

Detachment of the Proximal Tibial Epiphysis and the Tubercle Apophysis: A Case Report

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Abstract

Case Report

Proximal Tibial physis fractures are rare injuries seen in adolescents that may be associated with vascular injury. Diagnosis can be confirmed with plain radiographs of the knee. The treatment may be nonoperative or operative depending on the Salter-Harris classification, stability, and the degree of displacement of the fracture. We report a case of detachment of the proximal tibial epiphysis and the tubercle apophysis Salter-Harris II in young adolescent treated by a gentle reduction and cast immobilization with good evolution. Our aim, through this work is to show the uncommon characteristic of these injuries, possibility of local complications and the difficult of choice between: nonoperative and surgical treatment.

Keywords: Epiphysis, tibia, detachment, complications, treatment.

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INTRODUCTION

Knee injuries are common in children, yet the detachment of the proximal tibial epiphysis and the tubercle apophysis are very rare. The diagnosis can be difficult and the search for possible vascular or nerve complications, even if it must be systematic in the assessment of a fracture, takes here all its meaning given the anatomical proximity of noble elements (popliteal artery) and possible development of compartment syndrome.

From a therapeutic point of view, the presence of very active growth cartilages raises concerns about the occurrence of secondary growth disorders.

CASE REPORT

We report a case of a 14 years old male suffering of pain and a swelling left knee after sustaining a flexion force injury during a soccer collision. He was unable to bear weight. Flexion and extension of the knee were painful and no neurovascular deficit was noted. Radiographs (AP and lateral views) showed a posterior displacement of the proximal tibial epiphysis and the tubercle apophysis as a single unit Salter-Harris II (Figure1) completed by a knee CT scan (Figure2).

The patient underwent a closed reduction by gentle traction and gradual extension of the knee then a long-leg cast with extended knee was applied (Figure 3), he was instructed to avoid weight bearing for 4 weeks. A follow-up of 6 months shows a good evolution.



Fig-1: Posterior displacement of the epiphysis and the tubercle apophysis as a single unit Salter-Harris II



Fig-2: Knee CTscan showing the epiphyseal detachment



Fig-3: Post closed reduction radiographs (AP, lateral views)

DISCUSSION

Injuries in childhood and adolescence are frequent and the knee is one of the most common sites of injuries. And yet detachments of the proximal tibial epiphysis and the tubercle apophysis are very rare. This is due to several anatomical structures which appear to protect the proximal tibial epiphysis against traumatic injuries [1, 2]. Their incidence is less than 1% of all physeal separations and more commonly seen in children between 12 and 14 years old [3]. Male predominance is explained by later physiological epiphysiodesis, but also the fact that boys are more exposed to violent trauma due to their hyperactivity and turbulence [3].

The mechanism is usually a high energy trauma with varus/valgus force, hyperextension, rarely and a flexion force mostly occurring during sport activities [1].

The close relationship between the vascular and bone elements explains the relative frequency of vascular lesions [4].

It is usually a 13-16 years old boy with pain, knee effusion and hemarthrosis following a sports accident. Peripheral neurovascular examination and search for compartment syndrome must be systematic.

AP, lateral and oblique radiographs views are sufficient to make the diagnosis and establish the classification. Stress images and MRI can be used in case of doubt [5].

Most fractures concerning the proximal tibial physis result in anterior, anterolateral and anteromedial epiphysis displacement relative to the metaphysis. In the rare fracture with posterior displacement, the epiphysis and tubercle apophysis are displaced as a single unit.

Physeal fractures of the proximal tibia are classified according to Salter-Harris classification. Fractures type II are the most frequent with about 40% of cases [6], while the fractures of the type V are much rarer, their diagnosis being the most of the time delayed [7].

Proximal physeal fractures can also be classified based on the mechanism of injury: varus/valgus, extension and flexion avulsion injuries.

The goals of treatment are to obtain an anatomical reduction and maintain it without creating additional lesions of the physis.

Closed reduction and immobilization by a long-leg cast for 4 to 6 weeks is best reserved for non-displaced Salter-Harris type I and type II fractures. If the reduction is unstable or in case of type III and IV fractures: closed reduction and percutaneous fixation is performed preserving the growth cartilage. However, at less displacement, it seems safer to carry out open reduction in order to have a reduction as anatomically as possible [8].

Whatever the type of fracture or the type of treatment chosen, the patient should be monitored for at least 48 hours looking for a vascular deficit and / or a compartmental syndrome [5].

The most serious complication is the damage of the popliteal artery, which occurs in 3 to 10% of cases [9]. In about 50% of cases, there is a ligament lesion [10]. Growth disturbances only occur in 10 to 20% of cases because this fractures usually only occur in adolescents towards the end of growth [5, 9].

CONCLUSION

Despite the fact that trauma of the knee occurs frequently, the epiphyseal detachments of the upper extremity of the tibia are rare. It seems essential to properly diagnose the fracture, to assess the possible immediate complications like vascular deficit, and to have an anatomical reduction of the fracture to avoid long-term complications. The unpredictability of epiphyseal detachment fractures impose a long-term monitoring, until the end of growth.

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