VIA MEDICA

Case report

NOWOTWORY Journal of Oncology
2018, volume 68, number 4, 197–201
DOI: 10.5603/NJO.2018.0031

ISSN 0029–540X
www.nowotwory.edu.pl

Large tumor of iliac bone in a young woman imitating malignant disease as a sign of primary hyperparathyroidism

Daria Kalińska[1], Paulina Godlewska[1], Michał Wągrodzki[2], Piotr Rutkowski[3], Marek Dedecjus[1]

Detection of a bone tumor in a young adult draws suspicion of neoplastic disease.
A 22-year-old female was admitted for a bone tumor biopsy. MRI of the pelvis showed an osteolytic lesion at the level of the left sacroiliac joint. Radiologist suggested differential diagnosis between aneurysmal bone cyst and giant cell tumor of bone. Considering the high serum calcium and numerous foci of increased accumulation of the radioisotope on the bone scan, serum iPTH level was evaluated. The diagnosis of hyperparathyroidism was established. Neck ultrasound revealed focal lesion corresponding to an enlarged parathyroid gland. Parathyroidectomy was performed. The iliac bone tumor showed to be a brown tumor of primary hyperparathyroidism, detected only rarely in adolescents. Non-specific symptoms and lack of routine control of serum calcium in youths make an early diagnosis difficult; moreover, pathological features of brown tumor and giant cell tumor of bone are very similar.

NOWOTWORY J Oncol 2018; 68, 4: 197–201

Key words: primary hyperparathyroidism, osteitis fibrosa cystica, bone neoplasms

Introduction

A bone tumor can be a benign or a malignant neoplastic lesion or even a result of non-neoplastic condition. The incidence of benign bone neoplasms is higher than the one of primary malignant tumors. In addition, primary malignant bone tumors are outnumbered by metastases from carcinomas, melanoma, or hematologic malignancies, such as plasmacytoma [1].

The age-specific incidence rates of bone sarcomas show a bimodal distribution, with the first peak in the second decade, and the other after the sixth decade of life. Ewing sarcoma and osteosarcoma are the most frequent histologic subtypes in the first two decades, while chondrosarcoma, malignant fibrous histiocytoma, chordoma and secondary osteosarcoma show an increased incidence after the fourth decade of life [1].

As some types of malignant bone tumors affect mostly young people, bone lump found in a young person necessitates urgent diagnostic workup.

The osseous pelvis is a well-recognized site of primary and secondary musculoskeletal tumors [2]. Patients with pelvic tumor are usually older than the ones with tumors in extremities, and the lesions found are most often larger. The majority of tumors in the pelvis are malignant [3, 4]. Some tumor-like lesions occurring in the hip and pelvis may mimic neoplasm, e.g.: infections (including tuberculosis), insufficiency/avulsion fractures, cysts, fibrous dysplasia, aneurysmal bone cyst, Langerhans cell histiocytosis, and Paget's disease [3].

Another medical condition, which can lead to the bone deformity within the pelvic girdle, is an osteitis fibrosa cystica (OFC) resulting from hyperparathyroidism, uncommonly diagnosed among adolescents and young adults [5]. Excessive parathyroid hormone (PTH) secretion from e.g. parathyroid adenoma accelerates bone turnover with predominating osteoclastic activity. Succeeding intensive bone resorption together with intraosseus bleeding and

[1]Department of Oncological Endocrinology and Nuclear Medicine, Maria Skłodowska-Curie Institute — Oncology Center, Warszawa, Poland

[2]Department of Pathology, Maria Skłodowska-Curie Institute — Oncology Center, Warszawa, Poland

[3]Department of Soft Tissue/Bone Sarcoma and Melanoma, Maria Skłodowska-Curie Institute — Oncology Center, Warszawa, Poland

tissue degeneration may lead to the formation of cystic lesions filled with hemosiderin-loaded macrophages, giant cells, and fibroblasts. Hemosiderin deposits, hemmorhages and vascularization give brown colour to the soft-tissue component of the tumor [6]. Signs and symptoms of hyperparathyroidism from musculoskeletal system include bone pain and deformities, pathological fractures, proximal muscle weakness with hyperreflexia [7]. These complaints are characteristic in older groups. Brown tumors, representing the terminal stage of the bone remodeling process, can be located in any part of skeleton (but most frequently in the jaws, ribs, clavicles, extremities, pelvis). They are rare manifestations of prolonged hyperparathyroidism with an overall incidence of 2–3% [8].

The radiologic evaluation of a pelvic lesion often begins with the plain film and proceeds to computed tomography (CT) or magnetic resonance imaging (MRI) [2]. CT plays more important role in visualizing incidental findings and in characterizing tumor-like lesions, such as normal variants and post-traumatic sequelae. MR is the primary preoperative staging tool for sarcoma, as well as the most reliable one to detect tumor recurrence, especially in locations inaccessible by clinical examination, as pelvis [3, 9]. Clinical history and imaging characteristics can significantly narrow the broad differential diagnosis for osseous pelvic lesions [2].

Case presentation

A 22-year-old woman was admitted to the Maria Skłodowska-Curie Institute — Oncology Center in Warsaw because of a tumor in the left iliac bone she had noticed 4 weeks before. The MRI of lumbo-sacral region showed an osteolytic lesion containing fluid and soft tissue component (Fig. 1). Differential diagnosis between aneurysmal bone cyst and giant cell tumor of bone was suggested by the radiologist.

The patient reported unexpected weight loss of 10 kg when she was 18, followed by lack of appetite, frequent nausea, excessive thirst and by migrating bone and joints pain. The patient decided to see a doctor, when she noticed a tumor in the pelvis. On admission, the patient was underweight (BMI 13.8 kg/m^2). There was an 8 cm palpable tumor in the sacroiliac area.

The patient's age, clinical manifestation and imaging results suggested a neoplastic disease. The planned diagnostic workup included: laboratory blood tests, a three-phase bone scintigraphy and then a probe-guided bone biopsy of the tumor. Soft-tissue phase of bone scanning revealed increased accumulation of the tracer in peripheral part of the iliac bone tumor, while numerous foci of pathological radioisotope uptake in the skeleton were shown at the delayed phase of bone scintigraphy (Fig. 2). Meanwhile results of lab tests were obtained. As hypercalcemia (4.11 mmol/l, normal range: 2.2–2.65 mmol/l) was revealed, the

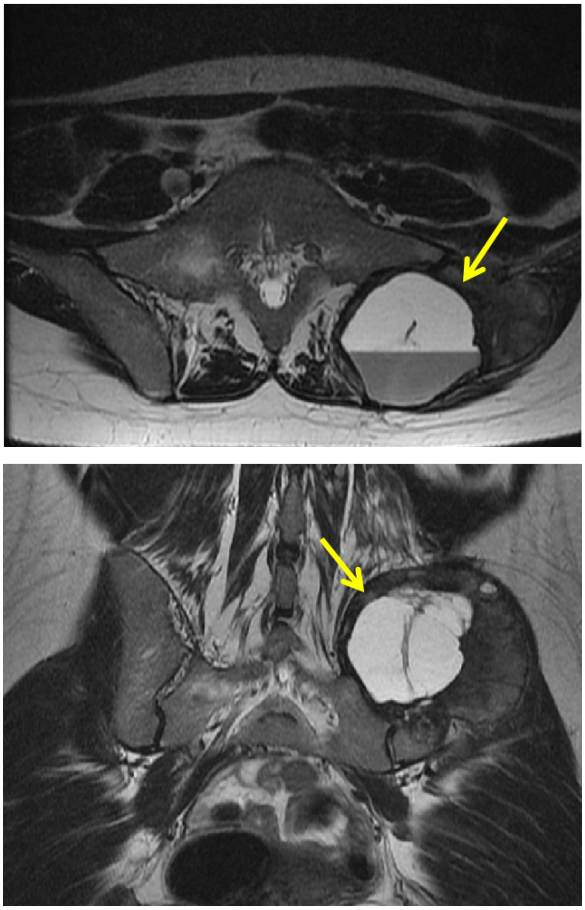

Figure 1. MRI of the pelvis: an osteolytic lesion of about 7.5 cm (arrows) in the left iliac bone at the level of the sacro-iliac joint; the cystic parts of the tumor contained fluid of various signal intensity (fluid-fluid levels)

laboratory panel has been broadened into intact parathyroid hormone (iPTH) and phosphate levels (Tab. I). At this point a probe-guided biopsy of the tumor in the left iliac bone was performed (Fig. 3).

The results of the medical diagnostic examination pointed to primary hyperparathyroidism (PHPT) with bone lesions corresponding to advanced form of OFC. A hypoechoic focal lesion in the right lobe of the thyroid was shown on the neck ultrasound (Fig. 4). The histological structure of the bone tumor resembled giant-cell tumor of bone, however negative result of H3F3A mutational testing together with clinical presentation allowed to confirm the diagnosis of the brown tumor of PHPT.

The patient was referred to the Department of Endocrine Surgery where parathyroidectomy was performed (Fig. 5). After the surgery, iPTH levels decreased significantly, which spoke in favor for the effectiveness of treatment (Tab. I). Histopathology revealed the adenoma of the inferior right parathyroid gland.

Postoperatively administration of vitamin D, alfacalcidol, calcium carbonate, magnesium was started. The symptoms of hungry bone syndrome with low serum calcium and

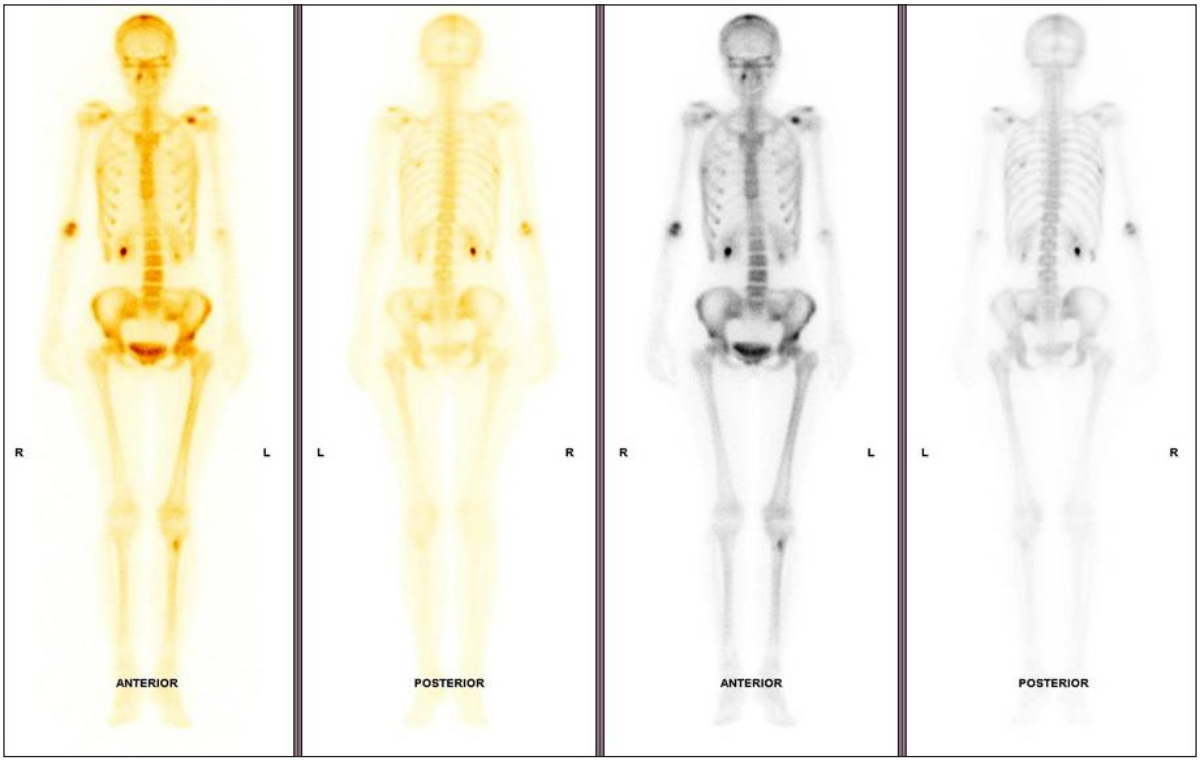

Figure 2. Delayed phase of 99mTc MDP bone scanning: numerous foci of pathological radioisotope uptake (left iliac bone, left shoulder, right ribs: the 6th and the 11th, proximal part of the left tibia)

phosphate levels were observed. The patient was discharged home. Further endocrinological treatment, orthopedic consultation and radiological control were all recommended.

Discussion

PHPT is most frequently diagnosed in middle-aged women, in youths it occurs rarely [10, 11]. Non-specific symptoms and lack of routine tests of serum calcium in young patients make an early diagnosis of this disease very difficult. Moreover, pathological features of brown tumor and giant cell tumor of bone are very similar.

In patients suffering from PHPT, first symptoms result from hypercalcemia. They are non-specific and often underestimated both by doctors and patients. Changes in mental status, gastrointestinal complaints (such as constipation, anorexia, heartburn, nausea, vomiting as well as peptic ulcer disease)

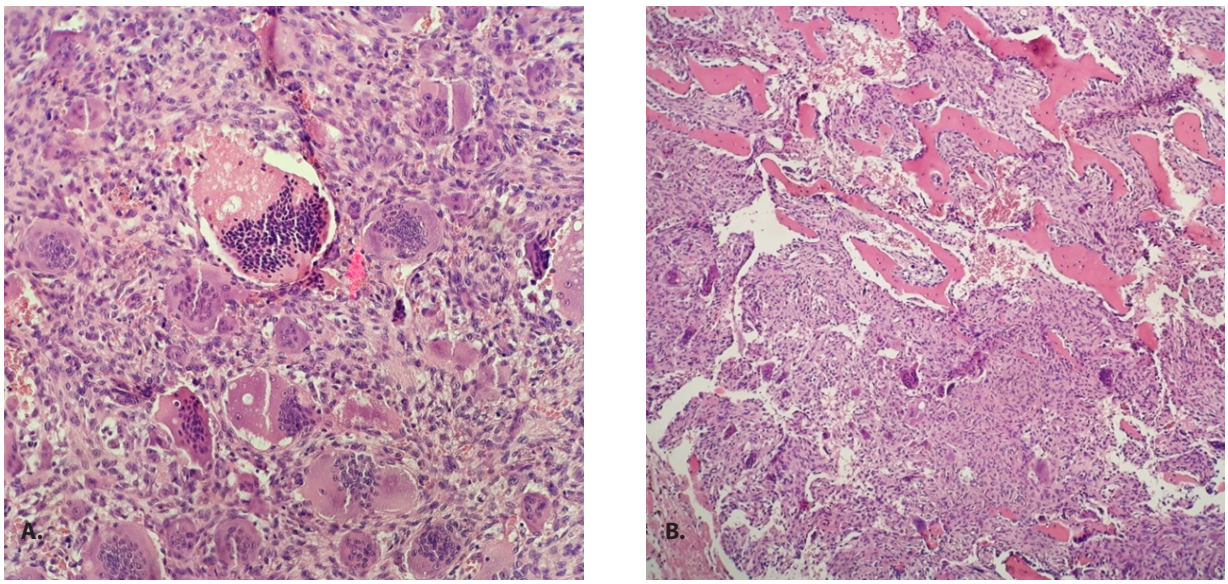

Figure 3. Histopathologic specimens — giant multinucleated cells are spread among small ovoid cells; areas of blood extravasation as well as newly formed bone trabeculae are also visible. **A.** HE 200x **B.** HE 40x

Table I. Preoperative and postoperative concentration of serum calcium and intact PTH

Blood test results (reference range)	Preoperatively	Postoperatively	3rd day after the surgery
Total serum calcium (2.2–2.65 mmol/l)*	4.11 mmol/l	2.8 mmol/l	2.29 mmol/l
iPTH (12–88 pg/ml)**	989 pg/ml	< 6.0 pg/ml	16 pg/ml

* Beckman Coulter, ** Access Intact PTH, Beckman Coulter

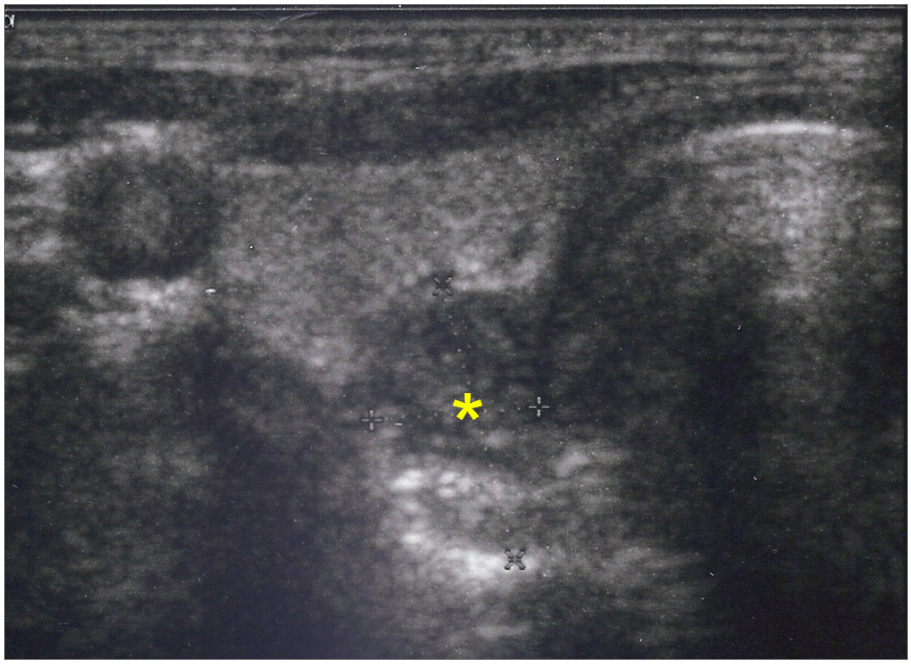

Figure 4. Neck ultrasound: focal hypoechoic lesion (asterisc) in the inferior pole of the right lobe of the thyroid, adjacent to the trachea

may be present [5]. The symptoms from bones and kidneys gradually increase, however emotional instability, especially in young patients, or rigorous dieting, as in the case of our patient, are often perceived as the main problem by physicians.

Young age of patient affected with PHPT should lead to consideration of inherited causes, including multiple endocrine neoplasia type I and type II, as it can be the first component of the syndrome [12].

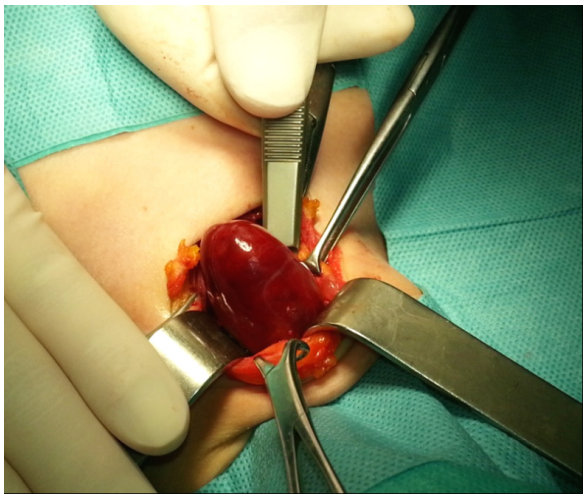

Figure 5. Excision of the tumor of right inferior parathyroid gland

Conclusions

Bone tumor in this young woman showed to be a brown tumor resulting from PHPT: an advanced form of OFC being an effect of intensive bone resorption.

Brown tumors of bone are an unexpected radiological finding. They can occur as multiple or, rarely, solitary bone cavities with solid component, presenting as destructive bone lesions, mimicking tumors of distending and infiltrative growth [13]. The suspicion of disseminated neoplastic disease may be strengthened after bone scintigraphy is performed. The results of serum calcium and iPTH are crucial for correct management.

The final diagnosis of bone tumors should be based on a synthesis of clinical presentation, imaging characteristics and histopathologic findings, preferably in the setting of a multidisciplinary team. Immunohistochemical and genetic/molecular genetic techniques are important for the definite classification of certain bone tumors [14].

The treatment of PHPT relies on the excision of pathologically changed parathyroid glands. As a rule, brown tumors of bones undergo spontaneous healing with the resorption of the soft tissue component, however surgical intervention may be needed in cases when long bones or vertebrae distention puts them at risk of fracture [15].

Conflict of interest: none declared

Marek Dedecjus, MD, PhD
Maria Skłodowska-Curie Institute — Oncology Center
Department of Oncological Endocrinology and Nuclear Medicine
ul. Roentgena 5, 02–781 Warszawa, Poland
e-mail: marek.dedecjus@gmail.com

Received: 25 Sept 2018
Accepted: 2 Nov 2018

References

1. Franchi A. Epidemiology and classification of bone tumors. *Clin Cases Miner Bone Metab* 2012; 9: 92–95.
2. Girish G, Finlay K, Morag Y et al. Imaging review of skeletal tumors of the pelvis — part I: benign tumors of the pelvis. *Scientific World Journal* 2012; 2012: 290–293.
3. Bloem JL, Reidsma II. Bone and soft tissue tumors of hip and pelvis. *Eur J Radiol* 2012; 81: 3793–3801.
4. Diel J, Ortiz O, Losada RA et al. The sacrum: pathologic spectrum, multimodality imaging, and subspecialty approach. *Radiographics* 2001; 21: 83–104.
5. Loh KC, Duh QY, Shoback D et al. Clinical profile of primary hyperparathyroidism in adolescents and young adults. *Clin Endocrinol (Oxf)* 1998; 48: 435–443.
6. Satpathy AS, Dasgupta A, Dutta C et al. Osteitis fibrosa cystica of mandible in hyperparathyroidism-jaw tumor syndrome: A rare presentation and review of literature. *Natl J Maxillofac Surg* 2017; 8: 162–166.
7. Bandeira F, Cusano NE, Silva BC et al. Bone disease in primary hyperparathyroidism. *Arq Bras Endocrinol Metabol* 2014; 58: 553–561.
8. Panagopoulos A, Tatani I, Kourea HP et al. Osteolytic lesions (brown tumors) of primary hyperparathyroidism misdiagnosed as multifocal giant cell tumor of the distal ulna and radius: a case report. *J Med Case Rep* 2018; 12: 176.
9. Aga P, Singh R, Parihar A et al. Imaging spectrum in soft tissue sarcomas. *Indian J Surg Oncol* 2011; 2: 271–279.
10. Yeh MW, Ituarte PH, Zhou HC et al. Incidence and prevalence of primary hyperparathyroidism in a racially mixed population. *J Clin Endocrinol Metab* 2013; 98: 1122–1129.
11. Cupisti K, Raffel A, Dotzenrath C et al. Primary hyperparathyroidism in the young age group: particularities of diagnostic and therapeutic schemes. *World J Surg* 2004; 28: 1153–1156.
12. Percivale A, Gnerre P, Damonte G et al. Primary hyperparathyroidism: epidemiology, clinical features, diagnostic tools and current management. *Ital J Med* 2015; 9: 330–345.
13. Hong WS, Sung MS, Chun KA et al. Emphasis on the MR imaging findings of brown tumor: a report of five cases. *Skeletal Radiol* 2011; 40: 205–213.
14. Kindblom LG. Bone Tumors: Epidemiology, Classification, Pathology. In: Davies AM, Sundaram M, James S (eds.) *Imaging of Bone Tumors and Tumor-Like Lesions: Techniques and Applications*, Berlin, Heidelberg: Springer; 2009, p. 1–15.
15. Godlewska P, Bakuła-Zalewska E, Łapińska G et al. Guzy brunatne kości towarzyszące pierwotnej nadczynności przytarczyc. *Med Dypl* 2017; (1): 83–90.