

Clinical and Radiographic Predictors of Acute Compartment Syndrome in Tibial Plateau

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Purpose: The aim of this study was to retrospectively evaluate the relationship between epidemiological, clinical, and radiographic factors of patients with tibial plateau fractures and the development of acute compartment syndrome.

Methods: 265 adult patients sustaining 269 intra-articular tibial plateau fractures between January 2005 and December 2009 were included in this retrospective cohort study. The outcome measure was acute compartment syndrome, which was clinically diagnosed. Patient-related (age, sex), fracture-related (mechanism of injury, closed vs open fracture), and radiological parameters (AO/OTA and Schatzker classifications, presence or absence of a noncontiguous tibial shaft or pilon fracture or knee dislocation, tibial widening ratio, femoral displacement ratio, anatomical axis displacement direction) were evaluated regarding their potential association with acute compartment syndrome.

Results: Overall, acute compartment syndrome occurred in 28 (10.4%) of 269 tibial plateau fractures. Four patients presented bilateral tibial plateau fractures; of them, 2 had unilateral, but none had bilateral acute compartment syndrome. Univariate analysis showed that age <45 years ($P = 0.014$), male sex ($P = 0.011$), open fracture ($P = 0.015$), noncontiguous tibia fracture or knee dislocation ($P = 0.001$), higher Schatzker grade (IV-V-VI; $P < 0.001$), higher AO/OTA classification (type 41-C; $P < 0.001$), tibial widening ratio higher or equal to 1.05 ($P = 0.004$), and femoral displacement ratio higher or equal to 0.08 ($P = 0.015$) were all associated with an increased rate of acute compartment syndrome. Mechanism of injury other than fall from own height, and anatomical axis displacement direction were not associated with acute compartment syndrome. In multivariable regression analysis, the presence of a noncontiguous tibia fracture or knee dislocation ($P < 0.001$), and a higher AO/OTA classification ($P < 0.001$) remained statistically significantly associated with the development of acute compartment syndrome.

Conclusion: Two parameters related to the occurrence of acute compartment syndrome have been highlighted in this study. They may be especially useful when clinical findings are difficult to assess (doubtful clinical signs, obtunded, sedated or intubated patients). However, larger studies are mandatory to confirm and refine the prediction of compartment syndrome occurrence.