

TIBIAL PLAFOND FRACTURES. INCIDENCE AND CASE ANALYSIS FOR A 2 YEAR SURVEY

B. PUHA¹, A. B. CIUBARĂ²

¹Phd "Gr. T. Popa" University of Medicine and Pharmacy of Iași, ²Emergency Clinic Hospital of Iași

Keywords: tibial plafond, classification, external fixator

Abstract: We have statistically analyzed and clinically investigated 36 patients, admitted in the Orthopedics and Traumatology Department in Emergency Hospital in Iasi, Romania, for fractures of the tibial plafond, for a two-year period, between 01.05.2004 – 31.03.2006. Descriptive statistics shown that most of the patients (25 cases, 70%) derive from rural areas, which shows a good addressability to our Orthopedic services and also a good field orientation for nursing staff. Age distribution among investigated patients showed that most of them (16 patients, 44,44%) were included in the group of 30-39 years of age, while only 4,11% were under 29 or over 50 years. Males were most involved in this type of pathology (24 cases, 66%), while only 12 female patients were considered during our study. Patients with comminutive or displaced fractures type II or III (24 cases) were submitted to anatomic reduction and internal fixation. 17 of these cases associated fibula fractures, treated by 1/3 tubular plate on the external malleolus. The 12 cases of type I fractures were subject to closed reduction under radiologic control and fixation by nails or transmaleolar screws. Eight patients with open fractures required external fixation; 65% cases showed a good progression. For type III fractures (10 cases), half of the cases showed a favorable prognostic while the other half showed an unsatisfactory evolution. The most frequent complications were: infections on the fixation nails, osteosynthesis implant rejection (3 cases – requiring implant removal), failure of the fibular plate (1 case) and pseudarthrosis.

Cuvinte cheie: pilon tibial, clasificare, fixator extern

Rezumat: Am realizat analiza statistică și clinică pentru 36 de pacienți internați în perioada 01.05.2004 – 31.03.2006, în Clinica de Ortopedie a Spitalului Clinic de Urgente Iași, pentru fracturi de pilon tibial. Analiza statistică descriptivă a demonstrat că majoritatea pacienților (25 cazuri, 70%) provin din zone rurale, ceea ce demonstrează o bună adresabilitate în serviciul Ortopedie – Traumatologie a Spitalului de Urgente Iași, precum și o recunoaștere a afecțiunii și orientare în teren a primului echipaj medical. Distribuția pe vârste între pacienții investigați a arătat că majoritatea acestora (16 cazuri, 44,44%) aparțineau grupei de vârstă 30-39 ani, în timp ce numai 4,11% au avut sub 29 ani sau peste 50 ani. Pacienții de sex masculin au predominat în această patologie (24 cazuri, 66%), în timp ce numai 12 paciente au fost incluse în studiu. Pacienții cu fracturi cominutive sau deplasate de tip II sau III (în număr de 24) au beneficiat de reducere sângerândă și fixare internă. Dintre acestea, 17 cazuri au asociat fractura de peroneu care a fost fixată cu placa 1/3 de tub. Pacienții cu fracturi de tip I (12 cazuri) au beneficiat de reducere ortopedică sub control radiologic și fixare cu broșe sau șuruburi transmaleolare. 8 pacienți cu fracturi deschise au necesitat fixator extern, dintre care pentru 2 cazuri complicate cu infecție s-a recurs la amputație de necesitate. Din cele 14 cazuri de fracturi de tip II, 65% au avut o evoluție foarte bună (9 cazuri) iar restul de 35% o evoluție satisfăcătoare. În cazul fracturilor de tip III (10 cazuri) s-a observat o evoluție bună la 5 pacienți și nesatisfăcătoare la celelalte 5 cazuri. Cele mai frecvente complicații au fost: 1. infecțiile traectelor broșelor de fixare (mai ales în fracturile de tip II); 2. intoleranța la materialul de osteosinteză (3 cazuri) care a necesitat ablația acestuia. 3. ruptura plăcii peroniere (1 caz); 4. pseudartroza.

INTRODUCTION

Tibial plafond fractures represent infrequent incidents in orthopaedic practice, accounting for 7-10% of all tibial fractures. (1) However, their incidence and variance into the general population that is addressing Iasi Orthopaedic services, allowed us to perform an analytical and clinical study regarding these fractures.

The term pilon (hammer) fracture was introduced to describe these compression injuries by Destot in 1911. (2) These fractures are consecutive to high-energy trauma and show significant bone and soft tissue damage. They are also called "explosion fractures". (3)

Fractures classification was considered according to Ruedi and Allgower: Type I: Little or no articular displacement; Type II: Displacement of the articular surface, without comminution; Type C: Intra-articular displacement occurs with marked comminution and/or impaction. (4)

Clinical aspects regarding tibial plafond fractures include pain, swelling, deformity, and crepitus about the ankle, together with the weight bearing inability. (3, 5, 6) Vascular and neurological examination should be performed. Multi-angle radiographs and CT imaging are required for an accurate diagnosis. (7) Significant soft tissue damage is involved in many tibial plafond fractures. Simultaneously, fractures of the foot, tibial shaft, or fibular fractures should be evaluated together

¹Corresponding Author: B. Ciubara, 7, Rufeni street, Iași, România; e-mail: abciubara@yahoo.com; tel +40-0744212518
Article received on 28.05.2011 and accepted for publication on 24.10.2011
ACTA MEDICA TRANSILVANICA December 2011; 2(4)265-267

CLINICAL ASPECTS

with an evaluation of the knee joint.(8) Radiologic examination includes the foot, ankle, tibia, and the knee. Traction radiographic views in anteroposterior and lateral planes, as well as contralateral ankle radiographs may be useful. (9, 10)

Treatment of the tibial plafond fractures should reestablish articular congruity, stable fixation of the metaphysis to the diaphysis with acceptable alignment and complications avoidance, together with fast functional rehabilitation. (11, 12).

The aim of this work is to perform a statistical analysis and clinical surveillance, including complications, for special cases of tibial plafond fractures, treated in the Orthopedics and Traumatology Department in Emergency Hospital in Iasi, Romania.

MATERIAL AND METHOD

We have statistically analyzed and clinically investigated 36 patients, admitted in the Orthopedics and Traumatology Department in Emergency Hospital in Iasi, Romania, for fractures of the tibial plafond, for a two-year period, between 01.05.2004 – 31.03.2006.

RESULTS

Descriptive statistics shown that most of the patients (25 cases, 70%) derive from rural areas, which shows a good addressability to our Orthopedic services and also a good field orientation for nursing staff. Age distribution among investigated patients showed that most of them (16 patients, 44,44%) were included in the group of 30-39 years of age, while only 4,11% were under 29 or over 50 years. Males were most involved in this type of pathology (24 cases, 66%), while only 12 female patients were considered during our study.

Most of the fractures were produced due to falling from heights injuries and rarely to traffic accidents.

According to the fracture type, we have observed a dominance of the closed fractures (26 cases, 72%) compared to a reduced incidence for open fractures (10 cases, 28%). Case follow-up lasted for a range between 3 months and 2 years. For fractures classification we have used Ruedi and Allgower criteria and we have observed a rather uniform distribution for the three fracture types. Most frequent fractures were of type II (14 cases, 39%), followed by type I fractures (12 cases, 33%) and type III fractures (10 cases, 28%).

Case peculiarities

Figure no.1. Comminutive fracture of the tibial plafond, type III. (A) Initial RX aspect, at hospital admission; (B) Surgical treatment by external fixator, plate with screws fixed on fibula, and X tibial nails; (C) Control X-ray at 90 days; (D) Control X-ray at 120 days



The first case we are presenting here is a male patient of 44 years of age, admitted and diagnosed with comminutive fracture of the tibial plafond, type III, according to Ruedi and Allgower classification (fig.1A). The surgical orthopedic treatment consisted in application of an external fixator, together with a plate with screws fixed on the fibula and X tibial nails.

The second case is that of a male patient of 30 years of age. He was admitted in our department and diagnosed with a type I fracture of the tibial plafond, according to Ruedi and Allgower classification (fig. 2A). He was treated by anatomical reduction, plate fixation by 1/3 tube plate on the external malleolus, closed reduction under radiologic control and external monopolar, monopolar fixation (fig. 2B).

The third case is that of a male patient of 49 years of age. He was admitted in our department and diagnosed with a comminutive fracture of the left tibial plafond, according to Ruedi and Allgower classification (fig. 3A). He was treated by the application of an external monopolar fixator and plate osteosynthesis by 1/3 tubular plate on external malleolus (fig. 3B).

Figure no. 2. Type II fracture of the tibial plafond. (A) Initial RX aspect, at hospital admission; (B) X-ray control at 60 days; (C) X-ray control at 80 days; (D) X-ray control at 3 months; (E) X-ray control at 80 days

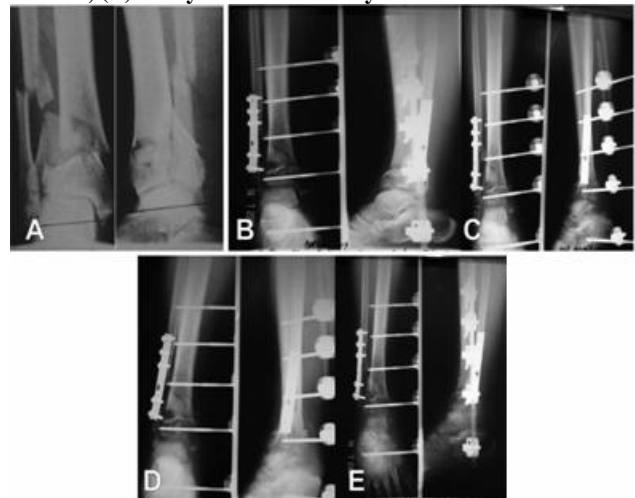
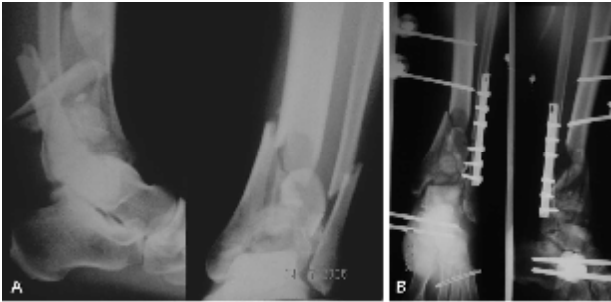


Figure no. 3. Comminutive fracture of the tibial plafond. (A) Initial RX aspect, at hospital admission; (B) Surgical

CLINICAL ASPECTS

treatment by external fixator and 1/3 tubular plate on external malleolus



The fourth case is that of a male patient of 43 years age. He was admitted in our department and diagnosed with a comminutive fracture of the right tibial plafond, according to Ruedi and Allgower classification (fig. 4A). He was treated by anatomical reduction, plate osteosynthesis by 1/3 tubular plate on external malleolus, and two transmaleolar X-nails and two trans-fibular-tibial screws (fig. 4B).

Figure no. 4. Comminutive fracture of the tibial plafond. (A) Initial RX aspect, at hospital admission; (B) Postoperative X-ray; (C) 1/3 tubular plate on external malleolus, two trans-fibular-tibial screws, X-ray at 30 days postoperatively; (D) X-ray at 60 days postoperatively; (E) X-ray at 90 days postoperatively – broken fibular plate, and pseudarthrosis; (F) X-ray at 120 days postoperatively, pseudarthrosis treatment, fibular plate replacement and external fixator.



DISCUSSIONS AND CONCLUSIONS

We have investigated 36 patients with various fractures of the tibial plafond, admitted in the Orthopedics and Traumatology Department in Emergency Hospital in Iasi, Romania, for fractures of the tibial plafond, for a two-year period, between 01.05.2004 – 31.03.2006. Patients with comminutive or displaced fractures type II or III (24 cases) were submitted to anatomic reduction and internal fixation. 17 of these cases associated fibula fractures, treated by 1/3 tubular plate on external malleolus. The 12 cases of type I fracture were subject to closed reduction under radiologic control and fixation by nails or transmaleolar screws. Eight patients with open fractures required external fixation; 2 cases were complicated by

severe infections that led to amputation. However, 65% cases showed a good progression. For type III fractures (10 cases), half of the cases showed a favorable prognostic while the other half showed an unsatisfactory evolution. The most frequent complications were: infections on the fixation nails, osteosynthesis implant rejection (3 cases – requiring implant removal), failure of the fibular plate (1 case) and pseudarthrosis.

BIBLIOGRAPHY

1. Barei DP, Nork SE. Fractures of the tibial plafond. *Foot Ankle Clin.* 2008;13(4):571-91.
2. Marsh JL, Borrelli J, Jr., Dirschl DR, Sirkin MS. Fractures of the tibial plafond. *Instr Course Lect.* 2007;56:331-52.
3. Germann CA, Perron AD, Sweeney TW, Miller MD, Brady WJ. Orthopedic pitfalls in the ED: tibial plafond fractures. *Am J Emerg Med.* 2005;23(3):357-62.
4. Dirschl DR, Ferry ST. Reliability of classification of fractures of the tibial plafond according to a rank-order method. *J Trauma.* 2006;61(6):1463-6.
5. Buchler L, Tannast M, Bonel HM, Weber M. Reliability of radiologic assessment of the fracture anatomy at the posterior tibial plafond in malleolar fractures. *J Orthop Trauma.* 2009; 23(3):208-12.
6. Marsh JL, Weigel DP, Dirschl DR. Tibial plafond fractures. How do these ankles function over time? *J Bone Joint Surg Am.* 2003;85-A(2):287-95.
7. LeBus GF, Collinge C. Vascular abnormalities as assessed with CT angiography in high-energy tibial plafond fractures. *J Orthop Trauma.* 2008;22(1):16-22.
8. Brumback RJ, McGarvey WC. Fractures of the tibial plafond. Evolving treatment concepts for the pilon fracture. *Orthop Clin North Am.* 1995;26(2):273-85.
9. Bone LB. Fractures of the tibial plafond. The pilon fracture. *Orthop Clin North Am.* 1987;18(1):95-104.
10. Ovidia DN, Beals RK. Fractures of the tibial plafond. *J Bone Joint Surg Am.* 1986; 68(4):543-51.
11. Marsh JL, McKinley T, Dirschl D, Pick A, Haft G, Anderson DD, et al. The sequential recovery of health status after tibial plafond fractures. *J Orthop Trauma.* 2010;24(8):499-504.
12. Hutson JJ, Jr. Outcomes after treatment of high-energy tibial plafond fractures. *J Bone Joint Surg Am.* 2004;86-A(8):1827.