



Postpartum Osteoporosis and Thoracic Vertebral Fracture in a Patient Treated with Heparin During Pregnancy

Gebelik Sırasında Heparin Tedavisi Alan Bir Hastada Postpartum Osteoporoz ve Torakal Vertebra Kırığı

Postpartum Osteoporosis and Heparin

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Özet

Postpartum Osteoporoz (PPO) gebelik ile ilişkili, nadir görülen bir osteoporoz tablosudur. Biz, doğumundan 1 hafta sonra şiddetli bel ağrısı şikayetiyle başvuran otuz beş yaşında bir kadın hasta sunduk. Hasta, protein C eksikliği nedeniyle gebeliği boyunca düşük molekül ağırlıklı heparin (DMAH) 40 mg/gün tedavisi almış. Vücut kitle indeksi (BMI) 19,8 ve gebeliği boyunca sadece 8 kg almış. Manyetik rezonans görüntüleme (MRG) torakal 11'de bir fraktür saptandı. Dual-enerji Xray absorpsiyometri (DEXA) Lomber1-4 vertebralarda T skoru= - 4,9 ve Z skoru= -4,8 ölçüldü. Bu bulgular, PPO'un postpartum hastalarda şiddetli bel ağrısı nedenlerinden biri olabileceğini düşündürmektedir. Özellikle düşük BMI'li ve gebelik sırasında DMAH kullanan hastalarda, PPO riskinin daha yüksek olduğunu düşünüyoruz.

Anahtar Kelimeler

Postpartum Osteoporoz; Heparin; Kemik Mineral Dansite; Fraktür

Abstract

Postpartum osteoporosis (PPO) is a rare form of osteoporosis related to pregnancy. We report the case of a 35-year-old woman who consulted for severe low-back pain one week after her delivery. This woman had a personal history of protein C deficiency and was treated with low-molecular-weight heparin (LMWH) 40 mg/day during her pregnancy. Her body mass index was 19.8 and she had only gained 8 kg during pregnancy. Magnetic resonance imaging (MRI) revealed a fracture of thoracic 11. Dual-energy X-ray absorptiometry (DEXA) measured T score = - 4.9 and Z score = -4.8 in Lumbar 1-4 vertebrae. These findings suggest that PPO may be one of the causes of severe back pain in postpartum patients. We think that PPO risk is higher in those patients with low BMI who were treated with LMWH during pregnancy.

Keywords

Postpartum Osteoporosis; Heparin; Bone Mineral Density; Fracture

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Introduction

PPO presents symptomatic vertebral compression fractures causing severe pain in the thoracic or lumbar area. It is not clear why some people are prone to develop PPO; however, hypotheses such as genetic susceptibility, an inherited defect in collagen synthesis, and an exacerbated response to physiological hormonal changes have been suggested [1].

Long-term unfractionated heparin (UFH) use is associated with osteoporosis in both non-pregnant and pregnant patients. Although the exact mechanism is unknown, possible mechanisms are decreased osteoblastic and increased osteoclastic activity caused by direct effect of heparin, vitamin D deficiency, and decreased serum ionized calcium concentrations resulting in increased PTH stimulated bone resorption [2]. In this case, we report severe PPO and a thoracic vertebral compression fracture diagnosed in the postpartum period, in a patient treated with LMWH throughout her pregnancy.

Case Report

We report the case of a 35-year-old woman who consulted for low-back pain one week after her first delivery. The second day after birth, she reported a severe back pain while she was getting up from the bed. In her history, she had protein C deficiency and had been treated with LMWH 40 mg/day during pregnancy for prophylaxis of thromboembolism. Her first pregnancy was terminated due to intrauterine exitus of fetus. The second pregnancy was completed as healthy. Menses of the patient occurred only 2 times in 16 months during this time period. Because of the risk of abortion, she had been immobilized during pregnancy. Her weight was 54 kg before pregnancy and her height was 165 cm, revealing a body mass index (BMI) of 19.8 kg/m²; she gained only 8 kg during pregnancy. A nutritional questionnaire showed that her daily calcium intake was between 800 and 1000 mg. She was healthy and had regular menses before pregnancy. There was no history of the use of drugs, such as corticosteroids or thyroid hormones that could affect bone metabolism, and no personal or family history of osteoporosis or fractures. She was a non-smoker. On physical examination, the patient had kyphosis and pain and tenderness on the thoraco-lumbar vertebrae with palpation. Her serum calcium, phosphorus, albumin, prolactin, and cortisol levels, thyroid hormones, and 25-hydroxyvitamine D were normal (Table 1). Magnetic resonance imaging (MRI) revealed height loss in thoracic 11, which was surrounded by a diffuse low bone marrow signal (Figure 1). Bone mineral density (BMD) was measured by using dual-energy X-Ray absorptiometry (DEXA), and very

low T and Z-scores were determined in lumbar vertebrae (Table 2). According to these findings, she was diagnosed with severe postpartum osteoporosis (PPO). After analgesia and 1 month of home relative bed rest, lactation was stopped and Alendronate 70 mg/week, calcium 1000 mg/day, and vitamin D 880 U/day were prescribed. Her pain was decreased at the third month.



Figure 1. Vertebral compression fracture in magnetic resonance imaging in thoracic 11.

Table 1. The laboratory findings of the patient.

Calcium (8,8-10,6 mg/dl)	9,7
Phosphorus (2,5-4,5 mg/dl)	4,1
Albumin (3,5-5,2 mg/dl)	4,4
Parathyroid hormone (15-68,3 pg/ml)	70,8
25(OH)D3 (10-60 ng/ml)	32,6
Thyroid stimulating hormone (0,35-4,94 mIU/ml)	0,53±0,5
Free triiodothyronine (1,71-3,71 pg/ml)	3,11
Free thyroxine (0,9-1,7 ng/dl)	0,8
Cortisol (6,2-19,4 mcg/dl)	9,8
Prolactin (5,18-26,53 ng/ml)	36,9

Table 2. Dual-energy X-ray absorptiometry results of the patient.

Lomber 1	
BMD (gr/cm ²)	0,489
T	-4,0
Z	-3,9
Lomber 2	
BMD (gr/cm ²)	0,530
T	-4,5
Z	-4,4
Lomber 3	
BMD (gr/cm ²)	0,486
T	-5,4
Z	-5,3
Lomber 4	
BMD (gr/cm ²)	0,512
T	-5,5
Z	-5,4
Lomber 1-4	
BMD (gr/cm ²)	0,504
T	-4,9
Z	-4,8
Femur neck	
BMD (gr/cm ²)	0,491
T	-3,2
Z	-3,0

Discussion

In this case report, we presented a vertebral compression fracture and severe PPO in a woman who used LMWH throughout her pregnancy. According to X-ray and MRI findings, we found a fracture in thoracic 11. Dual-energy X-ray absorptiometry (DEXA) showed very low T and Z-scores in lumbar vertebrae and the femur neck.

Postpartum osteoporosis (PPO) is a rare disease presenting with back pain and, at times, multiple vertebral fractures during late pregnancy or during the early postpartum period.

Although etiology and pathogenesis have not been clarified yet, possible mechanisms include: increased bone turnover to meet the calcium requirements of the fetus, increased serum parathyroid hormone (PTH), relative hypoestrogenemia and high prolactin levels, and presence of a genetic background [3]. During pregnancy and lactation, BMD was found to be decreased in some studies [4, 5], while it did not change in others [6, 7]. In the literature, various risk factors were identified for PPO. Amenorrhea and oral contraceptive treatment, suppressive levothyroxine treatment, osteogenesis imperfecta, low body mass index and weight loss, physical inactivity, and corticosteroid therapy are some of these risk factors [8-12]. However, genetic factors also play a major role in the pathogenesis of osteoporosis. Genetic studies indicate that osteoporosis is a polygenetic disorder resulting from the interaction between common polymorphic alleles and multiple environmental factors [13]. The risk of developing osteoporosis is believed to be substantially lower when LMWHs are preferred for prophylaxis or treatment of thromboembolism [14].

Long-term heparin therapy is associated with both an increase in osteoclast activity and a suppression of osteoblast function [15]. Heparin-induced osteoporosis has been reported in patients receiving heparin at daily doses of 15,000 units or more for at least 6 months [16]. LMWH suppresses osteoblast function, but may not increase osteoclastic activity, and this may explain why there appears to be a lower risk of osteoporosis with LMWH [17]. On the other hand, experimental animal studies have shown that unfractionated heparin (UFH) and LMWH exert similar unfavorable effects on histomorphometric parameters of cancellous and cortical rat bone [18, 19], and so the notion that LMWH is less likely to lead to osteoporosis and bone fracture remains somewhat controversial.

In rats, after the administration of enoxaparin, the ratio of bone mineral content to bone mass decreased, bone formation was inhibited, and bone resorption was intensified [18]. In a study evaluating patients receiving enoxaparin for 3–24 months, a modest but progressive decrease in BMD was observed, and the authors advised performing densitometry before starting long-term anticoagulation, especially in patients with concomitant risk factors for osteoporosis.

According to our knowledge, in the literature, there are few patients with PPO possibly associated with LMWH. Goëb et al. reported low-back and right-buttock pain and fracture of the right sacral ala in a 19-year-old woman treated daily with LMWH during her pregnancy [20]. Since she had no potential clinical risk factors for osteoporosis, the causal effect of LMWH was suggested. In another report, PPO and vertebral fractures were observed in a 40-year-old lactating woman who received

LMWH in the final 2 trimesters of pregnancy [21]. Ozdemir et al. showed PPO and vertebral fractures in two patients treated with enoxaparin during pregnancy. The first patient's age was 34, and the second was 36 years old. The two patients had multiple vertebral fractures and decreased BMD and body mass indexes of 21.9 kg/m² and 22.4 kg/m² respectively [22]. Because of the risk of abortion, our patient had been immobilized during pregnancy. She had a low BMI throughout her adult life. To our knowledge, the risk factors for our patient were weight loss, physical inactivity, and treatment with LMWH during pregnancy. In conclusion, PPO should be included in the differential diagnosis of severe back pain in pregnant and postpartum patients. Postpartum women presenting with the sudden onset of low-back pain, along with a diagnosis of a herniated disc or a mechanical low-back pain, PPO should be considered in the differential diagnosis. Especially in patients with low BMI using LMWH during pregnancy, we think that the risk is higher for PPO. In addition to the use of LMWH, immobilizing lowers the patient's risk of abortion, but we believe that it further increases the risk for PPO. In these patients, the diagnosis should be confirmed by MRI. Early radiographs are often inconclusive but are necessary. However, the diagnosis of PPO may be delayed. MRI may be a better imaging method for breastfeeding mothers.

Competing interests

The authors declare that they have no competing interests.

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