Pathoanatomy and Outcomes in Tibial Plateau Fractures with an Associated Tubercle Fragment

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INTRODUCTION: Tibial plateau fractures may have an associated tubercle fragment (TF). To our knowledge, there are no studies on surgical or clinical outcomes after fixation of TFs. The purpose of this study was to describe the pathoanatomy of the TF in tibial plateau fractures and to compare outcomes between patients with and without a TF.

METHODS: This was a retrospective study of patients >18 yo undergoing ORIF of a tibial plateau fracture at a Level I trauma center between 2011-2020. Patient demographics, fracture patterns, and surgical and radiographic outcomes were recorded. Patients were followed for $\geq$ 6 months or clinical and radiographic union. Univariate comparisons were conducted using Independent t-tests and Mann-Whitney U tests for continuous variables and Fisher Exact tests for categorical comparisons.

RESULTS:

A total of 237 patients were reviewed and 29 patients (12%) had a TF requiring surgical fixation (average age 48yo, 80% male). The average length, width, and depth of the TF on pre-operative CT scan were 5.3cm (1.8-9.3), 2.5cm (1.5-3.5), and 2.0cm (1.3-3.5), respectively. Average maximum displacement of the TF was 1.2cm (0.2-2.6). There were more bicondylar fractures among patients with a TF (96% vs 55%, p<.001) and the TF group had more open fractures (55% vs 13%, p<.001). 20% of all reviewed bicondylar fractures had an associated TF, vs 1% of unicondylar fractures (p<.001).

The most common mode of TF fixation was one or more lag screws (72%) and the remainder were fixed with a plate. The rate of deep infection (35.0% vs 8.9%, p=.001) was higher in the TF group. The rates of plateau nonunion (5.3% vs 1.9%, p=.368) were similar. There was one nonunion of the TF (5.3%) which was treated with above knee amputation in the setting of deep infection and soft tissue loss. Average time to range of motion as tolerated (1.7 vs 3.1 weeks, p=.086) and weightbearing (13.2 vs 12.7 weeks, p=.711) were similar between the groups. Average range of motion arc was also similar (121.9 vs 111.5 degrees, p=.163) with no documented extensor lag in the TF group.

DISCUSSION AND CONCLUSION:

This is the first comparative study of tibial plateau fractures with and without a TF. TFs are associated with more severe injuries and are usually large enough for fixation. Potential complications appear to be effectively mitigated by proper identification and fixation.