

Bilateral stress fractures of the femoral neck with no risk factor : A case report

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Fracture de fatigue bilatérale du col du fémur sans facteurs de risque:
A propos d'un cas

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R É S U M É

Prérequis : Les fractures de stress du col du fémur sont rares. Elles sont provoquées soit par une sollicitation excessive, soit par une fragilité de l'os.

But : Rapporter la survenue, chez une fille âgée de 15 ans, d'une fracture de fatigue du col du fémur sans aucun des facteurs de risques habituellement reconnus.

Observation : Nous rapportons une fracture de fatigue bilatérale du col du fémur chez une fille âgée de 15 ans, en bonne santé et ne pratiquant pas d'activité physique intensive. L'une des fractures du col était déplacée au moment du diagnostic et a été traitée par une ostéotomie sous trochantérienne de valgisation et ostéosynthèse par clou-plaque. Du côté controlatéral, la fracture était non déplacée, au moment du diagnostic. Un déplacement est survenu secondairement mal grés une ostéosynthèse en place par vis plaque.

Conclusion : La survenue d'une fracture de fatigue du col du fémur doit être suspectée devant des douleurs de hanches même en l'absence de facteurs de risque. Ceci devrait permettre d'éviter les retards diagnostiques sources de déplacement et de complications.

S U M M A R Y

Background : Stress fractures of the femoral neck are uncommon. They are caused by either excessive stress or bone fragility.

Aim: To report a case of bilateral stress fracture of the femoral neck in a 15-year-old girl without any risk factors

Observation: We report a case of bilateral stress fracture of the femoral neck in a 15-year-old girl in whom no risk factors were found. One of the fractures was displaced at first diagnosis and was successfully treated by closed reduction and valgus subtrochanteric osteotomy. The other fracture was initially undisplaced but displacement occurred later despite internal fixation with a dynamic hip screw.

Conclusion: A high index of suspicion of stress fractures of the femoral neck must be kept in mind even without risk factors. Delays in diagnosis and displacement should therefore be avoided.

M o t s - c l é s

Fracture de stress, Col du fémur, Enfant

Key - words

Stress fracture, femoral neck, children

Stress fractures are an uncommon cause of hip pain which can be easily missed and lead to very disabling complications owing to the displacement of the fracture. Usually a risk factor is easily recognised such as bone fragility or unusual physical activity causing repeated stresses on the femoral neck. The case reported in this paper is atypical as bilateral fractures occurred in a healthy young adolescent with no known risk factors. The diagnosis was not suspected initially and a displacement occurred which could have led to a disastrous outcome (1).

CASE REPORT

A 15 year-old girl was referred to our department with a 9 month history of mechanical pain in the right hip. She was a healthy high school student and was not involved in any excessive exercise. There was no history of hip trauma. She was treated initially with non-steroidal anti-inflammatory medication, as the X-ray taken 3 weeks after the onset of symptoms showed no abnormalities. Two weeks before her referral, she complained of a sudden worsening of the pain. Clinical examination in our department revealed a severe limp and a painful restriction of abduction of the right hip. There was a 3 cm shortening of her right limb. An X-ray showed a femoral neck fracture with sclerotic edges and varus displacement (Neck shaft angle of 105°). The left neck-shaft angle was 130° (figure 1). There was no evidence of avascular necrosis of the femoral head on Technetium-99m bone scan. The diagnosis of displaced stress fracture was due to the clinical history and the radiographic features. She had no known illnesses. Calcium and phosphorus levels and bone densitometry were all normal.

Figure 1 : Fracture of the right femoral neck with varus displacement



The fracture was treated with closed reduction and a 20° valgus subtrochanteric osteotomy (figure. 2). Partial weight-bearing was allowed after 1 month and complete union of both the fracture and the osteotomy was observed 3 months post operatively. Six months later, she returned complaining of left

hip pain without any preceding trauma. Radiographs showed a transverse non displaced femoral neck stress fracture with sclerotic edges.

Figure 2 : Consolidation of both the fracture and the osteotomy after a 20° valgus subtrochanteric osteotomy of the right hip. Transversal undisplaced fracture of the left femoral neck



The fracture was treated with a dynamic hip screw with compression of the fracture site. Partial weight-bearing was allowed post operatively. Radiographic follow up showed a displacement of the fracture which finally healed with a varus of the femoral neck (figure 3).

Figure 3 : Consolidation of the left femoral neck with varus deformity after dynamic hip screw fixation



DISCUSSION

Though uncommon, stress fractures of the femoral neck are not rare and several cases have been reported (1, 2). Stress fractures are either insufficiency or fatigue fractures. Insufficiency

fractures are caused by low bone resistance which fails under normal loading conditions. They are often seen in elderly women with osteopenia (3). These fractures can also be seen in younger patients with bone fragility (2, 4). Fatigue fractures are due to excessive repeated stresses applied to a normal bone. These fractures are mostly seen in military recruits, marathon runners and ballet dancers secondary to initiation of a new activity or an increase of intensity of a physical activity (5). Fatigue fractures can also occur secondary to an abnormal anatomy of the femoral neck such as coxa vara (6).

In our case, we could not identify any of the reported risk factors. To our knowledge, only one report of such stress fracture has been published (7). The fracture occurred in a 30 years old healthy man with no history of trauma or excessive training. In our patient, it may be that a thin cervical neck could have been responsible for increased bone fragility.

Two types of stress fractures have been described by Devas (8): The compression and the tension types. The latter is perpendicular to the line of force transmission, originates at the superior surface of the femoral neck and is at high risk of displacement. This type corresponds to the fractures in our case. The compression type has radiographic changes on the inferior femoral neck without apparent cortical disruption. In this type, displacement is unlikely.

Blickenstaff et Morris (1) described 3 types of stress fractures of the femoral neck. Type I corresponds to the compression type of Devas. Type II is a visible, undisplaced fracture of the femoral neck. This type is similar to the tension type of Devas and corresponds to the fracture seen on the left hip of our patient. Type III is completely displaced as seen in our patient at initial presentation.

Stress fractures are initially often missed. Johansson et al (9) reported an average diagnostic delay of 14 weeks. For Clough, this delay was of 10 weeks (10). In our case, the diagnosis was made 9 months after the onset of symptoms. This delay is due to the fact that initial symptoms are often mild and non specific.

The earliest radiological sign of a tension-type stress fracture is a minute crack on the superior surface of the femoral neck, which can be easily missed or hidden by the outline of the greater trochanter, if the hip is not correctly positioned (8).

The risk of a delay in diagnosis is the occurrence of a displacement, which is then associated with a high rate of complications. Visuri et al reported 12 cases of displaced stress fractures of the femoral neck, in which, 4 patients developed avascular necrosis and 3 developed non-union (11). Johanson et al reported an incidence of 30% of avascular necrosis complicating displaced stress fractures of the femoral neck (9). In the nine cases of displaced fractures reported by Blickenstaff et Morris, only 2 healed without complications (1).

Treatment of tension transverse fracture is a surgical emergency. Surgical internal fixation is required. However, despite correct fixation, delayed and non union can occur (1, 8, 9). In our case displacement occurred in the left hip despite a fixation that had been deemed stable. Fortunately, complete healing occurred within a few weeks of discharge. Selzer et al reported a case of non-union of a stress fracture treated by dynamic hip screw, requiring secondarily, a valgus osteotomy to achieve consolidation (12). As the fracture line in the femoral neck frequently has an unfavourable Pauwels' angle (1), we now consider that initial treatment combining osteosynthesis and valgus subtrochanteric osteotomy could decrease the occurrence of non-union by improving stability provided by internal fixation (13).

CONCLUSION

A high index of clinical suspicion must be kept in mind in any case of hip pain even without risk factors. One must not hesitate to perform an MRI or a bone-scan, which have been demonstrated to be very sensitive in the early stages of stress fractures of the femoral neck (14, 15). Delay in diagnosis and displacement should thereby be avoided.

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