CASE REPORT

Non-traumatic, bilateral subcapital femoral fractures postpartum

Anhar Yassin, Issrah Jawad, Ross Coomber, Aurora Gonzalez-Castro

Department of Trauma and Orthopaedics, Luton & Dunstable Hospital, Luton, UK

Correspondence to

Dr Anhar Yassin,
anharyassin@hotmail.com

SUMMARY

A 28-year-old Romanian woman, presented 2 weeks postnatally with pain in her left hip. Plain radiography suggested a left intracapsular, subcapital hip fracture. A CT scan of the pelvis showed diffuse osteopaenia with bilateral subcapital fractures of both femurs. From this imaging and subsequent investigation, a diagnosis of transient osteoporosis of pregnancy was made. The patient was treated with a closed reduction and cannulated screw fixation. Rehabilitative treatment, vitamin D, calcium and bisphosphonate therapy were initiated. She remains under close follow-up from orthopaedic, rheumatological and endocrine teams. Multiple opportunities were missed to identify the source of the patient's pain and inability to weight bear. Early detection and management of this condition is crucial because of the associated morbidity, including debilitating pain, reduced mobility, fractures and avascular necrosis. Cessation of breastfeeding, adequate pain relief, early use of bisphosphonates and rehabilitative treatment are essential.

BACKGROUND

Osteoporosis is defined as the loss of bone mass, rising frailty and increased susceptibility to pathological fractures.¹ The loss of bone density is assessed using dual emission x-ray absorptiometry (DEXA) scans which allocate a T (normal: -1 to +1) and Z score (normal: 0). These are measures which compare a patient's bone density with that of a young adult mean (T), and a matched gender and age mean (Z). Pregnancy and lactation cause a considerable increase in demand for calcium² that is met by different adaptive metabolic responses of which the outcome is to ensure sufficient delivery of calcium to the fetus while protecting the maternal skeleton. Initially, calcium levels are maintained through intestinal absorption while during the lactation period it is mostly reabsorbed from the maternal skeleton.² These changes in absorption and excretion of calcium are driven by the homeostasis of parathyroid hormone (PTH) and 1,25 (OH)₂D.³

The increased metabolic state of pregnancy and lactation results in some expected loss of bone mineral density, but with recognised individual variance.⁴ These changes are normally asymptomatic; however, women who start pregnancy in a deficient state would be at risk of developing problems.³ Research in the UK has shown that more than 50% of the adult population have insufficient levels of vitamin D with women at a 40% increased risk of being deficient compared with their

matched male controls,⁵ suggesting a large number of potentially vulnerable women.

CASE PRESENTATION

A 28-year-old primigravida of Romanian origin was referred to the orthopaedic department of a district general hospital. She was 2 weeks postpartum having had a spontaneous vaginal delivery to a healthy female child at term. She presented with bilateral hip, and groin pain and was unable to weight bear. There was no history of trauma and no orthopaedic or rheumatological medical history. She described a background of persistent pelvic, lower back and hip pain starting in the final trimester of her pregnancy which continued postpartum. Her obstetric team were treating this as pelvic girdle pain and did not investigate with radiographs due to the potential risks to the unborn child. On discharge from the maternity unit, she continued to report a deep aching pain in her back and pelvis radiating to the groin. She was advised that the pelvic girdle pain would take time to settle and she should continue to take anti-inflammatory analgesia regularly, use crutches and rest.

Her presentation to the accident and emergency department had been prompted by a significant increase in pain in the preceding 3 days. When asked if she could recall anything triggering off the deterioration, she informed us that she had become unable to bear weight after rising from a cross-legged position on the floor to a standing position. She described a 'cracking sensation' as she had moved and a progressive increase in pain from that point on. She had no medical history, and an uncomplicated pregnancy and delivery apart from the back pain. There was no history of corticosteroid, anticonvulsant or anticoagulant therapy, and the patient was a non-smoker and did not consume alcohol. She had attended all her antenatal appointments and had taken folic acid supplementation for the last month of her first trimester.

On examination, she was 167 cm tall and weighed 55 kg with a body mass index of 19.7. There was no pain on palpation of the greater trochanter, no deformity or leg-length discrepancy. Pain was elicited on internal rotation of the left leg. On examination, there was no pain on the right hip; however, all movements were restricted. She was distally neurovascularly intact.

INVESTIGATIONS

Initial radiographs showed a left-sided subcapital fracture of the proximal femur, the X-rays did not suggest the presence of severe osteopaenia

CrossMark

To cite: Yassin A, Jawad I, Coomber R, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-201625

Figure 1 Admission radiograph of hips.

(figure 1). In view of the patient's bilateral hip pain, she was investigated with a CT of her hips and pelvis which demonstrated bilateral impacted subcapital fractures (figure 2).

The patient had further investigations into the underlying cause of her pathological fractures. Her calcium levels were normal at 2.35 mmol/l (2.10–2.60) but she was found to have a low vitamin D level at 38 (70–200). Cortisol, PTH and serum protein electrophoresis were normal. A DEXA bone scan has shown a T and Z score of –2.3, suggesting osteopaenia. She was given a diagnosis of transient osteoporosis of pregnancy.

TREATMENT

The patient was managed operatively with closed reduction and internal fixation with cannulated screws (figure 3). The operative findings included soft osteoporotic-like bone. In view of this, the patient was advised not to bear weight for 3 months and only transfer from bed to chair to avoid further fractures or failure of fixation and to prevent non-union and avascular necrosis (AVN). She was initiated on bisphosphonate therapy, calcium replacement and high-dose vitamin D.

OUTCOME AND FOLLOW-UP

At the 6-week follow-up, the patient was still wheelchair-users although she was pain-free and able to transfer from bed to chair independently. Follow-up radiographs demonstrated signs

Figure 2 A CT of hips demonstrating bilateral subcapital fractures.

Figure 3 Post-closed reduction and cannulated screw fixation.

of union in the right hip. However, there were signs of AVN in her left hip for which she has been referred to the hip surgeons for further treatment. She continues to be under the care of the orthopaedic, rheumatology and the endocrinology physicians.

DISCUSSION

In 1959, Curtiss and Kincaid⁶ reported their first case studies of transient osteoporosis of the hip in pregnancy. They focused on a cohort of women who developed a similar pattern of hip pain in the final trimester, which continued after delivery, and who had evidence of osteoporosis. These women had no medical history to explain their symptoms and of the few who sustained fractures they were low-impact pathological fractures. The cohort of women studied almost fully recovered within 2 months postpartum and the natural history of the condition lasted 2–9 months postpartum.⁶

There are no available figures for the incidence of osteoporosis in pregnancy. A recent 2-year prospective study in a Spanish maternity unit reported 2 patients of a cohort of 4900 pregnancies; however, this study did not take into account whether the women were breastfeeding or not.⁷

The aetiology of this condition remains unclear, and as pregnancy results in several major changes in hormone homeostasis it is thought that high adrenocortical and parathyroid activity may play a role.³ Some research suggests that there may also be the added effect of weight-related mechanical stress.⁸ The present case is of particular interest as the pathological fractures most commonly seen in these women are in the vertebral column.⁹ There have also been cases reported of sacral fractures especially during vaginal deliveries where hips and pelvises are under a lot of physical strain.¹⁰ It is recognised that the mechanical process of delivery and interventions such as forceps or ventouse are risk factors for sustaining these fractures.¹⁰

The patients' bilateral hip fractures in the present case reflect an even smaller minority within those who suffer from transient osteoporosis of pregnancy. A review of the literature showed only four reported cases of bilateral hip fractures.^{11–15} All were young women under the age of 30 with no medical history of note who sustained bilateral neck of femur fractures. Three had low energy falls postpartum and one of the women had sustained the fractures during pregnancy with the diagnosis missed until after delivery.¹³

Learning points

- ▶ Although hip pain is a common symptom in pregnancy, it must not be ignored.
- ▶ The causes of hip pain include transient osteoporosis, osteonecrosis and pubic symphysiolysis.
- ▶ Ionising radiation should be avoided in pregnancy but MRI in the third trimester can be considered in these cases. The potential risks to the fetus, such as hearing damage, must be discussed with the parents before proceeding.¹⁶
- ▶ Once transient osteoporosis of pregnancy is suspected, antiresorptive therapy should be started as soon as possible after delivery.

Contributors AH, IJ, RC and AGC made substantial contributions to conception and design, were involved in acquisition of data and interpretation of data, revising the article critically for important intellectual content and approved the final version of the manuscript to be published.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Kanis J, Melton L, Christiansen C, *et al*. The diagnosis of osteoporosis. *J Bone Miner Res* 1994;9:1137–41.
- 2 Kovacs CS. Calcium and bone metabolism disorders during pregnancy and lactation. *Endocrinol Metab Clin North Am* 2011;40:795–826.
- 3 Hosking D. Calcium homeostasis in pregnancy. *Clin Endocrinol* 2006;45:1–6.
- 4 Wisser J, Florio I, Neff M, *et al*. Changes in bone density and metabolism in pregnancy. *Acta Obstet Gynecol Scand* 2005;84:349–54.
- 5 Hyppönen E, Power C. Hypovitaminosis D in British adults at age 45 y: nationwide cohort study of dietary and lifestyle predictors. *Am J Clin Nutr* 2007;85:860–8.
- 6 Curtiss PH, Kincaid WE. Transitory demineralization of the hip in pregnancy. A report of three cases. *J Bone Joint Surg Am* 1959;7:1327–33.
- 7 Steib-Furno S, Luc M, Pham T, *et al*. Pregnancy-related hip diseases: incidence and diagnoses. *Joint Bone Spine* 2007;74:373–8.
- 8 Spinarelli A, Patella V, Speciale D, *et al*. Hip fracture in a patient affected by transient osteoporosis of the femoral head during the last trimester of pregnancy. *Orthopaedics* 2009;32:5.
- 9 Michalakis K, Peitsidis P, Ilias I. Pregnancy- and lactation-associated osteoporosis: a narrative mini-review. *Endocr Regul* 2011;45:43–7.
- 10 Öztürk G, Külcü DG, Aydoğ E. Intrapartum sacral stress fracture due to pregnancy-related osteoporosis: a case report. *Arch Osteoporos* 2013;8:P139.
- 11 Emami MJ, Abdollahpour HR, Kazemi AR, *et al*. Bilateral subcapital femoral neck fractures secondary to transient osteoporosis during pregnancy: a case report. *J Orthop Surg (Hong Kong)* 2012;20:260–2.
- 12 Bircher C, Afors K, Bircher M. Transient osteoporosis of the hip in pregnancy resulting in bilateral fracture of the neck of the femur. *Int J Gynaecol Obstet* 2012;116:176–7.
- 13 Broadhead ML, Babazadeh S, Ng KW, *et al*. Atraumatic bilateral femoral neck fractures during pregnancy: a missed diagnosis. *Aust N Z J Obstet Gynaecol* 2011;51:563–4.
- 14 Morris F, Keriakos R, Mason S, *et al*. Spontaneous bilateral femoral neck fractures in a young primigravida. *J Obstet Gynaecol* 2011;31:549–51.
- 15 Münker R, Niedhart C, Niethard FU, *et al*. [Bilateral fracture of the femoral neck following transient osteoporosis in pregnancy.] *Z Orthop Ihre Grenzgeb* 2007;145:88–90.
- 16 De Wilde JP, Rivers AW, Price DL. A review of the current use of magnetic resonance imaging in pregnancy and safety implications for the fetus. *Prog Biophys Mol Biol* 2005;87:335–53.

Copyright 2014 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow