East African Scholars Journal of Medicine and Surgery
Abbreviated Key Title: EAS J Med Surg
ISSN: 2663-1857 (Print) & ISSN: 2663-7332 (Online)
Published By East African Scholars Publisher, Kenya

Volume-5 | Issue-10 | Nov-2023 | DOI: 10.36349/easjms.2023.v05i10.009

OPEN ACCESS

Case Report

A Rare Case of Tibial Tubercle Avulsion Associated with Patella Fracture

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Article History
Received: 08.09.2023
Accepted: 14.10.2023
Published: 29.11.2023

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: Tibial tubercle avulsion fracture is a rare injury in adolescents; its association with a patella fracture is exceptional. This current case report describes an 10-year-old boy admitted to the department of pediatric orthopaedic surgery for a left knee trauma. X-ray showed a displaced fracture of the tibial tubercle associated with a fracture of the patella, the sciatic nerve, and the fibrous band. We performed a surgical reduction of the tibial fragment with two cancellous screws and tension band wiring of the patellar fragment.

Keywords: Knee trauma; Child; Tibial tuberosity avulsion; Patella fracture; Rare association.

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INTRODUCTION

Tibial tuberosity avulsion fracture is a rare injury in adolescents, its association with a patella fracture is exceptional, and no case has been described in the literature. The mechanism of injury is twofold: a sudden tension of the patellar tendon associated with a direct impact of the patella. The treatment, as in our case, is surgical for displaced forms.

CASE PRESENTATION

A 10 year old boy, fall from his height during a run with direct impact on the left knee associated with a sudden contraction of the quadriceps. He described feeling his knee buckle and hearing a loud “crack” with immediate pain, swelling, and inability to ambulate. The left tibial tubercle was swollen and tender to palpation, with deficit of active and passive extension of the knee, the vascular-nervous examination is normal. X-ray demonstrated a displaced fracture of the tibial tubercle consistent with an Ogden Type IB associated with a fracture of the patella. We completed the imaging with a CT scan of the left knee with 3D reconstruction to better study the fracture line, and mainly to confirm the presence of an associated patella fracture (fig 1). Treatment consisted of surgical reduction of the tibial fragment with two cancellous screws and tension band wiring of the patellar fragment with a vertical medial approach and immobilization (fig 2).

Figure 1: X-ray showing fracture of the tibial tubercle (A), Reconstruction with 3d scan showing the association of the two fractures (B).

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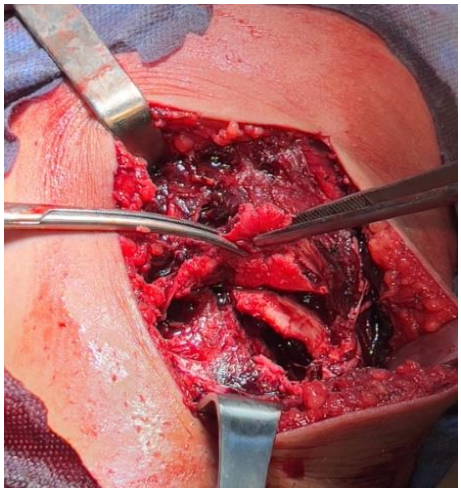

Figure 2: Intraoperative image objectifying the fragment of tibial tubercle

Figure 3: Post operative radiograph showing perfect reduction with osteosynthesis

Figure 4: Picture showing the radiological outcome after 3 months (consolidation completed)

The patient was declared discharged at day 4 with antibiotic therapy. Partial support authorized after 2 months of immobilization. After 3 months, the patient resumed walking with a slight stiffness of the knee, and physical therapy sessions for flexibility were started.

DISCUSSION

Patella fractures are rare in children, as are avulsion fractures of the anterior tibial tuberosity, few cases are reported in the literature [1, 2], and their association is exceptional. Usually, the mechanism of injury for these two fractures is a sudden tensioning of the patellar tendon associated with a direct impact on the patella, and sport is the main circumstance of occurrence. It mainly affects boys, between 14 and 17 years of age [3], because of the structural changes of this apophyseal zone before its closure. Proper diagnosis requires a detailed history, pertinent physical examination findings and radiographic findings [4]. The description of tibial tuberosity fractures involves bone displacement. Ogden describes three types. Ryu and Debenham proposed a type IV, which corresponds to an extension of the fracture line into the posterior cortex (corresponding to Salter type II). Frankl et al. introduced in 1990 the description of a type C in connection with the existence of a distal avulsion of the patellar tendon associated with a fracture of the tibial tuberosity furthermore the patella fracture, it can be classified into 3 categories: full body fractures, avulsion fractures of the proximal pole with ripping of the insertion of the quadricipital tendon, and fractures of the lower pole or Sleeves fractures detaching the entire lower pole of the patella.

The most common bone fracture is the transverse fracture, although vertical fractures can be seen. In non-displaced fractures, treatment may be orthopedic, displaced fractures are always treated surgically, as in our case, by screwing the tibial tuberosity and tension band wiring the patella. A joint fracture should be treated anatomically. We used an anterior approach for our patient. The anterior surgical approach allows perfect reduction of the bone fragments by lifting the periosteal flap, which is very frequently incarcerated in the fracture site [5]. It also allows exploration of the joint and treatment of associated injuries, especially the patellar ligament. On the other hand, the use of a lateral parapatellar approach is recommended by other authors in order to avoid sectioning the infra-patellar nerve and thus infra-patellar hypoesthesia. In this case, a high suspicion during initial workup resulted in prompt diagnosis and treatment. Timely treatment is important in mitigating extensor mechanism dysfunction due to callous formation or tendon tissue retraction [5]. The results reported in the literature remain good overall [6, 7]. Mobility is recovered regardless of the method of fixation or immobilization. Rarely, growth disorders such as knee recurvatum may occur [7, 8].

CONCLUSION

Tibial tubercle avulsion fracture is a rare injury in adolescents; its association with a patella fracture is exceptional. Radiological diagnosis must be precise, to lead to appropriate treatment. A Reconstruction with 3d

scan, can help formulate preoperative plan. Surgical treatment must be done quickly for displaced fractures.

Patient consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

Funding

No funding or grant support.

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Abbreviations

CT scan: Computerized tomography scan.

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Cite This Article: Mohamed Amine Oukhouya, Hind Cherrabi, Mohamed Taha Mellouki, Mohamed Oussama Azhary, Fatima Smahi, Kamal Elghazi1, Badr Bouamri (2023). A Rare Case of Tibial Tubercle Avulsion Associated with Patella Fracture. *East African Scholars J Med Surg*, *5*(10), 236-238.