

Incidence of and Factors Associated with Posttraumatic Osteoarthritis after Distal Femur Fracture

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INTRODUCTION:

The rate of and risk factors associated with posttraumatic osteoarthritis (PTOA) after periarticular fractures about the knee are poorly understood. These fractures pose a challenge for surgeons to minimize the risk of PTOA, especially in the middle- and younger-aged population, and previous literature has mostly focused on older patients. The goal of this study was to determine the incidence and risk factors associated with PTOA after distal femur fractures.

METHODS:

Retrospective chart and radiographic review was performed for all distal femur fractures that underwent operative fixation from 2013-2022 at a single tertiary referral center. Patients with minimum 1-year follow up were included. Radiographic review included evaluation of Orthopaedic Trauma Association (OTA) classification, Kellgren-Lawrence Classification (KLC) for osteoarthritis at initial presentation and final follow up, and presence of any articular step-off on immediate postoperative radiographs. Symptomatic PTOA diagnosis was defined as recurrent medial or lateral joint line pain regarded as posttraumatic in nature by the attending surgeon's clinic note, corticosteroid injection, or subsequent total knee arthroplasty (TKA). Chi-Square, Fisher exact test, and one-way ANOVA were used to compare groups where appropriate.

RESULTS:

A total of 150 patients were included with an average follow up of 3.42 years and average age of 52.5. Overall, 43.6% of patients had a diagnosis of PTOA. Demographic variables were similar between patients who did and did not have PTOA. Subsequent treatment for PTOA included 22.2% who obtained a corticosteroid injection and 7.6% who required a TKA. Average time to TKA was 3.27 years (SD 3.3) and this was significantly longer in patients with minor compared to severe radiographic PTOA on final follow up (7.53 vs. 2.54 years, $p=0.05$). Compared to extra-articular fractures, complete articular 33-C-type fractures had the highest mean increase in KLC grade between initial injury and final follow up (0.66 vs. 1.34, $p<0.001$) and significantly more developed symptomatic PTOA (34.0% vs. 51.5%, $p=0.041$). However, subsequent treatment for PTOA was similar between groups.

DISCUSSION AND CONCLUSION:

Rates of symptomatic and radiographically evident posttraumatic osteoarthritis following distal femur fractures remain high, primarily driven by complete articular fractures. However, subsequent treatment for PTOA is not necessarily dictated by fracture type, emphasizing the importance of the patient-physician relationship and individualized treatments plans for posttraumatic knee pain.