

Visualization of Fracture Fragments: A Technical Advantage: An Observational Prospective Study of Posteromedial Plating in Hohl and Moore Type 1 Tibial Plateau Fracture by Lobenhoffer Approachin Govt Vellore Medical College

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ABSTRACT: Visualization of fracture pattern is difficult in posteromedial fractures in open reduction in conventional approaches. Usually the fracture is indirectly reduced or elevated to facilitate reduction. In this study the posteromedial approach offers direct visualization of fracture depression and facilitates anatomical reduction, it also involves lesser soft tissue damage. It ensures protection of vital structures. The outcome of fractures is evaluated functionally by Rassmussen scoring system.

Me SH: Postero medial tibial plateau fractures, Lobenhoffer approach, Hohl and Moore type

Aim of study: This is an observational prospective study to assess the functional outcome of posteromedial buttress plating in Hohl Moore type 1 fracture. This fracture requires direct visualisation for anatomical reduction and buttress plating for stable fixation. Conventional anterolateral or medial approaches fails to visualise and allow stable fixation of fracture fragment, direct posterior approaches are more demanding and involve dissection of neurovascular bundle. Lobenhoffer posteromedial approach allows direct visualisation of fracture posteromedial split fracture of tibial plateau

I. INTRODUCTION:

Posteromedial tibial plateau fracture is very unstable –posterior subluxation of femur in knee flexion, often this fracture is underappreciated and neglected. With the use of CT and three dimensional reconstruction and better understanding of biomechanics increased attention has been paid for fixation of posteromedial fragment for better functional outcome.

Moore type 1 posteromedial split dislocation of proximal tibia are not well described by AO(41-B2.2/B3.2) or Schatzkar type 4 classifications. They do not differentiate when the medial fragment is posterior and subluxed as Moore system does. This fracture pattern is inherently unstable and difficult to reduce and stabilised by conventional technique and approaches.

II. MATERIALS AND METHODS:

Total of 10 patients of posteromedial tibial plateau fractures – 8 were isolated posteromedial fracture (Hohl and Moore type 1/Schatzkar type 4), 2patients are posteromedial fracture with lateral plateau involvement (Bicondylar tibial plateau fracture Schatzkar type 5). All are male patients, with road traffic accident. All underwent surgical fixation with buttress plating by direct posteromedial approach (Lobenhoffer approach) with additional fixation of lateral condyle fracture by anterolateral approach after thorough pre op evaluation with CT.

III. SURGICAL TECHNIQUE:

Under spinal anaesthesia, patient in supine position with sandbag under contralateral hip to facilitate external rotation of operating limb, knee joint was slightly flexed, a 6-8 cm longitudinal incision was made along the border of medial head of gastrocnemius, proximally ending at the level of knee joint, the plane between bone and medial gastrocnemius is developed, long saphenous vein and saphenous nerve are anterior to skin incision should be preserved, pes anserinus lie along the incision proximally is retracted medially, gastrocnemius muscle retracted laterally, care taken not to injure neurovascular structures in popliteal fossa lying between two heads of gastrocnemius muscle. Once the fracture was clearly exposed, good reduction was achieved by hyperextension with axial traction and pushing the fragment with assistance of periosteal elevator, Temporary fixation of the fragment done with K wire, and intraop C ARM to assess reduction. Reconstruction plates, narrow DCP, with cancellous screws was used for fixation, with minimum of 2-3 screws distal to fracture line. In bicondylar fracture additional fixation of lateral condyle done through anterolateral approach.

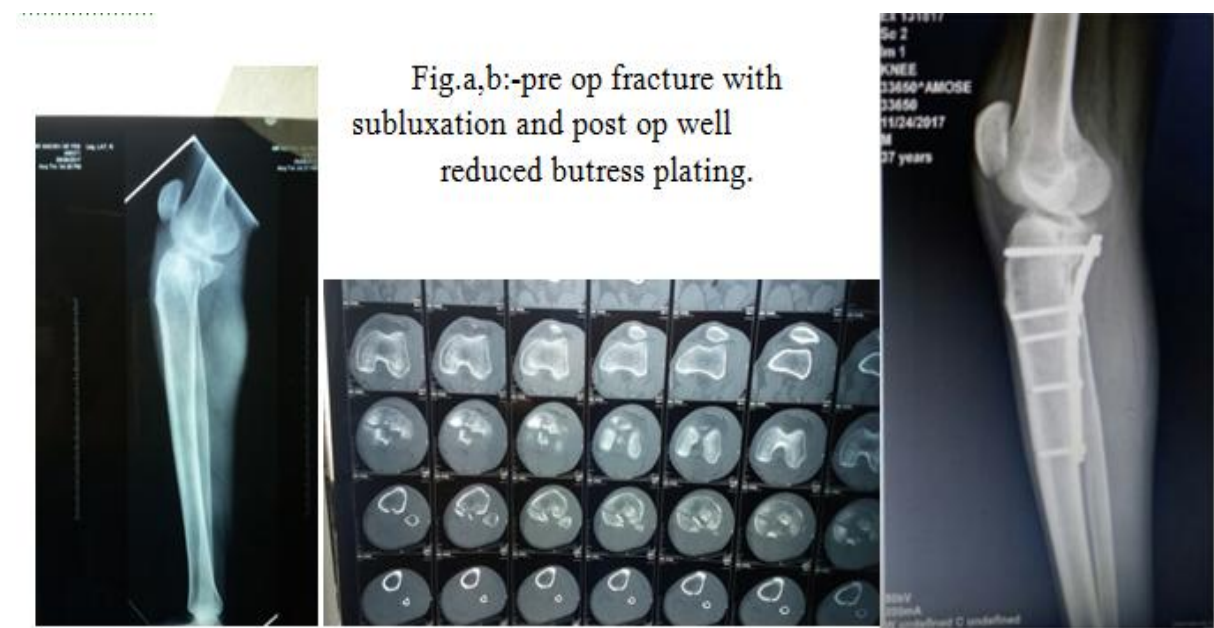


Fig. c, d :-poster medial Lobbenhoffer approach with direct fracture reduction.



Fig .e ,d ,g, h:-Intra-op pictures-fracture reduced temporary stabilised with K-wire and buttress plating.

Post Operative Treatment:

Post op rehabilitation started with knee bending and ankle pump exercise from 2nd post op day, non-weight bearing with crutches started on 5th post op day, partial weight bearing on 6th week, full weight bearing at 3-5 months after fracture union.

Assessment Methods:

RASMUSSEN knee function grading system was used to assess clinical outcomes. Five parameters (pain, walking capacity, lack of extension, range of movement, and stability of knee joint) were included for evaluation, each with full score of 6 points. Based on the total score of each patients, the function was graded as excellent (≥ 27 points), good (20-26 points), fair (10-19 points), and poor (6-9 points).

IV. RESULTS:

The patients were followed up for the period of two years (Nov 2015 to Nov 2017).all fracture attained satisfactory reduction. No major complications (like wound necrosis, screw loosening, fracture displacement, non-union or varus or valgus deformity) was observed. According to Rasmussen knee function grading system, the total scores were 27points in average (range 20-30 points). The mean pain scores were 4-5 points, mean walking capacity scores 5-6 points, mean lack of extension scores 5 points, mean range of motion scores 4-6 points, mean stability of the knee joint scores 5-6 points. And the results were graded as excellent in 8 cases, good in 2 cases.

V. DISCUSSION:

Posteromedial tibial plateau fractures was thought to be rare and neglected. With the increasing use of CT scan in patients with tibial plateau fractures this fracture pattern is better appreciated. The posteromedial tibial plateau fragment is a split fracture caused by the impact on the posterior plateau from the femoral condyle with the knee subjected to vertical or varus stress in flexed or semi-flexed position. The posteromedial tibial plateau fracture has several unique characteristics. The fracture fragment is relatively big, that the average area of bone fragment was 25% of entire tibial plateau articular surface and the displacement of articular surface is usually more than 5 mm. hence, this kind of fracture is very unstable so that the conservative treatment fails to obtain and maintain reduction.

The posteromedial tibial plateau fracture is a vertical split fracture not a compression fracture, even in the osteoporotic patients. For the anterior approach, it required extensive separation of the medial capsular ligament and osteotomy of the tibial tubercle in order to expose the posterior portion of the knee. The anteromedial approach can avoid injuries to the neurovascular structures in the popliteal fossa area, flexion contracture of the knee joint and other complications. However, semitendinosus and semimembranosus muscles obstructed the anteromedial approach. The fixation of fracture fragment by placement of the lateral locking screws through anterolateral approach was unreliable and the rate of failure was very high. Lobbenhoffer posteromedial approach allows direct visualisation of fracture reduction and stable fixation by buttress plating.

The posterior T-buttress plate fixation was biomechanically more stable in-vitro fixation method for posteromedial tibial plateau fracture. There was no internal fixation failure or fracture redisplacement.

VI. CONCLUSION:

Fixing the posteromedial fracture provides a stable knee. Posteromedial approach provides direct visualisation of fragment for a) satisfactory reduction, b) stable internal fixation and c) avoid dissection of neurovascular bundle in popliteal fossa with minimal soft tissue damage there by providing a better functional outcome in posteromedial tibial plateau fracture.

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