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Use of Arthroscopy-Assisted Surgery is Dependent in Type of Tibial Plateau Fracture

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The tibial plateau fracture is a common knee joint fracture. Some studies suggest that poor reduction of articular surface and residual joint laxity are key factors affecting the prognosis, while the long-term clinical effect is more dependent on the anatomical reduction of articular surface [1]. Since the arthroscopy-assisted reduction and internal fixation was firstly reported by Caspari et al. [2], its advantages in treatment of tibial plateau fractures were gradually found, including direct visualization of intra-articular fracture, accurate fracture reduction, and reduced morbidity [3]. At present, the arthroscopy has been widely applied in the treatment of tibial plateau fractures [4-6]. But there are still discrepancies among the clinical results and radiologic results reported by different authors. Siegler et al.[6] reported 27 patients treated with arthroscopy-assisted percutaneous fixation for stage I-III Schatzker tibial plateau fractures, of whom 21 patients were reviewed with a mean follow-up of 59.5 months (range, 24-138 months), which showed that 47.6% of the patients presented early osteoarthritis on radiological evaluation. Kayali et al [7] reported 21 patients with Schatzker I–III tibial plateau fractures with mean follow-up period of 38 months (range, 12-96 months), which showed that clinical result was excellent in 13 patients (62%), good in 6 (28%) and fair in 2 (10%), and that the radiologic result was excellent in 11 patients (52%), good in 7 (33%) and fair in 3 (14%).

In the meantime, mild or moderate arthritic changes were found in 5 patients (24%). Duan et al. [8] reported 39 patients with tibial plateau fractures (4 patients with type I, 12 with type II, 9 with type III, 12 with type IV and 2 with type V fracture according to Schatzker criteria) treated by arthroscopic fixation, the results showed that 36 patients (92.3%) obtained satisfactory results and the mean Rasmussen score was (26±3) points. No severe osteoarthritis with complete loss of space or bone destruction was observed. Chan et al. [9] reported 54 patients with tibial plateau fractures treated by arthroscopy-assisted reduction with internal fixation. According to the Schatzker classification, the fractures types were as follows: type I, 1 (2%); type II, 21 (39%); type III, 4 (7%); type IV, 10 (19%); type V, 8 (15%); and type VI, 10(19%). The mean follow-up period was 87 months (range, 28 to 128 months). The mean postoperative Rasmussen clinical score was 28.4 points (range, 19-30 points) and the mean radiologic score was 16.1 points (range, 12-18 points). Secondary osteoarthritis was noted in 10 injured knees (19%). Rossi et al. [10] reported 46 patient with tibial plateau fractures undergone an arthroscopic-assisted technique. At 5-year follow-up, the average Rasmussen clinical score was 28.2 points (SD 1.4).

The radiological Rasmussen score was excellent in 5 patients (11%), good in 39 (85%) and fair in 2 (4%). Chan et al. [11] reported 18 consecutive patients with complex tibial plateau fractures treated with arthroscopic-assisted bilateral buttress plate fixation, with follow-up period of 39-69 months (average 48 months). Using the Schatzker classification, there were 11 patients with type V and 7 with type VI fractures. The mean postoperative Rasmussen score was 26.6 points (range, 18-29 points). There were 89% excellent and good results radiologically. The Rasmussen scores differed among each study, but most patients (≥80%) got excellent and good clinical Rasmussen results. Honkonen [12] believed that fracture types were directly related with the prognosis and different fracture types could lead to satisfaction differences. But the arthroscopy-assisted technique already achieved a satisfactory clinical effect. Over 63% patients got excellent and good radiological Rasmussen scores, with proportions of 0 to 47.6% for patients with secondary osteoarthritis. Honkonen [13] observed that knee osteoarthritis appeared in 6-8 years following injury. In each study, different lengths of follow-up periods could also generate different results.

The arthroscopy-assisted technique has put forward higher requirements for surgeons. There are also complications at the same time, with compartment syndrome as the most severe complication of arthroscopic surgery. Kiefer et al. [14] reported the complication of osteofascial compartment syndrome occurred after arthroscopy-assisted treatment of tidial plateau fractures. As compartment syndrome may cause disastrous consequences, the prevention should still be the top priority.

Although the arthroscopy-assisted technique has got a satisfactory clinical effect, some unsolved problems still remain currently and there is no clear evidence to indicate the arthroscopic surgical result is better than that of traditional open surgery. In addition, application of arthroscopy can increase the occurrence risk of potential compartment syndrome, which will also increase patients' treatment costs. There is lack of a prospective randomized control study to verify the curative effect. To design a perfect prospective randomized control study becomes the focus of future clinical work. The arthroscopy-assisted technique is mainly applied in Schatzker type I-IV tibial plateau fractures [15] and there is still controversy about type V-VI fractures [9]. However, we hold that cutting the joint capsule is needed to treat type V-VI fractures and the arthroscopy-assisted surgery has no obvious advantage.

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