



CLINICAL NOTE

Transient osteoporosis complicated by a subcapital hip fracture in pregnancy: a clinical case and a literature review

A. Vergara-Ferrer, * B. Cornet-Flores, L. Sevillano González

Servicio de Cirugía Ortopédica y Traumatología, Hospital Universitario Severo Ochoa, Leganés, Madrid, Spain

Received November 5, 2010; accepted February 2, 2011

KEYWORDS

Transient osteoporosis of the hip;
Hip fracture;
Pregnancy;
Pathological fracture

Abstract Transient osteoporosis of the hip is a rare condition characterized by pain and marked osteopenia in the femoral head and neck that can occur in the third trimester of pregnancy. We describe the case of a 36 weeks pregnant with a subcapital hip fracture treated by closed reduction and internal fixation.

© 2010 SECOT. Published by Elsevier España, S.L. All rights reserved.

PALABRAS CLAVE

Osteoporosis transitoria del embarazo;
Fractura de cadera;
Embarazo;
Fractura patológica

Osteoporosis transitoria del embarazo complicada con fractura subcapital de cadera: caso clínico y revisión de la literatura

Resumen La osteoporosis transitoria de la cadera es una dolencia poco frecuente caracterizada por dolor y acusada osteopenia en la cabeza y cuello femorales que puede aparecer en el tercer trimestre de embarazo. Describimos el caso de una gestante de 36 semanas con fractura subcapital de cadera en la que se realiza reducción cerrada y fijación interna.

© 2010 SECOT. Publicado por Elsevier España, S.L. Todos los derechos reservados.

Introduction

Transient osteoporosis of the hip is a condition characterized by pain and marked osteopenia in the femoral head and neck. It has been described in pregnant young women during

the third trimester of pregnancy and during lactation, as well as in middle-aged men.¹

In pregnancy and in the absence of high clinical suspicion, the symptoms are often misinterpreted initially and may be confused with low back pain or mechanical pain, which delays diagnosis and increases morbidity.²

Since this condition in pregnant women was described by Nordin and Roper³ in 1955 and by Curtiss and Kincaid⁴ in 1959, numerous cases have been reported in the literature—complicated cases with associated fractures being much less common.^{1,5-7}

* Corresponding author.

E-mail: vergaraferrer.a@gmail.com (A. Vergara-Ferrer).



Figure 1 Pre-operative x-ray.

Clinical case

A 35-year-old secundipara, at 36 weeks, with unremarkable medical history who, 2 months ago, began to have pain in the right gluteal region radiating to the groin. Her gynaecologist diagnosed this as low back pain, and she was treated with minor analgesics.

After a fall from her own height, she was taken to Urgent Care because of increased pain and a functional deficit in the right lower extremity. When her history was taken, patient reported that she fell to the floor “when her leg suddenly gave out,” with no previous trauma.

On physical examination, patient’s right hip was tender to palpation with pain on movement, and her right lower extremity was shortened and externally rotated. Distal neurovascular examination was normal. Patient had no apophyseal or lumbar pain.

A simple AP x-ray was taken of the right hip, which revealed a Pauwels type II^o subcapital femur fracture, with marked regional osteoporosis of the proximal femur and acetabulum. The fracture line was rounded in appearance, suggestive of a stress/insufficiency fracture (fig. 1).

The fracture required surgical treatment, and after the Gynaecology Service had assessed the condition of the foetus, the baby was delivered by elective Caesarean section under spinal anesthesia. Immediately after the delivery, while patient was still under the effects of the same anesthesia, a closed reduction of the fracture and osteosynthesis with two cannulated screws was performed



Figure 2 Control x-ray at 11 months. Anterior-posterior view.

on an orthopaedic table with x-ray control. The time elapsed since the patient’s fall was approximately 6 hours.

The patient was kept non-weight-bearing on crutches for 6 weeks, and then partial weight-bearing was permitted. At 3 months, patient was permitted to ambulate without support.

At the last post-operative visit 11 months later, fracture healing was confirmed, with slight valgus and shortening of



Figure 3 Control x-ray at 11 months. Axial view.

Table 1 Published cases of hip fracture secondary to TOoP: principal author and year of publication

Author	Year of publication	Type of lesion	Moment of fracture	Time elapsed	Treatment	Results
Guryel	2010	Subcapital femoral neck fracture	38 weeks	15 hours	Closed reduction and synthesis with 3 cannulated screws	Osteonecrosis of femoral head
Aynaci	2008	Bilateral acetabular and femoral neck fracture	6 days postpartum	1 month and 8 months postpartum	Uncemented THR	
Cohen	2007	Garden III subcapital fracture	Week 29	12 hr without interruption of pregnancy	ORIF with cannulated screws	Followed for 24 months with no evidence of necrosis
Leistedt	2004	Bilateral subcapital fracture in patient with gran mal seizure	Week 34	THR 1 month postpartum	THR and conservative tx contralateral	
Wood	2003	Unstable subcapital fracture	5 months postpartum	Not reported	ORIF with pediculated bone graft and cannulated screws	
Wattanawong	2001	Bilateral fractures initially treated orthopaedically and with failure to heal	3 rd trimester	Conservative tx after failure	Bilateral PHR	Followed for 12 months with good progress
Fokner	1997	Subcapital fracture	3rd trimester	3 weeks post-fx; 2 weeks postpartum	Surgery at 3 weeks from fracture, associating plaster spica	
Junk	1996	Subcapital fracture	2 weeks postpartum	7 weeks postpartum	ORIF with ZESPOL screws and plate	
Fingeroth	1995	Subcapital fracture associated with seizure	38 weeks	Caesarean at 40 weeks; surgery 5 d. postpartum	ORIF with cannulated screws	
Gouin	1992	a) Garden IV subcapital fracture b) Subcapital fracture	a) 12 th day postpartum b) 36 th week	a) Not reported b) 15 days postpartum	a) Hemiarthroplasty b) Synthesis with screws	a) Without reference b) Good results at 2 years
Brodell	1989	a) Non-displaced b) Displaced subcapital		a) Conservative b) 6 weeks postpartum	Conservative Osteotomy	
Curtiss	1959	Subcapital fracture	Postpartum	No surgery	Initially unnoticed. Treatment was not established	Doing well clinically at 2 years

the femoral neck, along with an improvement of the osteoporosis in the hip. On simple x-ray, no signs suggestive of avascular necrosis were appreciated; no other imaging studies had been done. (figs. 2 and 3). The patient was asymptomatic with no impairments of gait, a slight limitation of internal rotation being the only sequela.

Discussion

Transient osteoporosis is a rare but well known condition, characterized by a progressive regional osteoporosis accompanied by severe pain in the affected area. It is believed to be a self-limited condition, with spontaneous resolution from 2 to 6 months after the onset of symptoms.^{1,3,4,6}

It may affect both males and females, the hip and spine being the most common sites. In males, the incidence peaks at 40 to 60 years of age; in females, the peak incidence is seen from 20 to 40 years of age, sometimes in association with the third trimester of pregnancy and with lactation.¹⁻⁴

Because it is rare, symptoms of transient osteoporosis of pregnancy (TOoP) may be confused with those of mechanical low back pain.² The pains reported by patients are usually attributed to the excess load on the lumbar musculature during the last months of pregnancy. A thorough history and physical examination will enable us to differentiate one clinical picture from the other. Diagnostic confirmation is obtained via simple x-rays of both hips—a low-risk procedure in the third trimester of pregnancy.

Laboratory tests are usually normal,^{1,4,9} except for the ESR and urine hydroxyproline levels, which are normally elevated in the third trimester of pregnancy, even in the absence of TOoP.¹ Aspiration of joint fluid as well as synovial and bone biopsies have been described, contributing no information for the diagnosis.¹⁰

As for imaging studies, a simple x-ray may be normal because osteopenia does not appear on x-ray until 3 to 8 weeks after the onset of symptoms.^{1,4,9} Although MRI and bone scans are more sensitive and pick up signs earlier, they are not specific enough for diagnosing TOoP.^{1,6,9}

The differential diagnosis of TOoP includes avascular osteonecrosis, inflammatory processes, and infectious processes.

Despite its benign course, transient osteoporosis may have serious complications when associated with pregnancy—the most serious, perhaps, being stress or insufficiency fractures.^{5,9}

The therapeutic approach to a case of TOoP includes pain control using minor analgesics and prevention of pathological fractures via protected weight bearing; these measures are sufficient until the clinical picture spontaneously resolves at about 8 week postpartum. Other therapeutic measures, such as administration of calcium, vitamin D, bisphosphonates, calcitonin, glucocorticoids, and NSAIDs, have shown no efficacy.^{1,4}

The incidence of this condition reflected in the literature is probably lower than the actual incidence, most likely because of its low frequency, its low index of diagnostic suspicion, and its natural tendency to resolve spontaneously.

In the literature we reviewed, there were 16 cases of hip fracture described (table 1). Therapeutic options, as shown

in the table, include closed reduction and synthesis with cannulated screws, open reduction and synthesis with or without bone graft, and partial or total hip arthroplasty.

In intracapsular femoral neck fractures in young patients, the objective of treatment is to achieve anatomical reduction and stable internal fixation, thus preventing, to the extent possible, medium- and long-term complications⁸: osteonecrosis, nonunion, and malunion, which could result in a clinical picture of femoroacetabular impingement and early-onset degenerative joint disease.

There are 2 aspects of our case to be highlighted: first, despite an apparent good reduction intra-operatively, which kept us from performing an open reduction, the results were not entirely satisfactory on x-ray—the fracture healed in valgus and with shortening. Although the patient is asymptomatic at the present time, we will monitor her for the possible long-term complications of these deformities.

Second, the different options having been evaluated, there is controversy as to the number of spongy bone screws to be used in treating these fractures. Although there are limitations to these studies, which are based on porous bone models, it appears that using 3 cannulated screws is the best option and that using 2 screws is suboptimal for achieving stable synthesis.⁸

In the cases reviewed, there was wide variation among the different authors as to the moment when the surgical procedure was performed. We did confirm, however, that in all but one case⁷ where a synthesis was done, the fracture healed with no subsequent necrosis, regardless of the time elapsed since the fracture was diagnosed.³

Conclusion

A high index of suspicion and early diagnosis are the keys to fracture prevention in TOoP.

Apparently the final outcome of the synthesis is not affected by a delay in surgical treatment; however, it is logical to suppose that the earlier the treatment, the better the result will be. The patient's pregnancy should pose no obstacle since there are the options of continuing the pregnancy after the synthesis or performing an elective Caesarean and then the synthesis immediately afterward in the same surgical event.

In our patient, the fracture healed despite the initial displacement, and the femoral head survived during the follow-up period, with good progress in terms of function.

Evidence level

Evidence Level V.

References

1. Wood ML, Larson CM, Dahners LE. Late presentation of a displaced subcapital fracture of the hip in transient osteoporosis of pregnancy. *J Orthop Trauma*. 2003;17:582–4.
2. Curtiss P, Kincaid WE. Transitory demineralization of the hip in pregnancy. *JBJS-A*. 1959;41:1327–33.

3. Ainaci O, Kerinoglu S, Ozturk C, Saracoglu M. Bilateral nontraumatic acetabular and femoral neck fractures due to pregnancy-associated osteoporosis. *Arch Orthop Trauma Surg.* 2008;128:313–6.
4. Kaplan SS, Stegman CJ. Transient osteoporosis of the hip. *JBJS* 1985;3:490–3.
5. Junk S, Ostrowski M, Kokoszczynski L. Transient osteoporosis of the hip in pregnancy complicated by femoral neck fracture. *Acta Orthop Scand.* 1996;67:69–70.
6. Fingerhuth RJ. Successful operative treatment of a displaced subcapital fracture of the hip in transient osteoporosis of pregnancy. *JBJS* 1995;77:127–31.
7. Guryel E, Shaikh N, Clark DW. Displaced intracapsular fracture complicating transient osteopenia of the hip in pregnancy: Timing of surgery. *Acta Orthop Belg.* 2010;76:555–8.
8. Ly TV, Swiontkowski MF. Treatment of femoral neck fractures in young adults. *JBJS-Am.* 2008;90:2254–64.
9. Cohen I, Melamed E, Lipkin A, Robinson D. Transient osteoporosis of pregnancy complicated by a pathologic subcapital hip fracture. *J Trauma.* 2007;62:1281–3.
10. Gouin F, Maulaz D, Aillet G, Fletu G, Passuti N, Bainvel JV. Fracture de col du fémur compliquant une algodystrophie de hanche au cours de la grossesse. *Revue de Chirurgie Orthopédique.* 1992;78:45–50.