic manifestation of PHPT is essential for expediting diagnosis, particularly in developing nations. In patients with multifocal osteolytic lesions, routine measurements of serum phosphate, serum calcium, and PTH levels are useful diagnostic tools.

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