Vitamin D-deficient rickets mimicking ankylosing spondylitis in an adolescent girl

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Vitamin D-deficient rickets (VDDR) remains an important health problem especially in developing countries. Insufficient dietary intake of vitamin D and inadequate sun exposure increase the risk of vitamin D deficiency. Since their vitamin D requirement is increased, children and adolescents are potentially at higher risk for vitamin D deficiency. In adolescents, vitamin D deficiency causes osteomalacia, osteoporosis and muscle weakness. While osteoporosis is not associated with bone pain, osteomalacia has been associated with isolated or generalized bone pain. The present case suffered from generalized bone pain for three years. She was misdiagnosed as ankylosing spondylitis, which is a seronegative arthropathy, and was treated with corticosteroids and methotrexate, which have potential side effects. Hypocalcemia, hypophosphatemia, elevated alkaline phosphatase level, secondary hyperparathyroidism, and extremely low vitamin D level were consistent with the diagnosis of severe vitamin D deficiency. Complete clinical and biochemical resolution was achieved with vitamin D replacement.

Key words: vitamin D deficiency, rickets, osteomalacia.

Although prophylactic vitamin D administration in childhood has reduced the incidence of vitamin D-deficient rickets (VDDR) in our country, it remains an important health problem in children and young adults as well as in other developing countries[1,2]. Since their vitamin D requirement is increased, children and adolescents are potentially at higher risk for vitamin D deficiency[2]. Insufficient dietary intake of vitamin D and inadequate sun exposure increase the risk of vitamin D deficiency. Moreover, even in the sunniest areas, in some lifestyles in which people shield their skin from the sun, vitamin D deficiency is common[3-6]. According to age of presentation, VDDR may show different clinical presentations, such as cardiomyopathy, pneumonia, Brown tumor, short stature, convulsion, etc., leading to misdiagnosis or delay in the diagnosis at first[7-10]. Vitamin D deficiency in adolescents causes osteomalacia, osteoporosis and muscle weakness. While osteoporosis is not associated with bone pain, osteomalacia has been associated with isolated or generalized bone pain[11,12]. Herein, we present an adolescent girl with VDDR mimicking ankylosing spondylitis who was diagnosed after three years of symptoms.

Case Report

A 14-year-old immigrant African black girl was admitted to our clinic with generalized bone pain (Fig. 1). Her previous history revealed that her complaints had been present for three years. She was investigated in another clinic with pain in her back and extremities. Her complaints did not resolve with non-steroidal antiinflammatory drugs. Slightly increased acute phase reactants as well as findings suggesting sacroiliitis on pelvic magnetic resonance imaging (MRI) led clinicians to diagnose her with seronegative arthritis (ankylosing spondylitis). She was put on methotrexate and prednisolone therapy. Her symptoms were refractory to treatment and she was referred to our hospital for further rheumatologic evaluation. At the time of presentation, she had generalized bone pain and fatigue. On physical examination, her weight was 42 kg (10th percentile) and height 151.5 cm (3-10th percentile). There was mild O-shaped deformity in her lower extremities and a waddling gait. Laboratory examination revealed

Fig. 1. The patient was black, and was covered as part of her religious beliefs.

hypocalcemia (serum total calcium [Ca]: 6.2 mg/dl, N: 8.6-10.5 mg/dl), hypophosphatemia (serum phosphorus: 2.7 mg/dl, N: 3.5-5.5 mg/dl), elevated alkaline phosphatase (ALP, 2312 IU/L), severe vitamin D deficiency (25-OH vitamin D: 1 nmol/L), and elevated parathyroid hormone (PTH, 923 pg/ml, N: 10-65 pg/ml). Acute phase reactants were within normal limits (erythrocyte sedimentation rate [ESR]: 17 mm/h and C-reactive protein [CRP]: 0.1 mg/dl). There were findings consistent with sacroiliitis on previous lumbosacral MRI. X-ray examination showed O-shaped deformity, defective mineralization and radiolucent bands at the metaphyses of the long bones (Fig. 2). The patient was diagnosed as VDDR/osteomalacia. Methotrexate and prednisolone were discontinued. Vitamin D was administered at a dose of 300,000 U and Ca 1000 mg/d was started. Her symptoms improved within one week, and resolved completely within a month. Biochemical parameters returned to normal limits. Maintenance therapy using 800 U/day vitamin D was continued afterwards.

Discussion

Adolescence is a critical period for growth and development as well as for bone mineralization. Accelerated skeletal growth with increased bone turnover during adolescence necessitates an increased daily intake of vitamin D. Inadequate vitamin D, calcium and phosphorus supplementation diminishes bone mineralization, which results in signs of rickets in children and osteomalacia in adolescents and adults[13,14-16]. Localized or generalized bone pain may be associated with osteomalacia[11,12]. Plotnikoff et al.[17] showed that between 10-65 years of age, 93% of admissions to a hospital emergency department with the complaints of muscle aches and bone pain and with a wide variety of diagnoses, including fibromyalgia, chronic fatigue syndrome, and depression, were found to be vitamin D-deficient.

In adolescents, complications of vitamin D deficiency occur over time rather than immediately[2,18]. It is also notable that the majority of the adolescents with vitamin D deficiency are asymptomatic for a long time[2,18,19]. Moreover, adolescent patients with vitamin D deficiency may present with non-specific symptoms like generalized bone pain, muscle weakness and fatigue. Thus, it is not uncommon for the diagnosis to be delayed. In clinical practice, differential diagnosis of these patients includes juvenile rheumatoid arthritis, juvenile ankylosing spondylitis and malignant diseases. In the presence of risk factors (black race, poor socioeconomic status, insufficient exposure to sunlight), vitamin D deficiency should be considered in the differential diagnosis. Misdiagnosis of rickets mimicking rheumatologic diseases has been reported previously. Onur et al.[20] reported hypophosphatemic rickets in an adolescent girl with a presentation simulating sacroiliitis.

The present case suffered from generalized bone pain for three years. Unfortunately, she was misdiagnosed as ankylosing spondylitis, which is a seronegative arthropathy, and she was treated

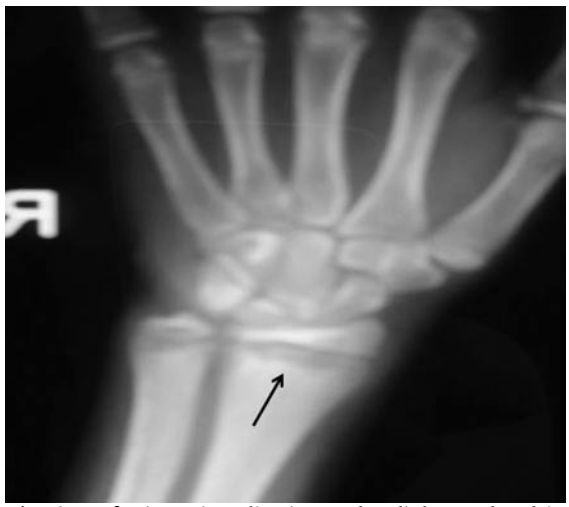

Fig. 2. Defective mineralization and radiolucent band in the metaphysis of the radius and ulna.

with corticosteroids and methotrexate, which have potential side effects. She had several risk factors for vitamin D deficiency, i.e. she was black, lived in a refugee camp, had a poor socioeconomic status, and was covered as part of her religious belief, limiting her exposure to sunlight. Although her symptomatology and physical findings were not clear or specific, evaluation of her medical history together with biochemical and radiological findings provided sufficient clues for the diagnosis of osteomalacia caused by vitamin D deficiency. Hypocalcemia, hypophosphatemia, elevated ALP level, secondary hyperparathyroidism, and extremely low vitamin D level were consistent with the diagnosis of severe vitamin D deficiency. Complete clinical and biochemical resolution with vitamin D therapy confirmed the diagnosis.

In conclusion, adolescents constitute a potential high-risk group for vitamin D deficiency. Since symptoms of vitamin D deficiency are not specific and may mimic a wide variety of diseases, including rheumatologic and malignant disorders, vitamin D-deficient osteomalacia should be kept in mind in the differential diagnosis, especially when risk factors are present.

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