Stress fractures, better known as slow fractures, are of 2 types: fatigue fractures due to excessive repeated stress on a healthy bone and fractures due to bone failure, that are due to normal activity carried out by an abnormal bone (weak and with altered elasticity). The first type is usually seen in people with excessively demanding physical activities such as athletes and military personnel, but in any person who does a lot of physical activity. The main differential diagnosis must be a femoropatellar syndrome. We consider surgical, and not conservative, treatment advisable in young persons, because it allows a rapid return to work and prevents complications due to displacement.

CASE REPORT

Supracondylar Stress Fractures of the Femur

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Description of a clinical case report of a stress fracture in the supracondylar femur – an extremely rare fracture site. We wish to highlight the importance of early diagnosis of these fractures to prevent complications. Their existence must be considered when there is persistent pain in the anterior knee, not only in the case of athletes or military personnel, but in any person who does a lot of physical activity. The first type is usually seen in people with excessively demanding physical activities such as athletes and military personnel, but in any person who does a lot of physical activity. The main differential diagnosis must be a femoropatellar syndrome. We consider surgical, and not conservative, treatment advisable in young persons, because it allows a rapid return to work and prevents complications due to displacement.

Key words: fatigue fracture, stress fracture, femur fracture, supracondylar.

Fractura de estrés en región supracondílea de fémur

Se describe un caso clínico de una fractura de estrés en la región supracondílea del fémur, una localización extremadamente rara. Pretendemos llamar la atención sobre la importancia del diagnóstico precoz de estas fracturas para evitar el desarrollo de complicaciones, debiendo tenerlas presentes ante un dolor persistente en la región anterior de la rodilla, no sólo en atletas y militares, sino en cualquier persona que realice una actividad física importante. El diagnóstico diferencial principal se hace con el síndrome femoropatelar. En personas jóvenes nos inclinamos por el tratamiento quirúrgico de estas fracturas frente al conservador, ya que permite una rápida reincorporación a la actividad laboral previa y evita las complicaciones derivadas de su desplazamiento.

Palabras clave: fractura por fatiga, fractura de estrés, fractura de fémur, supracondílea.

Stress fractures, better known as slow fractures, are of 2 types: fatigue fractures due to excessive repeated stress on a healthy bone and fractures due to bone failure, that are due to normal activity carried out by an abnormal bone (weak and with altered elasticity). The first type is usually seen in people with excessively demanding physical activities such as athletes and people in the military. Whereas the second are seen in the elderly who frequently suffer bone metabolism alterations. The real incidence rate is unknown. New diagnostic methods (bone scans, computed axial tomography [CAT], nuclear magnetic resonance [MRI]) have detected an increase in the incidence rate of these fractures.

We present here a clinical case of a fracture in a very rare location such as the femoral supracondylar area.

CASE REPORT

The patient is a 41 year old male with a history of Hepatitis A. By profession a meat and meat byproducts delivery person, who came to the Emergency Service of our Hospital due to pain in the distal third of his left thigh and anterior part of his knee of two weeks duration, which became worse after perception of a clicking noise on walking.

The patient did not report any history of trauma. On physical exploration there was a slight swelling of the distal third of the left thigh, with pain on palpation. The patient was unable to flex his knee but had no nerve or vascular alterations.
Complementary tests: a plain X-ray was performed, and a left femur transverse supracondylar non-displaced fracture was seen. An MRI was requested to rule out any pathological condition. The MRI a transverse fracture line was seen in the distal third of the femur, extending into the cortical bone, with edema of soft tissues and a small amount of subperiosteal fluid. No images of pathological conditions of the bone marrow nor masses in soft tissues were seen (Figure 1). In view of the radiological findings and the lack of a history of trauma or pathological conditions, a fracture due to fatigue was diagnosed.

The patient underwent surgery 5 days later under spinal anesthesia. The fracture was nailed with a retrograde supracondylar proximal and distal locking SCN nail.

During surgery a biopsy was taken and the only significant finding was a bone callus at the fracture site.

The patient started walking 48 hours after surgery and the postoperative period was uneventful. The patient was discharged from hospital on the fourth day.

During follow-up in external consulting rooms, the patient evolved favorably, with slight discomfort in the patellar tendon during complete flexo-extension of the knee. On X-ray two and a half months after surgery the fracture was seen to have healed (Figure 2), and the patient returned to work.

**DISCUSSION**

Stress fractures are relatively frequent, and although they are more commonly found in the military and athletes, they must be considered in the case of any person who carries out significant physical activity. The most common locations are the tibia, fibula, and metatarsals. Only 5% of these fractures are femoral shaft fractures, and 40% of these are complete displaced fractures.

Provost and Morris classified these fractures in three types according to X-ray images: type I are those with an oblique radiolucent line in the medial cortical area of the femoral shaft, type II are displaced spiral oblique fractures of the femoral shaft and type III fractures include transverse fractures of the distal third of the femur, with or without displacement.

In femoral fractures the most common location is, by a large margin, the proximal third, followed by the middle third, with the lowest frequency seen in the distal third (9.2%). Glorioso et al in a review carried out due to the description of two supracondylar fractures, only found six cases described in the literature. The main problem we ran into when we wished to carry out a bibliographical review of fractures of this type is that many times they are not classified as such, but are under the same title as distal femoral shaft fractures.

We consider that a supracondylar fracture is a fracture located in the distal part of the femur between the femoral condyles and the juncture of the diaphysis and metaphysis of the femur; this area includes the 9-15 cm of the distal femur. Above this area the fractures are distal shaft fractures.

The absence of a history of trauma as a cause of the fracture caused us to rule out a pathological origin, and this was the reason for the MRI and the intraoperative biopsy. The literature on the subject advises a CAT scan to view longitudinal stress fractures, whereas an MRI is preferable in transverse fractures.

Multiple predisposing or risk factors have been described for this type of fracture: previous poor physical con-
Bone healing after retrograde intramedullary nailing with a 3,6.

Stress is an important predisposing factor is repeated mechanical stress. Although other causes, such as nutritional and menstrual imbalances, that cause a decrease in bone density as a consequence of hormonal imbalances, have become ever more important due to the growing participation of women in high competition sports.

Undoubtedly, the repeated mechanical stress that our patient’s femur was exposed to as a consequence of his work was the cause of the fracture. However, we cannot always identify repeated stress or a metabolic disorder affecting the bone; occasionally we are not able to determine the cause of fracture.

Clinically, as this type of fracture initially causes anterior knee pain, it may be confused with patellofemoral pain syndrome, quadiceps tendinitis or intraarticular pathology; especially when no alterations are seen on X-ray during the initial phase. Early diagnosis and suspension of activities are essential to prevent the development of a complete fracture and its displacement. The difference between a supracondylar stress fracture, and other causes of anterior knee pain, is the intensity of the pain, especially on knee flexion and weightbearing. In the case of our patient, he only came to the Emergency Service 2 weeks after feeling pain and an X-ray showed the fracture. It is very likely that if the patient had come in for consultation when the pain began the X-ray would not have shown evidence of the fracture. The rate of initial sensitivity to plain X-rays is only 15%, this increases in direct proportion to the time elapsed from the fracture to the X-ray. Usually, changes on X-ray are seen at 2-3 weeks after the beginning of symptoms, frequently the reason due to which these fractures are under-diagnosed.

This type of supracondylar fracture frequently initially only affects the medial cortical bone. The internal cortical bone is the side under greatest tension in the supracondylar region, especially if associated with a genu valgus.

As well as valgus, the medial collateral ligament and the adductor muscles create opposing forces that initiate a stress fracture.

Most of the fractures of the shaft or femoral condyles can be treated conservatively if they are partial or understandable fractures.

Total fractures should preferably be treated by endomendular nailing, although some authors prefer orthopaedic treatment of complete non-displaced fractures. We prefer endomendular nailing with a retrograde nail due to the location of the fracture and the fact that we are familiar with the technique.

In conclusion, we wish to highlight the importance of early diagnosis of these fractures, since this can prevent significant complications caused by their displacement. It is therefore essential to ‘always keep in mind’ the possibility of this type of fracture when there is persistent femoropatellar pain in a person with significant physical activity. We recommend surgical and not conservative treatment due to the rapid recovery of the patient that makes it possible for them to return to work soon and also prevents the risk of fracture displacement.

And, lastly, we wish to highlight the role of trauma professionals and sports trainers in the prevention of stress fractures: adequate training programs, scientifically studied sports activities and appropriate surfaces on which these are carried out are all ways of decreasing the incidence of this type of lesion. Other methods such as impact absorbing insoles may be beneficial, but this has not been confirmed by other authors.

REFERENCES

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