BAOJ Orthopedics

Lawson E, et al., BAOJ Ortho 2017 2: 3
2: 018

Case Report

Nonunion of Neglected Medial Tibial Plateau Fracture. About a Case and Literature Review

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Abstract

Nonunion of medial tibial plateau is an uncommon complication which occurs after management of fracture. Its treatment is controversial. Its can occur after surgical or orthopaedic management. We report a case of an exceptional nonunion of untreated/neglected medial tibial plateau fracture in a 45 years old man. This injury was managed surgically with osseous decortications and osteosynthesis with a T shape plate. Union was achieved in Three months. Anatomic and functional results were good at two years follow-up. After discuss frequency and physiopathology of this injury, we make a literature review according to incidence, mechanism of occurrence, treatment options and outcomes.

Key Words: Neglected; Nonunion; Tibial Plateau Fracture

Introduction

Nonunion is a rare complication of epiphyseal fractures, mainly those of tibial plateau [1]. Tibial plateau nonunions are uncommon due to the relatively large appositional cancellous bone, as well as the cross sectional area and abundant blood supply of the proximal tibia [2]. It often occurs after a high-energy metadiaphyseal displaced fractures, metaphyseal proximal tibial osteotomies not well-executed or after infection complicating fractures. It can occur after an orthopedic or surgical management.

Review of literature raveled only few cases of published nonunion of intra-articular tibial plateau fracture and majority occurred after a failed surgical management [3-5]. According to our knowledge, there is only one published study about a case series of three patients with a neglected medial tibial plateau fracture nonunion [6].

The aim of this study was to report a case of an exceptional nonunion of neglected medial tibial plateau fracture managed surgically with satisfactory anatomic and functional results at two years follow-up, and to make the literature review of this injury, through its incidence, mechanism of occurrence, therapeutic options and results of its management.

Case Report

G. E., is 45 years old man who presented in our department in May 2015 for pain on the right knee since 7 months and 2 weeks, associated to a knee laxity after a road traffic accident. The patient would have lost the control of his motor with a direct impact on the medial face of the knee in February 2014. A fracture of medial tibial plateau was diagnosed but he refused to be treated. Any immobilization of the knee was done. The patient had started to walk after disappearance of pains.

Physical examination noted a genu varum deformity with an intermalleolar distance of 3 centimeters. The Lachman-Trillat test was negative. X ray of knee **(figure 1)** showed an old Cleavage fracture of the right medial tibial plateau type IV of Schatzker [7]. There is besides a fracture of the tibial spine which correspond to anterior cruciate ligament injury and a beginning gonarthrosis.

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Sub Date: November 8th, 2017, **Acc Date:** December 28th, 2017, **Pub Date:** December 28th, 2017.

Citation: Lawson E, Tidjani I F, Chigblo P, Padonou A, Amossou F, Agavoedo G and Hans-Moevi Akué A (2017) Nonunion of Neglected Medial Tibial Plateau Fracture. About a Case and Literature Review. BAOJ Ortho 2: 018.

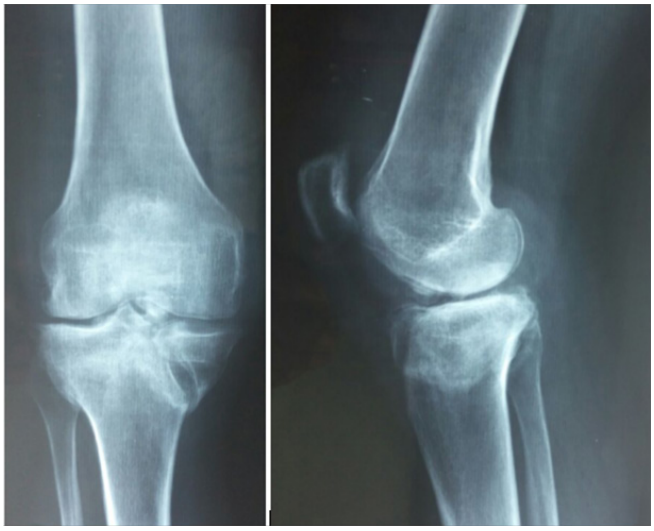

Figure 1: preoperative frontal and sagittal knee radiography

The patient was operated in September 2015 for the cure of the nonunion. By an antéro-medial approach of the knee according to Gernez, the medial proximal tibia was exposed. After refresh of fracture extremities and reduction, stabilization was performed with a T shape plate. A bone grafting has not been done. Similarly, no gestures were made for the tibial spine fracture. Evolution was favorable. Radiographs showed a satisfactory reduction **(Figure 2)**.

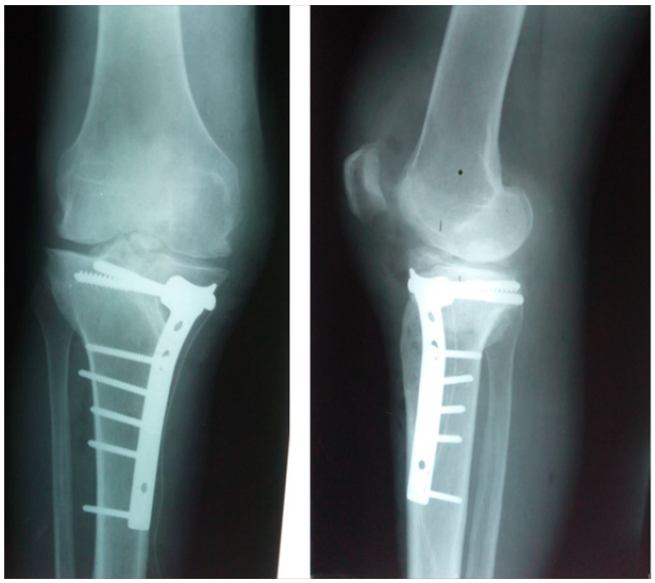

Figure 2: postoperative frontal and sagittal radiography

A kinesitherapy protocol was performed for 4 months. Partial weight bearing was allowed on the 60th post operative day. At the 90th postoperative day, the consolidation allowed total weight bearing. At two years follow-up, the patient experienced no pain. There was no instability in frontal and sagittal planes **(Figure 3)**. The articular movements of the knee were: flexion: 120 °; extension: 0 °. IKS (International Knee Score) knee score was 95/100 [8]. Functionally, walking was normal without any help, as was the ascent and descent of stairs. The patient went to his former activities and the IKS functional score was 100/100 [8]. The overall IKS score was 195/200 [8].

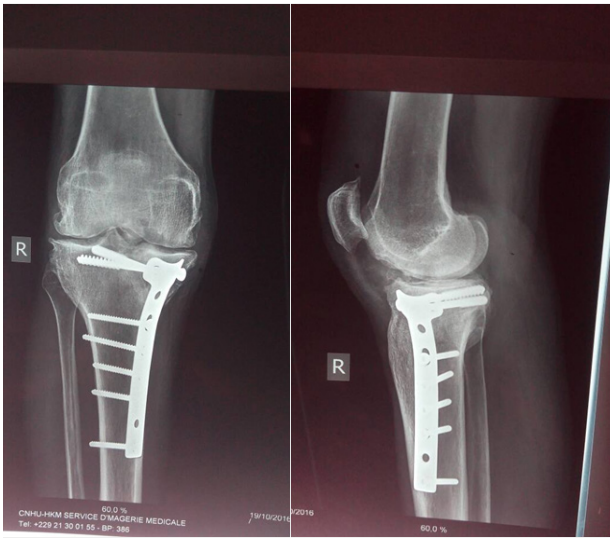

Figure 3: frontal and sagittal knee radiography at one year follow-up.

Discussion

Incidence

Nonunion of tibial plateau fracture is an uncommon clinical entity. Literature studies on proximal tibia fractures reports nonunion rates between 0 and 3% [9-10]. It is difficult to adequately determine incidence of nonunion of tibial plateau fracture after surgically or conservatively treatment. Moore et al. [11] reporting a study on 988 tibial plateau fractures, found 1 case (0.1%) of metaphyseal nonunion. Schatzker et al. [3] reported a case of displaced bicondylar plateau fracture with conservative management that evolve to nonunion. Toro-Arbelaez et al. [5] reported a case series of five nonunions after failed open reduction and internal fixations. Sen et al. [12] reported 4 different profile cases of intraarticular tibial plateau non-union treated with 4 different methods. Blokker et al. [13] reported 2 cases (0.03%) in a serie of 60 fractures with no more additional details.

Mechanism of Occurrence

Nonunion of the tibial plateau is a very rare lesion [6, 8,9]. This is explained by the rich vascularization of this epiphyseal zone [2]. The known risk

factors for this nonunion are: a high energy injury with complex fracture (Schatzker IV, V, VI), associated soft tissue damage and dévascularisation following high energy mechanism, infection, metaphyseal extension of the fracture and the surgical treatment, especially when a double approach is performed.

Most of the series that cited this complication describe it after surgical management [5,9,14]. The presence of an interfragmentary gap after this management is incriminated [6]. The rarity of our report is that nonunion occurred following a neglected medial tibial plateau fracture. In literature we have found only one study of Devgan et al. [6] reporting three cases of untreated/neglected medial tibial plateau nonunion.

Tibial plateau nonunion may be the natural evolution of a neglected fracture, and it is often a fracture of the medial tibial plateau as was the case in our patient. In these cases, it is the early weight bearing without any immobilization which would induce permanent shearing forces on the fracture, thus favoring nonunion.

In our case, we can advance that lack of immobilization following fracture occurrence would be the reason behind nonunion. Indeed, it was about a case of medial tibia plateau fracture with anterior medial spine injury. This explains the lack of stability of the fracture without immobilization. And that fact leads this case to nonunion, which was unavoidable.

Unlike the sub-diagnosis of fracture evolving towards nonunion because of minimal trauma, it is the opposition to an initial management which is incriminated in our case. The nonunion can be accompanied by associated injuries. In our case, a fracture of the tibial spine corresponding to a injury of anterior cruciate ligament was found, associated to a beginning arthrosis in evolution.

Treatment and Results

The treatment of the tibial plateau nonunion is controversial; some authors advocate a refresh of the extremities of the fracture, a bone grafting and a fixation by an epiphyseal plate [14]. Others are satisfied with a realignment of the lower limb axis by an osteotomy and a screw-up on the fracture [6]. In our case, we preferred the first therapeutic conduct without a bone grafting. Indeed, the tibial plateau are well vascularized, and once the shearing forces have been neutralized by the reduction and osteosynthesis, the fracture has consolidated well, like a new fracture. The fracture of the tibial spine had no repercussions on the knee's stability. However, its intra-articular location could accelerate the arthrosis process [6,8,9]. This arthrosis should be treat effectively in order to lengthen the time before arthroplasty.

Conclusion

Nonunion of the tibial plateau are uncommon. They can occur even on simple but neglected fractures. The management by fixation with an epiphyseal plate after refresh of extremities and reduction is possible and gives good radiological and functional results.

Compliance with Ethical Standards

Ethical approval: This article does not contain any studies with animals performed by any of the authors.

Informed consent: Informed consent was obtained from the patient included in the study.

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