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A study of tibial plateau fracture according to associated Injury and Its outcome

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Abstract
Introduction: Tibial plateau fractures may occur together with meniscal and ligamentous injuries to the knee. Although certain injury patterns may suggest a predominantly osseous injury to the knee, others may suggest significant soft-tissue injury.
Aims and Objectives: To Study of Tibial Plateau Fracture According to Associated Injury and Its outcome.
Methodology: This is institutional based prospective study which comprises of 50 patients with displaced tibial plateau fracture and were treated between Jan 2012 to Jun 2013 with minimal invasive percutaneous plate osteosynthesis (MIPPO). Statistical analysis done by Chi-square test.
Result: 12 (24%) patients had associated injuries whereas 38 (76%) patients had no other associated injuries. Fracture patella was most commonly associated injury. The association between associated injury and result is statistically non-significant ($P>0.05$). Only 16.66% of patients having associated injury had excellent results as compare to 55% in patients without associated injuries.
Conclusion: 24% patients had associated injuries and associated injuries seems to be not related with outcome of the injuries as association between associated injury and Outcome is statistically non-significant.

Keywords: Tibial Plateau Fracture, Associated Injury, Outcome

1. Introduction
Tibial plateau fractures may occur together with meniscal and ligamentous injuries to the knee. Although certain injury patterns may suggest a predominantly osseous injury to the knee, others may suggest significant soft-tissue injury. Standard tibial plateau fractures involve cortical interruption or depression or displacement of the articular surfaces of the proximal tibia without concomitant significant injury to the capsule or ligaments of the knee [1]. On the basis of plain radiographic findings, the prevalence of ligament injury in these types of fractures is approximately 20%–30% [2, 3]. The Schatzker classification system divides tibial plateau fractures into six types: lateral tibial plateau fracture without depression (I), lateral tibial plateau fracture with depression (II), compression fracture of the lateral (IIIA) or central (IIIB) tibial plateau, medial tibial plateau fracture (IV), bicondylar tibial plateau fracture (V), and tibial plateau fracture with diaphyseal discontinuity (VI). The first three types (I, II, and III) are typically the result of low-energy injury [4, 5]. The second three types (IV, V, and VI) are typically the result of high-energy injury. However, relatively low-energy trauma to osteoporotic bones may produce fracture patterns similar to those of high-velocity injuries [6]. The magnitude of the force determines both the degree of fragmentation and the degree of displacement [4]. The frequency and type of associated soft-tissue injury and the surgical approach vary by fracture type and are discussed under each fracture type. Orthopedic surgeons have traditionally relied on physical examination, surgical findings, and arthroscopy for detection of ligament injury. In fact, a composite history and physical examination may be highly predictive of ACL or posterior cruciate ligament (PCL) tear [7]. Recently, however, orthopedists have increasingly accepted CT and MR imaging for preoperative assessment of soft-tissue injury, especially if there is a tibial plateau fracture. Gardner *et al.* [8] evaluated preoperative MR imaging results in 103 patients with all types of tibial plateau fractures and found that the overall prevalence of injury to soft tissues was higher than previously reported. Only 1% of patients had complete absence of any soft-tissue injury; 77% had a complete tear or avulsion of one or more cruciate or collateral ligaments, and 68% had tears of one or more of the posterolateral corner structures of the knee.

Currently, the clinical significance of preoperative diagnosis of meniscal and ligamentous injury is unknown, but diagnostic imaging may prove helpful for surgical planning in the future. A recent systematic review of 59 articles that reported the results of 7367 MR imaging examinations and 5416 arthroscopic procedures showed that MR imaging is able to demonstrate most internal derangements of the knee efficiently [9]. Advances in mechanization and acceleration of travel have been accompanied by increase in numbers and severity of fractures in which tibial plateau is no exception. These fractures constitute about 1% of all fractures and 8% of the fractures in elderly with ever increasing incidence in modern lifestyle. The Lateral condyle is more frequently involved than the medial condyle [12]. Whereas the involvement of both condyles is found in 10 to 30% of the reported series [13].

2. Aims and Objectives: To Study of Tibial Plateau Fracture According to Associated Injury and Its outcome

3. Methodology: This is institutional based prospective study which comprises of 50 patients with displaced tibial plateau fracture and were treated between Jan 2012 to Jun 2013 with minimal invasive percutaneous plate osteosynthesis (MIPPO). All patients were screened using following inclusion and exclusion criteria. Mono-trauma polytrauma patients. Grade I, II, IIIA compound fracture, Medically fit for surgery, < 2 weeks post fracture Were included into study whereas Fracture due to malignancy, Grade IIIB and IIIC compound fractures, Non-ambulatory previous fracture, Severe dementia, Medical contra-indication to surgery were excluded from study. Statistical analysis done by Chi-square test.

4. Result

Table 1: Distribution of Cases According to Associated Injuries

Associated injuries	No. of cases	Percentage
Head injury	1	2%
Chest injury	1	2%
Blunt trauma abdomen	1	2%
Ipsilateral Fracture patella	4	8%
Ipsilateral Fracture supracondylar femur with intra articular extension.	3	6%
Ipsilateral Fracture shaft femur	1	2%
Ipsilateral Fracture bimalleolar	1	2%

In present study, 12 (24%) patients had associated injuries whereas 38 (76%) patients had no other associated injuries. Fracture patella was most commonly associated injury.

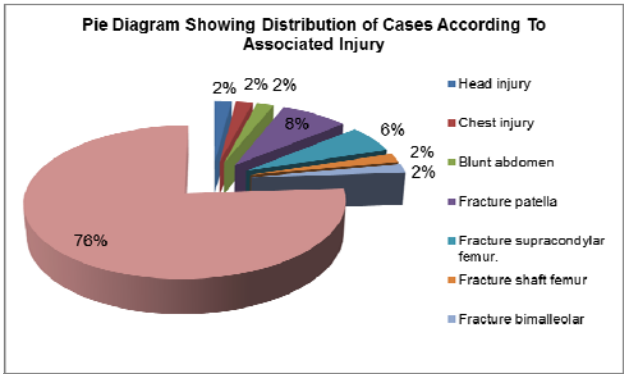


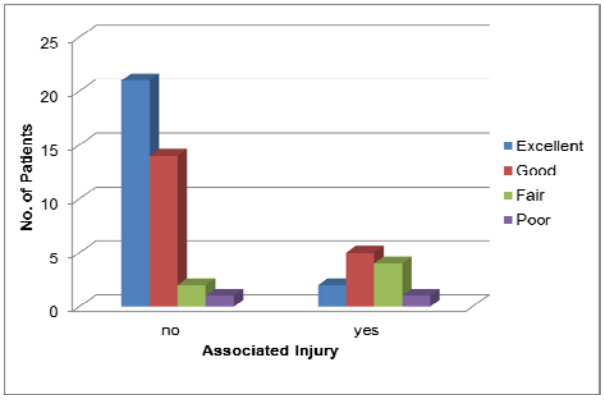
Fig 1: Pie Diagram Showing Distribution of Cases According To Associated Injury

Table 2: Distribution of Cases According To Associated Injury Vs Outcome

Associated injury	Excellent	Good	Fair	Poor	Total
No	21(55.27)	14(36.85)	2(5.2)	1(2.63)	38
yes	2(16.66)	5(41.66)	4(33.33)	1(8.3)	12
Total	23	19	6	2	50

Figures in parenthesis denote percentages; $\chi 2 = 9.7$ d(f) 3 $p>0.05$

The association between associated injury and result is statistically non-significant ($P>0.05$). Only 16.66% of patients having associated injury had excellent results as compare to 55% in patients without associated injuries.



5. Discussion

In present study, 12 (24%) patients had associated injuries whereas 38(76%) patients had no other injuries.

In the study done by Manidakis *et al.* [10] associated injury present in 23.2% of patients while in Park *et al.* [11] it was 20.68%.

Associated injuries mainly caused delay in surgery and prolonged hospital stay. 66.66% (8 out of 12) patients were operated after 3 days because of associated other fractures or polytrauma resulting in prolonged hospital stay.

Study	Associated injury
Present study	24%
Manidakis *et al.* [10]	23.2%
Park *et al.* [11]	20.68%

In addition, only 16.66% of patients having associated injury had excellent results as compare to 55.27% in non associated injury patient. Indicating that associated injuries were associated with poorer results.

6. Conclusion

24% patients had associated injuries and associated injuries seems to be not related with outcome of the injuries as association between associated injury and result is statistically non-significant.

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