J Turk Spinal Surg 2025;36(2):83-87
DOI: 10.4274/jtss.galenos.2025.52714

A RARE CAUSE OF POSTPARTUM LOWER BACK PAIN: SACRUM STRESS FRACTURES

Mehmet Nuri Erdem[1], Yiğit Kültür[1], Abdulhalim Akar[2], Mehmet Aydoğan[2]

[1]İstanbul Yeni Yüzyıl University Faculty of Medicine, Department of Ortopaedics and Traumatology, İstanbul, Türkiye
[2]Memorial Şişli Hospital, Clinic of Spine Surgery, İstanbul, Türkiye

ABSTRACT

Objective: Although lower back pain is one of the most frequent complaints during pregnancy, a rare but very important cause is a sacral stress fracture. Although rarely seen, the condition should form one of the differential diagnoses for back pain during pregnancy and the postpartum. This study aims to present one of those uncommon causes of postpartum lower back pain in order to improve awareness and aid diagnosis.

Materials and Methods: Six postpartum patients with no previous history of osteoporosis or trauma were diagnosed with sacral stress fractures. Of these, four presented within two weeks from delivery, and two presented three months after delivery (mean: 39.3 days). All patients had normal laboratory findings and bone mineral density, thus excluding metabolic bone diseases. All direct radiographs were normal, but magnetic resonance imaging (MRI) detected an isolated fracture of the wing of the sacrum in all cases.

Results: Mean age of patients was 33 years (range: 30-35 years). All had pain in the sacral region, which was accentuated by weight-bearing and improved by rest. MRI revealed an isolated fracture of the sacral wing with no adjacent bony or soft tissue abnormality. Conservative management with activity modification, analgesia, and physiotherapy led to complete resolution within 8-12 weeks.

Conclusion: Although less common, sacral stress fractures must be considered in the differential diagnosis in the postpartum period of low back pain. An early MRI study is crucial for an accurate diagnosis. Conservative treatment usually ensures complete recovery. This series highlights the need for early diagnosis and intervention to treat this uncommon condition.

Keywords: Postpartum, sacrum, stress fracture, pregnancy

INTRODUCTION

Pregnancy is a period of accelerated metabolism. In the second and third trimester, there is an increased mineral and nutritional requirement due to the rapid growth of the fetus. Particularly, there is an increased need for calcium in the third trimester parallel to the growth of the fetal skeletal system[1,2]. Additionally, the increased size of the uterus causes greater mechanical stress on the pelvis, spine and lower extremities[3]. The most common cause of back pain throughout pregnancy and into the early postpartum period. The effects of increased mechanical stress together with the increased need for calcium because of the fetus, raise the risk of stress fractures developing in the mother. Although the exact incidence is not known, sacral stress fractures in pregnancy complications that are rarely seen. Still, they represent one of the reasons for hip and back pains in pregnancy and in the early postpartum period[1,4-7]. To date, there have been very few reports in literature of postpartum sacral stress fractures. In this paper, 6 cases of postpartum sacral stress fractures are presented and discussed in the light of relevant literature.

MATERIALS AND METHODS

This is a retrospective study of six postpartum women who were diagnosed to have sacral stress fractures. Inclusion criteria are:

- Sacral stress fracture confirmed by magnetic resonance imaging (MRI).
- No history of previous osteoporosis or trauma and other metabolic bone diseases.
- Patients presented within six months of delivery.

We reviewed the demographic data, clinical presentations, laboratory results, and imaging findings. All patients were subjected to comprehensive evaluations that included complete blood counts, calcium, alkaline phosphatase levels, and bone mineral density (BMD) studies. All of them had

Address for Correspondence: Yiğit Kültür, İstanbul Yeni Yüzyıl University Faculty of Medicine, Department of Ortopaedics and Traumatology, İstanbul, Türkiye
E-mail: yigitkulturr@hotmail.com
ORCID ID: orcid.org/0000-0001-8201-6994
Received: 15.01.2025 **Accepted:** 25.03.2025 **Epub:** 09.03.2025 **Publication Date:** 15.04.2025
Cite this article as: Erdem MN, Kültür Y, Akar A, Aydoğan M. A rare cause of postpartum lower back pain: sacrum stress fractures. J Turk Spinal Surg. 2025;36(2):83-87

unremarkable radiographs; thus, MRI confirmation was needed for the confirmation of the diagnosis. Our retrospective data were approved by the ethics committee of İstanbul Yeni Yüzyıl University (approval number: 2025/01-1434, date: 09.01.2025).

Statistical Analysis

No statistical analysis was made for this study since the data in respect to these six patients included just age and postpartum follow-ups.

RESULTS

The mean age of patients was 33 years (range: 30-35 years). All patients presented with lower back pain localized to the sacral region that worsened on weight bearing or walking and improved on rest. Four patients presented to us within fifteen days of delivery while two patients presented three months after delivery (mean 39.3 day).

MRI studies revealed isolated sacral wing fractures without any evidence of associated adjacent bony or soft tissue abnormality. The laboratory and BMD studies were normal, ruling out metabolic bone pathologies. All cases resolved under conservative management that included modification of activity, analgesia, and physiotherapy over 8-12 weeks.

Clinical Cases and Management Approaches

Case 1

A 35-year-old woman was referred to our outpatient clinic with a history of lower back pain after delivery. It was the patient's second pregnancy and she had no complaints during either of her pregnancies. During her second pregnancy, she gained 14 kg, of which 4 kg was within the last trimester. She was managed conservatively throughout her pregnancy and was delivered of a 3200 g baby by cesarean section without any complications. The baby was breastfed after birth. Her complaints began 10 days after delivery. There was no history of lower back pain the past or any previous trauma. There were also no endocrine or metabolic disorders, no obesity, no smoking, and no drug intake. She complained of her back pain being worse on the left side and radiating to the front of the groin. Her gait had been affected and she could not bear full weight on her left leg.

On clinical examination, the spine appeared normal. There was tenderness over the region to the left side of the sacrum. The hips had full ranges of movement and the sacroiliac joint (SIJ) stress tests were positive. Straight leg-raising test was negative in both lower limbs. Serum parathormone level was 28 pg/mL (15-68), calcium level was 9 mg/dL (8.5-9.4 mg/dL), alkaline phosphatase level was 50 (30-130 IU/L) and 25-(OH) vitamin D3 44 µg/L (9-59). Plain radiographs, computed tomography (CT) scan, and bone densitometry did not reveal anything abnormal. However, the Coronal MRI image of the sacrum revealed a vertical fracture line (Figure 1).

After bed rest and limited daily activities for eight weeks, there was no evidence of the lower back pain which had been evident on the left side of the groin. Normal gait was regained with full weight-bearing and range of motion of the hip.

Case 2

A 31-year-old woman was referred to our outpatient clinic with lower back pain in the sacral region, reflecting to her right buttock, which had increased within five days after delivery by a cesarean section. It was her first pregnancy, and she did not have any abnormalities during gestation. Her 3400 g baby was delivered with no complications. There was no history or record of menstrual irregularity, previous fracture, smoking or nutritional disorders. Her family history was negative for metabolic bone disease. During the gestation period, the patient gained 15.5 kg.

Examination showed normal spine. There was tenderness in the region to the right side of the sacrum. Hip joints examination were normal. Trendelenburg test was positive on the right side. Internal rotation of the right hip was restricted and painful. Pressure on the groin was not painful but the sacral area was sensitive. She had pain in her lower back and groin when lifting her baby but no irradiating sciatic pain. Neurological examination, plain radiographs, CT scans and bone densitometry were all normal. Serum parathormone level was 37 pg/mL (15-68), calcium level was 9.4 mg/dL (8.5-9.4 mg/dL), alkaline phosphatase level was 72 (30-130 IU/L) and 25-(OH) vitamin D3 52 µg/L (9-59). The Coronal MRI of the sacrum revealed a vertical fracture through the upper part of the right sacral wing (Figure 2).

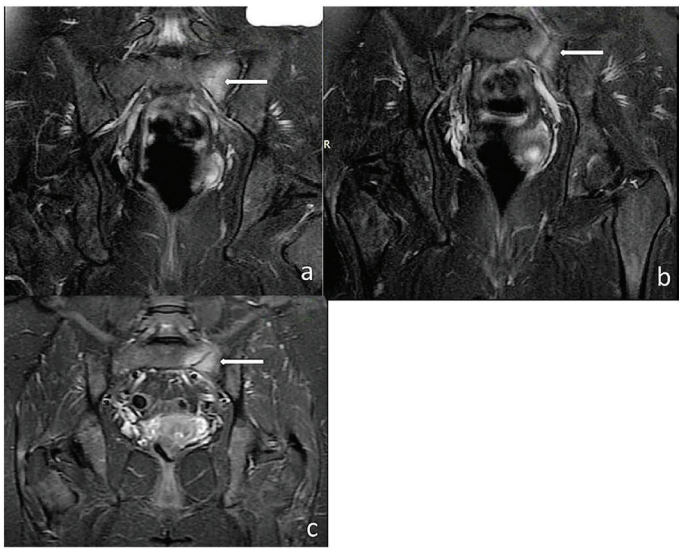

Figure 1. (a) Coronal T2 fr FSE FSat MRI of the sacrum showing bone marrow edema in the left sacrum (arrow). (b) Coronal fr FSE T2-weighted image demonstrating the fracture line in the left sacrum (arrow). (c) Coronal STIR image demonstrating the fracture line in the left sacrum (arrow)
FSE: Fast spin echo, FSat: Fat saturation, MRI: Magnetic resonance imaging, STIR: Short tau inversion recovery

After bed rest and limited daily activities for eight weeks, normal gait was regained with full weight-bearing and range of motion of the hip. She had no evidence of lower back pain.

Case 3

A 32-year-old woman was referred to our outpatient clinic with lower back and left buttock pain, which started two weeks after delivery by cesarean section. It was her first pregnancy. During gestation, she gained 12 kg and delivered a healthy, 3700 g baby with no complications. Within two weeks, the pain became such that the patient was obliged to support herself with a crutch in order to walk. No history of trauma was reported. The patient did not report pain in the pelvis or spine either during or before her pregnancy, neither were there endocrinological nor metabolic disease. She had no history of smoking. Because of a fall in the 3rd month of pregnancy which resulted in a right radius and ulna fracture, closed reduction and percutaneous pinning was performed.

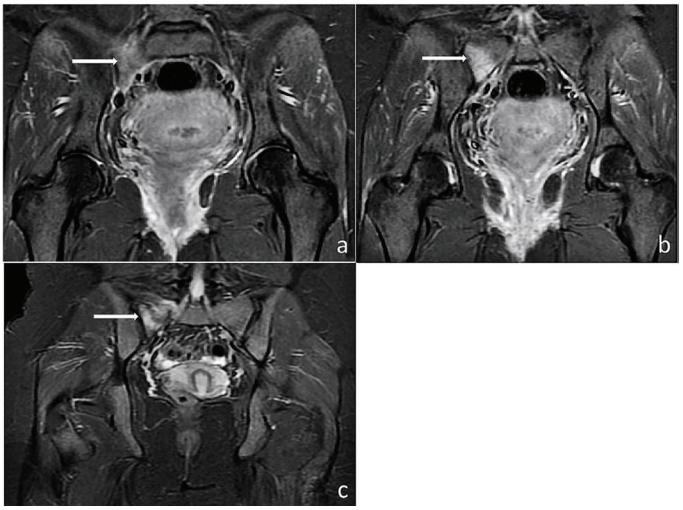

Figure 2. (a,b) Coronal STIR images demonstrating the fracture line in the right sacrum (arrow). (c) Coronal T2 fr FSE FSat MRI image of the same fracture (arrow)
STIR: Short tau inversion recovery, FSE: Fast spin echo, FSat: Fat saturation, MRI: Magnetic resonance imaging

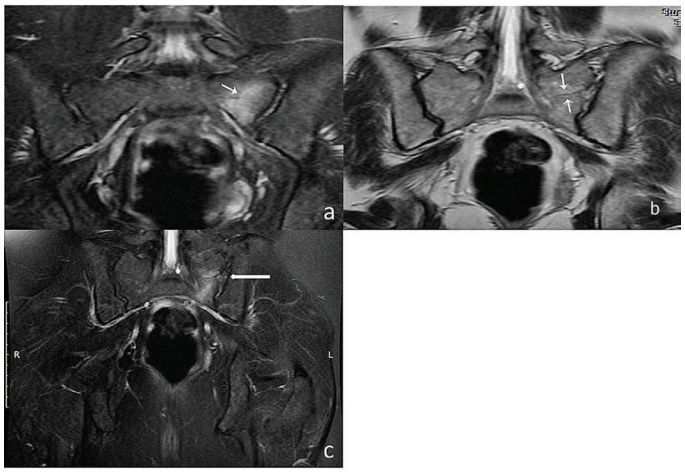

Figure 3. (a) Coronal STIR images demonstrating the fracture line in the left sacrum (arrow). (b,c) Coronal T2 and Coronal T2 fr FSE FSat MRI images of the same fracture (arrows)
STIR: Short tau inversion recovery, FSE: Fast spin echo, FSat: Fat saturation, MRI: Magnetic resonance imaging

On physical examination, there was tenderness on mild palpation of the left SIJ. There was considerable tenderness over the region of the right gluteal, and excruciating pain during sacral and iliac compression. During ambulation, there was an antalgic gait pattern which presented with limping. There was no neurovascular abnormality and bone densitometry was normal. Serum parathormone level was 21 pg/mL (15-68), calcium level was 9.2 mg/dL (8.5-9.4 mg/dL), alkaline phosphatase level was 74 (30-130 IU/L) and 25-(OH) vitamin D3 48 µg/L (9-59). Due to increasing pain within one week of delivery, the patient was checked at another hospital and prescribed non-steroidal anti-inflammatory drugs. The patient was referred to our orthopedic clinic two months after delivery because of continuous pain and gait abnormality. X-rays of the pelvis and thoracolumbar spine revealed no osteoarticular abnormalities. MRI pelvis showed a transverse fracture through the upper part of left sacral wing (Figure 3). Bed rest and medical treatment were recommended. Two months later at the follow-up examination, the patient had no pain and the gait was normal.

All the patients were treated with conservative methods. The management of the treatment included bed rest, analgesics, and calcium supplement (1 g/day) and vitamin D (2000 IU/day). There was no recurrence during the 2 year follow-up period. After two months, symptoms had resolved and clinical outcomes were recovered.

DISCUSSION

More than half of all pregnant women have some degree of back pain at some time in their pregnancy[1,2,8]. General causes of this include pelvic ligamentous laxity, mechanical factors, sacroiliac pain, vascular compression, spondylolisthesis, discogenic or radicular pain and hip pathologies[1,2,4]. Sacral stress fractures are an extremely rare condition reported in the literature as causing back pain during pregnancy and/or the early postpartum period[2,4,5].

A stress fracture develops because of unaccustomed stress loaded on to a bone of normal resistance or normal stress on a weak bone[5,9-12]. Stress fractures associated with insufficiency are generally seen in the elderly, in osteoporotic patients or in those who are undergoing radiotherapy for a pelvic malignancy[12,13]. Sacral fractures and mechanical SIJ disorders are likely grossly underestimated, largely because the nature of the manifestations that are generally non-specific and the overall unfamiliarity among clinicians about these disorders in pregnant patients[6,14]. In contrast, postpartum sacroiliitis are relatively easy to diagnose and are often caused by infection or by inflammatory processes and pregnancy recognized as being one potential causative or contributing factor[15].

Although the actual incidence is not known, there exist in literature few case reports of pregnancy-associated sacrum stress fractures. All these case reports were associated with either vaginal or postpartum early periods presentation with a description of a collection of possible risk factors; these may be listed as having a history of vaginal delivery with a large fetus, hydramnios, increased lumbar lordosis, excessive weight gain, quick vaginal delivery, lactational osteopenia, pregnancy-related osteoporosis, use of forceps, heparin use and excessive sports activities[1,3,16,17]. As the cases reported here were caesarian section deliveries, they did not have the above-mentioned risk factors.

It is unclear what the etiology of pregnancy-associated osteoporosis is. However, Black et al.[18] found that there was a mean loss of spinal BMD by 3.5% from the pregnancy stage to postpartum. Phillips et al.[19] reported that BMD usually recovers in the years following and that the condition would therefore seem reversible. It has been associated with high levels of relaxation causing ligamentous laxity, increased weight gain during pregnancy, hyperlordosis, and osteopenia caused by prolactin[20,21].

SIJ mechanical disorders usually do not present with symptoms; nonetheless, if they do present as pain and functional disability, imaging modalities-primarily MRI or CT-are needed to exclude sacral fractures. Isolated SIJ edema on MRI sometimes leads to the overdiagnosis of inflammatory sacroiliitis, and therefore careful differential diagnosis is necessary[6]. Pregnancy-and lactation-associated osteoporosis, while rare and not fully understood, can enhance women's vulnerability to fragility fractures, particularly sacral fractures. Nordin and Roper[22] were the first to describe this syndrome, reporting cases of vertebral compression fractures in women after delivery. Since their original report, several subtypes have been identified, such as idiopathic osteoporosis of pregnancy, transient osteoporosis of the hip, postpregnancy vertebral osteoporosis, and osteoporosis related to lactation[23]. This unique type of osteoporosis typically presents with vertebral or femoral neck fractures; however, sacral involvement is unusual, with few case reports in the literature[20].

Physical examination and appropriate radiological investigations are the key methods to demonstrate the pathology. Clinically, sacral stress fractures present as localized gluteal region tenderness and low back pain; however, radicular symptoms have also been described[17]. Physical examination is essential for eliminating other causes, while imaging tests are necessary for accurate diagnosis and differential diagnosis[10]. In the cases reported here, there were no specific findings in the physical examination. However, in these 3 patients the finding which was seen on one side of pain and sensitivity in the lower back and over the SIJ, was an important finding. The first step in radiological imaging of a stress fracture is plain radiographs but it is difficult to determine a sacrum stress fracture on a plain radiograph and generally there is a false negative result. Therefore, CT, bone scintigraphy or MRI should be used to confirm the diagnosis[1,7,8,12,24]. Bone scintigraphy and CT are harmful to a fetus because of their teratogenic effects and therefore, the use of these tests during pregnancy is problematic[25,26]. On CT examinations, continuing deterioration of cortical or spongious bone or sclerosis and new bone structures may be seen together with the fracture line[5]. However, if CT slices of sufficient thinness can not be obtained, indistinct sclerotic areas may be missed. MRI can be safely performed during pregnancy and is more sensitive than bone scintigraphy in demonstrating bone stress injuries. Because MRI remains the only imaging technique that does not involve exposing the fetus to ionized radiation, it is the most crucial modality in the diagnosis of pregnancy-related stress fractures[1,4,8,16]. In structured time-dependent inverse regression sequences, particularly in the frontal slices, oedema in both sacra is clearly seen. Diagnosis is made with the visualization of a fracture line in the same area on T1-weighted sequences[27]. As these fractures have a low risk of complications, conservative treatment is recommended. The treatment of sacral stress fractures is mainly focused on pain relief, with analgesics being a mainstay until the symptoms subside. While there is no consensus regarding the efficacy of total bed rest versus early mobilization, some authors advocate for the protocol of early supervised walking, with or without assistive devices, as long as it is not painful. This approach can help in fracture healing by stimulating osteoblast activity and in avoiding complications of long-term immobility[1,3,5,16,17].

The true incidence rate of these fractures is not known. Since the period of birth is a time of particularly high prevalence of back pain and this generally improves spontaneously in the postnatal period, birth-related sacral stress fractures are probably underdiagnosed. The avoidance of using radiological imaging methods during pregnancy and the healthy course of stress fractures can be considered major factors in the lack of knowledge of the true incidence of this occurrence. Together with the cases presented herein, increased awareness of sacral stress fractures in the differential diagnosis of back pain in pregnancy and postpartum will lead to defining the true incidence and the formulation of treatment approaches.

Study Limitations

This study has several limitations. First, the retrospective nature of the study coupled with a small sample size leads to poor statistical power and limits the potential for extensive comparative analysis between the cases studied. Additionally, the lack of fetal biometrics and labor-induced mechanical stress parameters could potentially have precluded a complete insight into the etiology of these fractures. Also, widely recognized quantitative outcome measures like pain scales or functional assessment scores were not used; therefore, clinical recovery was assessed by subjective means.

CONCLUSION

Sacral stress fractures are rare but have to be considered within the differential diagnosis of postpartum low back pain. An early MRI study is crucial for the diagnosis. It has been seen in most cases that conservative management leads to a complete recovery. This series highlights the awareness and early intervention needed in the management of this rare condition.

Ethics

Ethics Committee Approval: The study was approved by the İstanbul Yeni Yüzyıl University (approval number: 2025/01-1434, date: 07.01.2025).
Informed Consent: Retrospectively study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: M.N.E., Y.K., A.A., M.A., Concept: M.N.E., M.A., Design: M.N.E., M.A., Data Collection or Processing: M.N.E., Y.K., A.A., M.A., Analysis or Interpretation: M.N.E., Y.K., A.A., M.A., Literature Search: Y.K., A.A., Writing: M.N.E., Y.K., A.A., M.A.
Conflict of Interest: No conflict of interest was declared by the authors.
Financial Disclosure: The authors declared that this study received no financial support.

REFERENCES

1. Sibilia J, Javier RM, Werle C, Kuntz JL. Fracture of the sacrum in the absence of osteoporosis of pregnancy: a rare skeletal complication of the postpartum. Br J Obstet Gynaecol. 1999;106:1096-7.
2. Schmid L, Pfirrmann C, Hess T, Schlumpf U. Bilateral fracture of the sacrum associated with pregnancy: a case report. Osteoporos Int. 1999;10:91-3.
3. Rousière M, Kahan A, Job-Deslandre C. Fracture du sacrum du postpartum sans ostéoporose gravidique. Postpartal sacral fracture without osteoporosis. Rev du Rhum. 2001;68:80-3.
4. Alonso-Burgos A, Royo P, Díaz L, Aquerreta JD. Labor-related sacral and pubic fractures. A case report. J Bone Joint Surg Am. 2007;89:396-8.
5. Druga R, Drugová B. Poporodní netraumatická zlomenina krízové kosti: kazuistika a biomechanické poznámky [Postpartal atraumatic sacral fracture. A case report and biomechanical comments]. Ceska Gynekol. 2008;73:192-5.
6. Karataş M, Başaran C, Ozgül E, Tarhan C, Ağildere AM. Postpartum sacral stress fracture: an unusual case of low-back and buttock pain. Am J Phys Med Rehabil. 2008;87:418-22.
7. Thein R, Burstein G, Shabshin N. Labor-related sacral stress fracture presenting as lower limb radicular pain. Orthopedics. 2009;32:447.
8. Narvaez J, Narvaez JA. Post-partal sacral fatigue fracture. Rheumatology (Oxford). 2003;42:384-5.
9. Eskin D, Memisoglu S, Copuroglu C, Ozcan M. Postpartum stress fracture of the sacrum: a case report. Internet J Orthop Surg. 2008;14.
10. Peh WC, Khong PL, Ho WY, Yeung HW, Luk KD. Sacral insufficiency fractures. Spectrum of radiological features. Clin Imaging. 1995;19:92-101.
11. Major NM, Helms CA. Sacral stress fractures in long-distance runners. AJR Am J Roentgenol. 2000;174:727-9.
12. Ahovuo JA, Kiuru MJ, Visuri T. Fatigue stress fractures of the sacrum: diagnosis with MR imaging. Eur Radiol. 2004;14:500-5.
13. Leroux JL, Denat B, Thomas E, Blotman F, Bonnel F. Sacral insufficiency fractures presenting as acute low-back pain. Biomechanical aspects. Spine (Phila Pa 1976). 1993;18:2502-6.
14. Berthelot JM, le Goff B, Maugars Y, Laredo JD. Sacroiliac joint edema by MRI: far more often mechanical than inflammatory? Joint Bone Spine. 2016;83:3-5.
15. Gordon G, Kabins SA. Pyogenic sacroiliitis. Am J Med. 1980;69:50-6.
16. Beltran LS, Bencardino JT. Lower back pain after recently giving birth: postpartum sacral stress fractures. Skeletal Radiol. 2011;40:461-2, 481-2.
17. Lin JT, Lutz GE. Postpartum sacral fracture presenting as lumbar radiculopathy: a case report. Arch Phys Med Rehabil. 2004;85:1358-61.
18. Black AJ, Topping J, Durham B, Farquharson RG, Fraser WD. A detailed assessment of alterations in bone turnover, calcium homeostasis, and bone density in normal pregnancy. J Bone Miner Res. 2000;15:557-63.
19. Phillips AJ, Ostlere SJ, Smith R. Pregnancy-associated osteoporosis: does the skeleton recover? Osteoporos Int. 2000;11:449-54.
20. Thienpont E, Simon JP, Fabry G. Sacral stress fracture during pregnancy--a case report. Acta Orthop Scand. 1999;70:525-6.
21. Kent GN, Price RI, Gutteridge DH, Smith M, Allen JR, Bhagat CI, et al. Human lactation: forearm trabecular bone loss, increased bone turnover, and renal conservation of calcium and inorganic phosphate with recovery of bone mass following weaning. J Bone Miner Res. 1990;5:361-9.
22. Nordin BE, Roper A. Post-pregnancy osteoporosis; a syndrome? Lancet. 1955;268:431-4.
23. Kohlmeier L, Marcus R. Calcium disorders of pregnancy. Endocrinol Metab Clin North Am. 1995;24:15-39.
24. Shah MK, Stewart GW. Sacral stress fractures: an unusual cause of low back pain in an athlete. Spine (Phila Pa 1976). 2002;27:E104-8.
25. De Santis M, Di Gianantonio E, Straface G, Cavaliere AF, Caruso A, Schiavon F, et al. Ionizing radiations in pregnancy and teratogenesis: a review of literature. Reprod Toxicol. 2005;20:323-9.
26. Hall EJ. Scientific view of low-level radiation risks. Radiographics. 1991;11:509-18.
27. Arendt EA, Griffiths HJ. The use of MR imaging in the assessment and clinical management of stress reactions of bone in high-performance athletes. Clin Sports Med. 1997;16:291-306.