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Posterior Approach in Postero-Medial Fractures of the Tibial Plateau: About 6 Cases and Review of the Literature

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Abstract: The posteromedial fracture of the tibial plateau is relatively rare and few studies have concentrated on it so far. The purpose of this study was to review the results of surgical treatment of this type of fracture using a posteromedial approach. The clinical results of a series of 6 patients, collected prospectively, were presented here. At the last follow-up, there were no cases of infection, intraoperative vascular nerve damage, internal fixation loose or breakage, disunion, deformity of the varus / valgus of the knee or re-displacement of the fracture. 4 cases were rated as excellent, 1 as good, 1 as fair, and 0 as poor according to the Rasmussen functional score system. All patients were satisfied with the surgical results.
Keywords: fracture, posteromedial approach, tibial plateau.

INTRODUCTION

Posterior fractures represent less than 10% of the tibial plateau fracture total. They frequently occur due to high energy trauma, but osteopenic patients can also present this fracture pattern related to low energy events.

Posterior element fracture management has changed significantly throughout the last decade. Several classification systems, posterior approaches, and technical tricks were developed for outcome treatment improvement.

This kind of fracture is a special fracture pattern that is not well described by the AO or Schatzker classification systems [1, 2].

There are controversies about surgical approaches and post-medial tibial plateau fixation methods, as it is difficult to reduce and stabilize the lesion by conventional strategies.

MATERIALS AND METHODS

Six patients admitted to our hospital from Jan 2014 to July 2017 (4 males and 2 females, age range 26-58 yrs., mean age 37.6 yrs.) were included in the study. The causes of injury included traffic accidents in 3 patients, fall in 3 patients. All of them were fresh closed fractures. Before operation, all patients had received knee joint lateral and frontal X-ray (Figure-1), CT scanning with 3D reconstruction to identify the displacement and classification of the fractures (Figure-2).

The operative approach that was chosen is an inverted "L" posteromedial incision was made at 3 cm above the popliteal stripes till reaching the posterior margin of the posteromedial condyle, and then along this margin to 10 cm below the joint line (Figure3). After the skin and subcutaneous tissue were incised, skin flap was lifted to expose semitendinosus and gastrocnemius medial head.

Special attention should be paid to protect the saphenous nerve and great saphenous vein in the superficial fascia. Then the gastrocnemius medial head and the popliteal vessels and tibial nerves on its lateral surface were drawn outward. The semitendinosus tendon was pulled inward to expose the semimembranosus attachment on the posterior articular capsule. Then, the semimembranosus attachment was cut off from the joint line. After sub periosteal dissection, posterior tibial condyle was revealed. After the posterior joint capsule was incised along the joint line, the posterior horn of medial meniscus was pulled upward. Then the articular facet of posterior tibial condyle was disclosed. If the incision needed extension to the distal end to expose the proximal tibia, the soleus starting point could be incised for sub periosteal dissection.

After reduction of the fracture filling with bone substitute with placement of a T-type locking plate type LCP was necessary in 2 cases (Figure-4, 5),

in the remaining 4 cases simple screwing was sufficient.

Postoperatively, the patients were mobilized without support d + 1, the rehabilitation on arthro-motor began at d + 5 and that in pool at d+ 21. Resumption of support was allowed at d + 90.

Fig-1 (a, b): A standard X-ray of Face and Profile showing a posteromedial fracture of the right tibial plateau

Fig-2 (a, b): A CT scan that shows the association of a separation-depression of the fracture

Fig-3: Diagrammatic sketch showing posteromedial inverted "L" incision

Fig-4(a, b): posteromedial approach and fixation with a LCP plate after reduction and placement of a bone substitute

Fig-5 (a, b): Postoperative X-rays showing anatomical reduction.

RESULTS

All the 6 patients were followed for 12-30 months (average, 18.1 months). There were no cases of infection, intraoperative vascular nerve damage, internal fixation loose or breakage, disunion, deformity of the varus / valgus of the knee or re-displacement of the fracture. Knee function results were evaluated by patients' self-assessment (pain and walking ability) and clinicians' examination (knee joint range of movements and knee joint stability) according to the Rasmussen functional scoring system [3]. In this group, 4 cases were evaluated as excellent, 1 cases as good, 1 as fair, and 0 cases as poor.

All patients were satisfied with the surgical results. The work was resumed 18 months after surgery in 5 patients, 24 months for the remaining case.

DISCUSSION

Generally, the posterior lateral condyle suffers from compression, while the medial posterior condyle suffers from separation. Medial condylar compression is rare. In our study, 2 cases of fracture separation compression of the posterior medial condyle and 4 cases of fracture separation. This fact may be associated with the greater force exerted by the medial condyle, and also with the external rotation stress in the movement of the knee flexion [4].

Although Schatzker's classification for tibial plateau fractures is used around the world, he only considers anteroposterior view radiography with a lack of information on the sagittal displacement of the fracture [5]. Moore attempted to create a classification that considers lateral view radiography [6].

Our fractures are classified type I according to Moore

The anterolateral and anteromedial approaches are generally unsuitable for reduction and fixation of the posterior elements, because they lead to unsatisfactory functional results.

Tscherne and Lobenhoffer described the posteromedial approach for Moore's type I fractures, which allows direct fracture reduction and rigid fixation with a non-slip plate [7].

However, the medial collateral ligament (MCL) is easily injured during dissection in case of traditional anteromedial approach when the dissection is spread over a large area, so skin necrosis is likely to occur. In addition, the limited exposure also adds the difficulty of reduction and fixation. Currently, the posteromedial approach of the knee has been widely applied in the treatment of posterior medial condylar fracture [8]. Using this incision to expose the fracture of the medial posterior tibial plateau, satisfactory results were obtained.

Brunner *et al*., [9] advocated a T-shaped posterior anti-slip plate, which they felt provided better stability. Its effect has been confirmed biomechanically by Zeng *et al*., [10].

CONCLUSIONS

Standard face, profile and oblique radiographs, as well as the 3D reconstruction scanner, are essential for operational planning.

Although current results applying these promising techniques may put us on the right track regarding the management of postero-medial fracture of the tibial plateau, long-term follow-up is needed to evaluate functional outcomes and complication rates related to these encouraging procedures.

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