



Spontaneous avulsion fractures of the tibial tuberosity in adolescents. Case report and reviewer of literature

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ABSTRACT

We report a particular case of a rare entity knee trauma in adolescents. It is spontaneous avulsion fracture of the tibial tuberosity, which occurred in a girl of 16, after a blunt trauma in his right knee during a basketball game. We treated surgically by surgical fixation with good clinical and radiological evolution.

Key words: tibial tuberosity; avulsion; surgical fixation.

INTRODUCTION

Avulsion fracture of the tibial tuberosity adolescent trauma is a rare lesion [1-2], it is accompanied by a rupture of the extensor mechanism of the knee. This disease entity is a tear of the anterior tibial tuberosity in adolescents at the end of growth, at that weak area. The aim of our study was to report a case that illustrates this very rare disease entity in a girl of 16, following a sports injury. Through this observation we will make a general presentation and our personal experience with a general review of the literature emphasizing the interest of early treatment with a stable internal fixation at the end of a stable knee, painless, mobile with satisfactory functional results.

MATERIALS AND METHODS

DA miss, aged 16, without significant medical history, a student occupation, recreational sports (basketball). She suffered a sports injury, who presented sudden pain during sudden transition from squatting to standing, throwing the ball. Examination of Musculoskeletal objectified a swollen knee pain mobilization during active knee extension with bruise next to the tibial tuberosity. The vascular and neurological assessment foot found no detectable lesion. The radiological assessment performed initially in emergency showed a fracture - avulsion of the tibial tuberosity with a large displacement classified Type III A of Ogden) and a high localization of the patella (Figure 1). The patient initially benefited emergency analgesic action by medical treatment and immobilization with a simple splint posterior knee-ankle-pedal.

Surgical Technique **:

The surgical procedure was performed under local anesthesia and pneumatic tourniquet the limb. Under spinal anesthesia. An induction antibiotic prophylaxis. The patient was installed on the

regular table in the supine position. We performed a median surgical approach. Careful dissection of the subcutaneous tissue and fascia with hemostasis. The opening of the periosteum which allowed to discover a fracture. The bone fragment is drawn up by the patellar tendon without articular fracture or rupture of the patellar tendon. The reduction is obtained after cleaning and temporary fixation with two pins kirschner. The final stabilization is provided by a cortical screw (4.5mm) (Figure 2). The additional capital is achieved by a brace knee-ankle-pedal walking for 4 weeks.

The removal of the screw performed after 2 months postoperatively. At 8 months of decline, the functional outcome was satisfactory with good quadriceps strength and a full recovery of mobility of the knee in flexion-extension with indolence. The patient was able to resume daily activities and sports. The radiograph showed no bone abnormalities.

RESULTS AND DISCUSSION

Traumatic pathology of the knee is common in everyday practice of trauma emergencies. The rupture of the extensor apparatus in adults are frequently encountered in clinical practice of orthopedic surgery. The total cutaways of the tibial tuberosity is a clinical variety of rupture of the extensor apparatus in adolescents. In the pediatric general population, avulsion fractures of the tibial tuberosity are rare. These fractures account for about 3% of the proximal tibial fractures and less than 1% of all epiphyseal fractures [1-2]. The incidence compared to all the epiphyseal fractures has been reported from 0.4 to 2.7% [1]. The anterior tibial tuberosity fractures often occur in young athletes with strong muscles of the quadriceps muscle, which leads to an avulsion of the tibial tuberosity after a sudden and excessive contraction of the quadriceps muscle. [3]

The anatomical and radiological feature of the tibial tuberosity in adolescents can lead to ignorance of its trauma hence the need for careful clinical examination and radiographic comparative except in obvious clinical pictures (IIB, III and IV). We have conducted extensive research on Medline, PubMed and databases computerized electronic journals specializing in trauma and orthopedic surgery, orthopedic trauma on newspapers until February 2014. We used keywords, title, abstract about our question. Thus, about 97 cases of avulsion fracture of the tibial tuberosity is described (all types) including eight bilateral publications.

The diagnosis of knee injuries in adolescents is based on good knowledge of anatomy bone lesions at this age, and good radiological analysis sometimes requires the use of additional imaging methods such as CT with three-dimensional reconstruction. The classification of avulsion of the anterior tibial tuberosity has evolved over the years. All classifications are based on the original classification of Watson-Jones [4]. Type I is an avulsion of the small portion of the tibial tubercle. Type II extends over the whole of the anterior tibial tuberosity across the epiphyseal plate, but does not involve the articular surface. Type III is similar to the type II, but an extension of the fracture occurs and enters the joint. Ogden [5] added A and B each type to indicate the displacement and comminution. Type C was added later by Frankl et al. [6] through two observations for entities: tearing of the anterior tibial tuberosity with section of the patellar ligament. Moreover, Ryu et al. [7] described the type IV, which is the full participation of the tibial epiphysis. Finally, Type V was described by Mckoy et al [8] as a combination of two types IIB and IV formed fracture 'Y' (Figure 3).

The goal of surgery is to restore the knee extension function and obtain a normal location of the ball which is generally patella Alta. And several surgical attachment methods are described: staples, cortical or cancellous screws, metal straps. We weigh the fixation cortical screw and washer provides better stability torn bone fragment and a perfect anatomical reduction, which allows a normal height of the patella. Biomechanically it allows better compression during knee flexion and allowed early mobilization of joint. Other authors believe that this technique is not always possible

if the comminution of the anterior tibial tuberosity where associated direct pinout interest has metal strapping. [9] A number of complications are described including gene has the tibial tuberosity, laxity stage I see ACL anterior instability of the knee, the patellar tendon calcification [1] residual .l'insensibilité of the skin area next to the tibial tuberosity after a section of the sensory branch of the saphenous nerve during the surgical approach remains a classic complication of this surgical approach. Furthermore, the premature fusion of the epiphyseal plate has indeed minimal morphological impact because growth is almost complete maturation stage or occurring these lesions [10].

Overall, at last follow our functional and radiological results were satisfactory after a rehabilitation conducted respecting the particularities of this articulation of the lower limb. Our results are congruent with those of the various authors published in the literature, with minimal complications, with excellent final functional results. Thus, this surgical method remains our view excellent technical treatment avulsion fractures of the tibial tuberosity.

CONCLUSION

Avulsion of the tibial tuberosity fractures lead to a rupture of the extensor mechanism of the knee. It occurs when a knee injury whose sudden distraction mechanism cartilage croissance.les displaced avulsion of the tibial tuberosity of the knee required surgical fixation for anatomic and functional restoration of the knee.

Conflicts of interest

The authors declare no conflict of interest.

Author Contributions

All authors contributed to the realization of this work. The authors also read and approved the final manuscript.



Figure 1: front knee radiography and profile showing an avulsion of the tibial tuberosity.



Figure 2: Surgical fixation avulsion of the tibial tuberosity of a screw

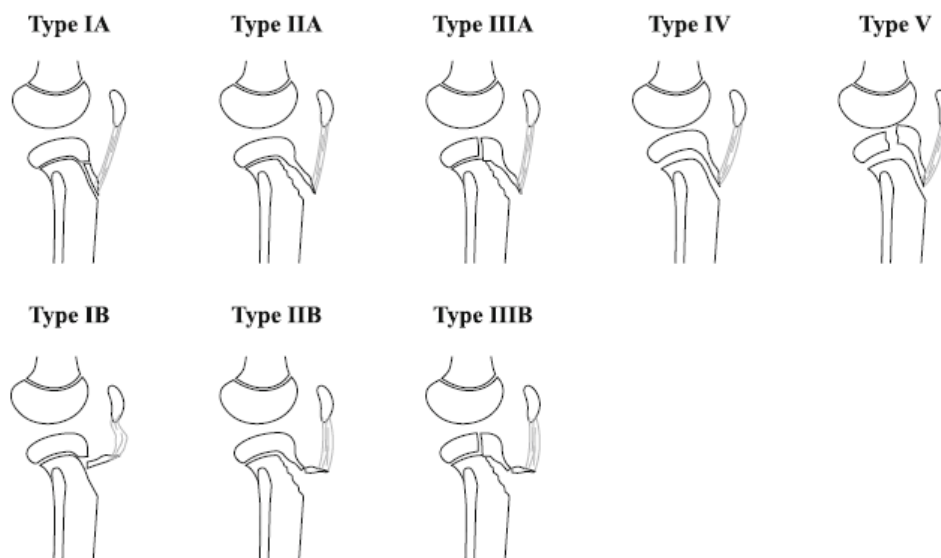


Figure 3: avulsion fractures of the Classification of the tibial tuberosity [5-8]

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