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Meniscal Injuries with Tibial Plateau Fractures: Role of Arthroscopy

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ABSTRACT

Tibial plateau fractures are complex intra-articular injuries associated with variety of intra-articular soft tissue injuries. The load bearing and shock absorbing functions of menisci makes them increasingly susceptible to injury during a traumatic event. Associated meniscal injuries should not be neglected at the time of fracture fixation. We recommend arthroscopy for the diagnosis and proper treatment of associated soft tissue injuries including meniscal injuries, so as to prevent the development of degenerative osteoarthritis.

Key words: *Tibial plateau fractures, Meniscal injuries, Arthroscopy*

INTRODUCTION

The menisci of the knee have many important functions including load transmission, shock-absorption, passive stabilization of the knee joint and cartilage nutrition, and lubrication via synovial fluid[1]. The load bearing and shock absorbing functions of these structures makes them increasingly susceptible to injury during a traumatic event. Tibial plateau fractures are complex injuries to treat due to their articular involvement and associated disruption of ligamentous structures in the knee[2]. The primary aim of fracture treatment is to restore the congruence of the articular surface and ensure mechanical axis alignment, any deviations from anatomical condylar position or ligamentous

instabilities may lead to an increased likelihood of degenerative osteoarthritis[3]. Various studies have shown that tibial plateau fractures are associated with number of intra-articular soft tissue injuries. It is now widely accepted that the incidence of soft tissue injuries both meniscal and ligaments injuries with tibial plateau fracturesrange from 47% to 80%[4,5]. Recent studies have employed preoperative magnetic resonance imaging (MRI) or operative arthroscopy to evaluate the extent of soft tissue injuries with tibial plateau fractures. The advantage of arthroscopy are that it is more cost effective and safer than MRI, it also allows operating surgeon to address these intra-articular soft tissue injuries at the time of fracture fixation[6].We use arthroscopy for the diagnosis and treatment of associated meniscal injuries with tibial plateau fractures.

METHODS AND MATERIALS

The present study titled "Association of meniscal injuries with tibial plateau fractures: role of arthroscopy" was conducted in postgraduate department of orthopedics, Hospital for Bone and Joint Surgery Barzulla Srinagar from july 2011 to august 2013. 20 patients with closed tibial plateau fractures of either sex were included in the study. Undisplaced fractures or those with less than 5 mm of condylar widening and less than 3 mm of articular depression managed non-operatively were excluded from the study. All the patients with condylar widening of more than 5 mm, articular step of more than 3 mm and varus or valgus instability were included for the operative management. Pre-operative assessment included detailed physical examination of the soft tissue envelope, evaluation of the sensory and motor functions of the limb and determination of vascular status of the limb. All the patients underwent anterioposterior and lateral plain radiography and computed tomographic (CT) scanning of their injured knees. Surgery was delayed until swelling of the leg had subsided and soft tissue condition around the knee had improved. After taking written informed consent "arthroscopic assisted reconstruction" of tibial plateau fractures was performed with minimal stripping and dissection of soft tissues. Tibial plateau fractures were classified according to the Schatzker classification system[7].

In all patients surgery was conducted under spinal anesthesia in supine position. Arthroscopy knee was done via standard anteromedial and anterolateral portals. After hematoma evacuation and thorough joint lavage, diagnostic arthroscopy was performed; intra-articular meniscal and ligamentous injuries were assessed arthroscopically.In all cases inflow pressure was kept minimum to reduce risk of fluid extravasation and increase in compartment pressure[8]. Patients with meniscal tears were addressed before fracture fixation. Those with stable peripheral tears, meniscal repair was done using arthroscopic inside-out suture technique. Those with unstable full thickness radial tears, incarcerated at the fracture site were managed by arthroscopic partial menisectomy with balancing of the remaining meniscus[9]. After that arthroscopic assisted fracture fixation was done using cannulated screws or peri-articular locking

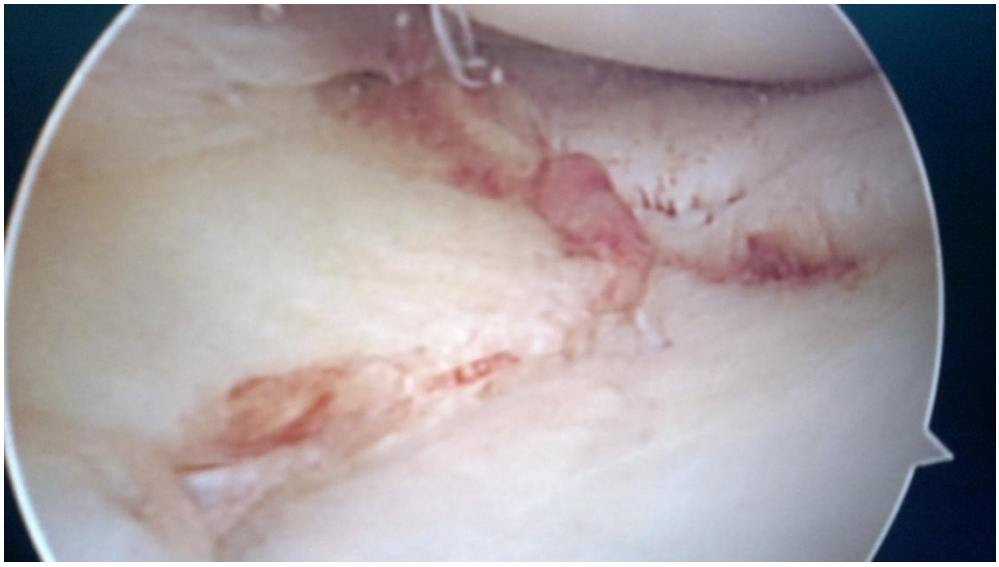
compression plates depending upon the fracture comminution and displacement, those with articular depression elevation of articular surface was done by making a cortical window below the depressed area and filling the defect with autogenous bone graft taken from the ipsilateral iliac crest. Post-operatively patients were advised crutch walking with non-weight bearing for 10-12 weeks and full weight bearing by 14-16 weeks. ROM knee was stared at 2nd post-operative day with aim of 0-90o by end of 2nd week and full ROM by end of 6 weeks.

RESULTS

The patients in our study ranged in age from 20-57 years of age with mean age of 38.5 years. In present study there were 12(60%) males and 8(40%) females. Right limb was involved in 6 (30%) cases and left limb was involved in 14 (70%) cases, left side was involved more than right side. RTA was most common mode of trauma in 12 (60%) cases, in 4 (20%) cases mode of trauma was sports related injuries, in 2 (10%) cases injury was due to fall from standing height, in 2 (10%) patients injury was due to fall from height. Using Schatzker classification system we had 2 (10%) type I (split), 10 (50%) type II (split and depression of lateral plateau), 3 (15%) type III (pure depression of lateral plateau), 2 (10%) type IV (medial plateau), 2 (10%) type V (bicondylar) and 1(5%) type VI (bicondylar with diaphyseal extension) fractures. Type II the most common type, was noted to have a higher incidence of soft tissue injuries than other 5 types. Out of 20 patients 12 (60%) had associated meniscal injuries diagnosed by arthroscopy at the time of surgery. Of them medial meniscal injuries were seen in 3 patients and lateral meniscal injuries were seen in 9 patients. Type II tibial plateau fractures were associated with highest number of meniscal injuries, out of total 10 type II tibial plateau fractures 7 (70%) were associated with meniscal injuries. In our study peripheral tears were seen 5 (41.67%) patients and unstable radial tears were seen in 7 (58.33%) patients.

Relationship between fracture type and meniscal injuries

Fracture Type	No of Patients	Peripheral Tear	Radial Tear	Frequency of Meniscal Tears
Type I	2	0	1	50% (1/2)
Type II	10	3	4	70% (7/10)
Type III	3	1	1	66.67% (2/3)
Type IV	2	0	1	50% (1/2)
Type V	2	1	0	50% (1/2)
Type VI	1	-	-	-
Total Injuries	20	5	7	60% (12/20)



Arthroscopic pictures of tibial plateau fractures with meniscal injuries

DISCUSSION

There is much controversy regarding the management of meniscal injuries associated with tibial plateau fractures. Association of soft tissue injuries with tibial plateau fractures have been reported by several authors. Honkonen (1995)[10] identified an 8% rate of ligament injury and a 50% rate of meniscal injuries in a study of 76 tibial plateau fractures. Glabbeek[11] in an investigation of 20 cases of arthroscopically assisted reduction and internal fixation of tibial plateau fractures determined that 50% of patients incurred soft tissues injury, including 35% with meniscal lesions and 15% with ACL injuries. M. Z. Abdel Hamid et al [12] reported 70/98 (71%) patients with tibial plateau fractures were associated with intra-articular soft tissue injuries including 57% patients with meniscal injuries. Jordanna (2013) in a study of 101 patients with tibial plateau fractures found 66.4% patients had associated meniscal injuries with tibial plateau fractures. Associated meniscal injuries were found in 60% of the patients in our study. As demonstrated by Walker and Erkman (1975) [13] both menisci are crucial for

the maintenance of a normal joint function. For this reason the treatment of associated lesions of the meniscus is important and should be repaired or partially removed if indicated. Tibial plateau fractures associated soft tissue injuries are diagnosed through clinical evaluation and the use of radiography, CT and MRI. Gardner (2006)et al [14] found that soft tissue injury could be predicted based on plain radiographic findings. Articular depression of more than 6 mm and widening of more than 5 mm were associated with lateral meniscal tear in 83% (vs 50% for less displacement) and more than 8 mm was associated with increased risk of medial meniscal tear (53% - 78%). Kode et al [15] reported a 68% incidence of associated soft tissue injury diagnosed with MRI in 22 tibial plateau fractures. However arthroscopy provides a safe, quick and accurate method of diagnosis and treatment of associated meniscal injuries with tibial plateau fractures. We recommend arthroscopy for tibial plateau fractures for diagnosis and proper treatment of associated meniscal and ligamentous injuries so as to prevent the development of degenerative osteoarthritis. For stable tears in peripheral red-red zone we recommend meniscal repair using arthroscopic inside- out suture technique. For unstable tears in white zone we recommend partial menisectomy and balancing of remaining meniscus.

CONCLUSION

Menisci have many important functions including joint lubrication, cartilage nutrition, load transmission and shock absorption.Associated meniscal injuries should not be neglected at the time of fracture fixation. Arthroscopy should be used for the diagnosis and proper treatment of associated soft tissue injuries including meniscal injuries, preventing the development of degenerative osteoarthritis.

REFERENCES

1. Jordanna M. Forman, Raj J. Karia, Roy I. Davidovitch et al. Tibial plateau fractures with and without meniscal tears. Results of standardized treatment protocol. Bulletin of the Hospital for Joint Diseases 2013; 71(2): 144-51
2. Yi-Sheng Chan et al: Arthroscopy assisted surgery for tibial plateau fractures. Chang Gung Med j 2011;34: 239-47
3. Francesco Pogliacomi et al: combined arthroscopic and radioscopic management of tibial plateau fractures: report of 18 clinical cases. Acta Biomed 2005; 76; 107-114)
4. Fowble CD, Zimmer JW et al: The role of arthroscopy in the assessment and treatment of tibial plateau fractures. Arthroscopy 1993;9:584-90
5. C.Thomas Vangness Jr et al: Arthroscopy of meniscal injuries with tibial plateau fractures. Bone And Joint Surg1994:76;488-90
6. Cemil Kayali et al: Arthroscopic assisted percutaneous osteosynthesis of lateral tibial plateau fractures. Can J surg, vol.51, No.5, october2008.
7. Schatzker J.et al.The tibial plateau fractures. Clin Orthop(1979)138:94-104

8. James H.Lubowitz, Wylie S.Elson et al: Arthroscopic management of tibial plateau fractures. The Journal Of Arthroscopic And Related Surgery.2004 ;20 pp: 1063-1070
9. G. Burdin: Arthroscopic management of tibial plateau fractures; Orthopaedics and traumatology: Surgery and Research (2013) 995, 5208-5218
10. Honkonen S. Degenerative arthritis after tibial plateau fractures. J Orthop Trauma 1995;9:273-277
11. F.Van Glabbeek et al: arthroscopically assisted reduction and internal fixation of tibial plateau fractures: report of twenty cases. Acta Orthopedic Belgica; Vol. 68-3-2002)
12. Mohamed Zaki Abdel-Hamid, Chung-Hsun Chang, Yi-Sheng Chan:Arthroscopic evaluation of soft tissue injuries in tibial plateau fractures: retrospective analysis of 98 cases.The Journal Of Arthroscopic And Related Surgery,2006;vol 22:pp 669-675
13. Walker PS, Erkman MJ. The role of menisci in force transmission across the knee. Clin-Orthop 1975;109:184-92
14. Garden MJ, et al. Prediction of soft tissue injuries in schatzker II tibial plateau fractures based on measurements of plain radiographs. J trauma 2006;60:319-323
15. Kode L, Lieberman JM, Motta AO, Wilber JH et al. Evaluation of tibial plateau fractures: Efficiency of MR imaging compared with CT. AJR Am J Roentgenol 1994; 163: 141-147