History of Tobacco Use and Diabetes Are Significantly Associated with Higher Postoperative Complication Rates in Bicondylar Tibial Plateau Fractures

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Purpose: Our objective was to evaluate the effect of baseline patient characteristics on outcomes in bicondylar tibial plateau fractures.

Methods: Adult patients who underwent open reduction and internal fixation of a bicondylar tibial plateau fracture (AO/OTA 41-C) between 2004 and 2020 at a large academic Level I trauma center were retrospectively identified. Postoperative complications including superficial surgical site infection (sSSI), deep SSI (dSSI), wound dehiscence (WD), osteomyelitis, nonunion, and reoperation rates to address wound complications were tallied. Baseline patient characteristics such as sex, smoking history, illicit drug use history, history of alcohol abuse, body mass index (BMI), and medical comorbidities were noted. Injury factors such as mechanism, open versus closed fracture, and polytrauma status were also tallied. A multivariate logistic regression was constructed to evaluate associations between baseline patient characteristics, injury factors, and complication rates.

Results: We identified 247 patients for inclusion in the study. Mean age was 50 ± 15 years, and mean BMI was 27 ± 8. Of these patients, 67 had a history of smoking, 30 had a history of alcohol abuse, 30 had a history of drug abuse, 29 had diabetes, and 41 had a history of peripheral vascular disease. 21 patients presented with an open fracture and 63 presented as a polytrauma. Mean time to surgery was 8 ± 8 days. 13 patients developed an sSSI, 21 developed a dSSI, 9 developed WD, 10 developed nonunion, and 14 developed postoperative osteomyelitis. Univariate logistic regression models relating tobacco to complications and diabetes to complications were significant for associations between tobacco/diabetes and development of sSSI, dSSI, and all complications. A multivariate logistic regression controlling for open fractures, tobacco use, drug abuse, sex, diabetes, polytrauma, and BMI revealed a significant association between tobacco use and dSSI ($P<0.01$). Tobacco use ($P<0.01$), diabetes ($P = 0.046$), sex ($P = 0.027$), and open fracture ($P = 0.03$) were significantly associated with greater risk of developing any soft-tissue infection. Diabetes ($P<0.01$), tobacco use ($P = 0.03$), and open fracture ($P = 0.04$) were all significantly associated with greater risk of all complications.

Conclusion: The unstable fracture pattern in bicondylar tibial plateau fractures and the extensive soft-tissue damage that often occurs in these injuries often results in high postoperative wound complication rates. This study demonstrated that tobacco use and diabetes are significantly associated with increased wound complications following operative management of these fractures. Providers should continue to counsel their patients regarding risk factor management and consider additional preemptive measures in this subset of patients to help improve postoperative outcomes.