

Osteopoikilosis: a case report and literature review

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Abstract: Osteopoikilosis (OPK) is a rare, benign, autosomal dominant disorder, in which sclerotic bone lesions could be found all over the skeleton. Patients are usually asymptomatic; lots of them are discovered incidentally on radiographic images. Loss of-function mutations in LEMD3 gene may be responsible for the lesions. The main differential diagnosis in OPK are mastocytosis, tuberous sclerosis and, osteoblastic metastasis. Bone scintigraphy plays a crucial role in distinguishing OPK from malignant diseases. Since there might be an association between osteopoikilosis and osteosarcoma, clinical follow-up is necessary.

Keywords: Osteopoikilosis; autosomal dominant; sclerotic; skeleton

INTRODUCTION

Osteopoikilosis(OPK) or “osteopathia condensans disseminata, spotted bone disease” is a rare, benign, autosomal dominant disorder characterized by sclerotic bone lesions most commonly involving the hands, feet, pelvis, and ends of long bones[1,2]. Abnormality in the enchondral bone maturation process is developed during childhood and persists throughout life. Lesions are typically found incidentally on imaging studies done for unrelated complaints [3]. The symmetric distribution, vary in size from a few millimeters to several centimeters, lack of bone destruction, and location differentiates OPK from metastatic disease, which tends to be seen more often in ribs, vertebral bodies, and the diaphysis of long bones. Bone scintigraphy is normal in most patients with OPK [2]. Other principal considerations in differential diagnosis in the cases of OPK are mastocytosis and tuberous sclerosis. Early recognition is essential to prevent unnecessary emotional distress and invasive testing [3]. In this article, we aimed to present a case of OPK. At the same time, similar literature was examined.

CASE REPORT

History

A 58-year-old woman without history of past illness presented to the out-patient clinic in another hospital with 4 month of low back pain and 1 month of right gluteal region pain. The patient did not have any other complaints and systemic diseases. Plain radiographs of the pelvis and lumbar spine were

performed and the multiple, well-defined, dense lesions on the femoral neck, acetabular roof, bilaterally sacroiliac, pelvic, and lumbar spine were discovered. The patient was misdiagnosed into metastatic disease and subsequently referred to our hospital for treatment.

Examinations

Physical examination was only significant for right posterior superior iliac spine tenderness, corresponding to the X-ray findings. There was no lymphadenopathy, mass, or obvious tenderness of her spine. There were no examination findings suggestive of arthritis in the joints. The dermatological examination was normal. Laboratory examinations consisted of complete blood count, electrolytes, liver, renal function tests, acute phase markers, urinalysis and CA125 level. They were normal. On radiologic examination, multiple, symmetric, well defined, sclerotic lesions were identified on humerus (Fig. 1,2), spine (Fig. 3,4), pelvic, and femur (Fig. 5). Found on CT imaging were diffuse sclerotic foci (Fig. 6). A nuclear bone scan was normal, without evidence of any blastic metastatic lesions. After main differential diagnoses were excluded, with the presence of typical radiologic findings, the diagnosis of OPK was concluded, a rare benign condition of the bone. Management with nonsteroidal anti-inflammatory drugs (NSAIDs) resulted in improvement in pain control. Currently, she continues to require pain medications to maintain her daily activities.

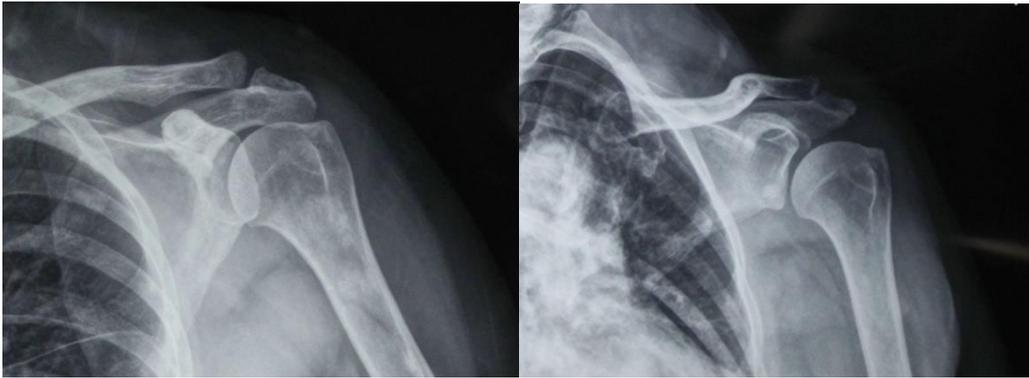


Fig-1, 2: multiple osteosclerotic lesions of scapula and humerus

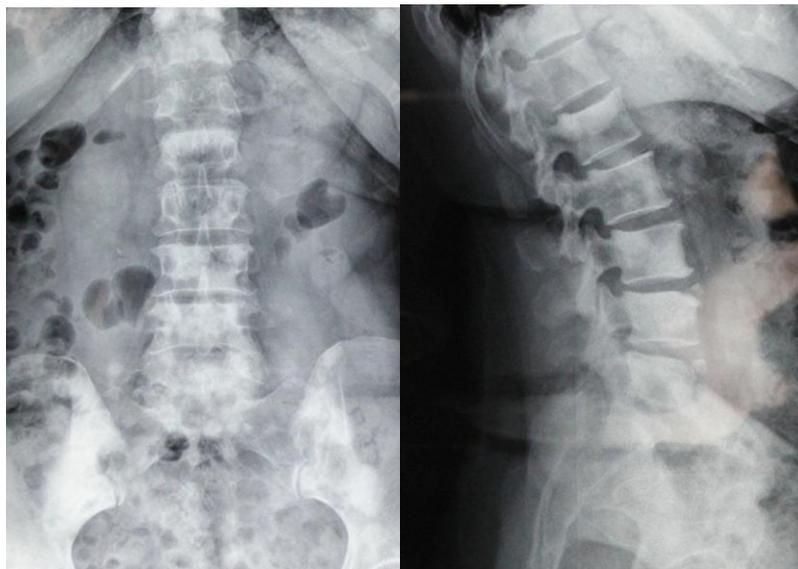


Fig-3, 4: multiple osteosclerotic lesions of lumbar spine



Fig-5: The X-ray graphics of vertebral body shows multiple osteosclerotic lesions



Fig-6: Traverse CT image shows the multiple well-rounded hyperdense nodular sclerotic areas which vary in size in the pelvis

DISCUSSION

OPK is a rare, autosomal dominant heritable sclerosing bone dysplasia caused by failure of resorption of secondary spongy bone [1]. The incidence of osteopoikilosis is estimated to be 1 in 50,000 [6]. The disorder consists of multiple benign bone islands scattered throughout the entire skeleton, with an increase in concentration in the ends of tubular bones as well as the carpal and tarsal bones of the hands and feet [4, 5]. Sites of predilection include phalanges (100%), carpal bones (97.4%), metacarpals (92.5%), foot phalanges (87.2%), metatarsals (84.4%), tarsal bones (84.6%), pelvis (74.4%), radius (66.7%), ulna (66.7%), sacrum (58.9%), humerus (28.2%), tibia (20.5%), and fibula (2.8%) [8]. These lesions are most often discovered incidentally on radiographic imaging. The typical lesions of OPK are characteristically numerous, symmetric, vary in size from 1 to 10 mm, well-defined, homogeneous, circular or ovoid, and usually they develop during childhood and persist throughout life. Their size may change but rarely had been reported to disappear with aging [9]. Patients are usually asymptomatic, but in 15–20% of patients complain slight articular pain and joint effusions. The cause and the pathogenesis of OPK are not known; however, there are many hypotheses: (1) a hereditary failure to form normal trabeculae along lines of stress, (2) dysplasia of endochondral ossification, which can result in focal densities and/or striations within the trabecular bone, (3) loss of-function mutations in LEMD3 gene, and (4) altered osteogenesis may be responsible for the lesions [7]. The main differential diagnosis in OPK are mastocytosis, tuberous sclerosis and, principally, osteoblastic metastasis. In both tuberous sclerosis and mastocytosis, lesional symmetry, metaphyseal, epiphyseal preference, uniform involvement and well-rounded focuses are less evident than in OPK [10]. Osteoblastic metastasis normally is asymmetric lesions, ranging in size, having axial skeleton predilection, present with osseous destruction, periosteal reaction, and positive bone scintigraphic findings. Bone scintigraphy plays a crucial role in distinguishing OPK from osteoblastic metastasis. Typically, there is no increased uptake of radiopharmaceutical substance on nuclear medicine

bone scan in OPK [2, 8]. Cutaneous lesions can be found in 25 % of OPK patients, which is categorized as Buschke–Ollendorff syndrome (BOS) [10]. Skin lesions consist mainly of juvenile elastoma and dermatofibrosis lenticularis disseminata. Occasionally, this condition is associated with organ abnormalities (coarctation of aorta, urogenital defects), skeletal system disorders, endocrine disorders (diabetes mellitus), dental and facial abnormalities [1]. Several pathologies also coexist with OPK, such as heumatoid arthritis, systemic lupus erythematosus, reactive arthritis, ankylosing spondylitis, psoriatic arthritis, familial Mediterranean fever, dacryocystitis (Gunal–Seber–Basaran syndrome), scleroderma, fibromyalgia, and Quervain’s syndrome [1, 2, 11]. Although the risk of malignant transformation with OPK is very rare, osteosarcoma, giant cell tumors, and chondrosarcoma have been associated with OPK. Mindell *et al.* [10] reported a case which has an association between OPK and osteosarcoma. This association is thought to be due to the active osteogenesis in OPK. Therefore, clinical monitoring of these patients is important. When there is no association with other systemic diseases, the laboratorial tests in OPK usually are normal. Complete blood count, erythrocyte sedimentation rate, C-reactive protein, electrophoresis of blood proteins, electrolytes, liver and renal function tests, thyroid stimulating hormone, serum calcium and phosphorus, 24-h urinary calcium, parathyroid hormone, 25-hydroxyvitamin D, and biochemical markers of bone turnover should be normal in OPK patients. Pain treatment may be necessary in some patients. There is no consensus on literature about the treatment. NSAIDs are often used as an option, analgesics such as acetaminophen and opioids can also be used. Rare active lesions have been treated with bisphosphonate therapy, but the results are controversial [12]. Pain in our patient repeats, it affected her daily life. Thus, pain control management was necessary.

CONCLUSIONS

When multiple, symmetric, similar sclerotic lesions are observed in radiologic studies, OPK should be considered. A good questioning of family history could avoid misdiagnosis and invasive diagnostic procedures. Since OPK could be interfered with the

osteoblastic metastases and might be associated with osteosarcoma, clinical monitoring is important.

REFERENCES

1. Serdaroglu M, Çapkin E, Üçüncü F, Tosun M. Case report of a patient with osteopoikilosis. *Rheumatol Int.* 2007; 27(5): 683-686.
2. Ozdemirel AE, Burcu DC, Erdem HR, Koc B. A rare benign disorder mimicking metastasis on radiographic examination: a case report of osteopoikilosis. *Rheumatol Int.* 2011; 31(8):1113-1116.
3. Benli It, Akalin S, Boysan E, Muncu EF, Kis M, Türkoglu D. Epidemiological, clinical and radiological aspects of osteopoikilosis. *J Bone Joint Surg Br.* 1992; 74(4):504-506.
4. de Vernejoul MC, Kornak U. Heritable sclerosing bone disorders: Presentation and new molecular mechanisms. *Ann N Y Acad Sci.* 2010; 1192(4):269-277.
5. Van Hul W, Vanhoenacker F, Balemans W. Molecular and radiological diagnosis of sclerosing bone dysplasias. *Eur J Radiol.* 2001; 40(8):198-207.
6. Ben-Asher E, Zelzer E, Lancet D. LEMD3: The gene responsible for bone disorders (osteopoikilosis). *Isr Med Assoc J.* 2005; 7(2):273-274.
7. Tuncel M, Caner B. Osteopoikilosis: a major diagnostic problem solved by bone scintigraphy. *Rev Esp Med Nucl.* 2012; 31(2):93-6.
8. Ozdemirel AE, Burcu DC, Erdem HR, Koc B. A rare benign disorder mimicking metastasis on radiographic examination: a case report of osteopoikilosis. *Rheumatol Int.* 2011; 31(8):1113–1116.
9. Woyciechowsky TG, Monticielo MR, Keiserman B, Monticielo OA. Osteopoikilosis: what does the rheumatologist must know about it? *Clin Rheumatol.* 2012(3); 31:745–748.
10. Roberts NM, Langtry JAA, Branfoot AC, Gleeson J, Staughton RCD. Case report: osteopoikilosis and the Buschke–Olendorff syndrome. *Br J Radiol,* 1993; 66:468–470.
11. Kaparov A, Uludag M, Sari H, Akarirmak Ü. De Quervain's syndrome associated with osteopoikilosis: a case report and review of the literature. *Rheumatol Int.* 2011; 31(6):809–813.
12. Sanyal K, Stuart B. Osteopoikilosis spotted bone disease in a patient with psoriatic arthritis. *J Clin Rheumatol.* 2010; 16(5):251.