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SPECTRUM OF PRESENTATIONS AMONG PATIENTS OF TIBIAL PLATEAU - SCHATZKER TYPE IV FRACTURES

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Abstract:

Objective: *To identify the spectrum of presentations among patients of Tibial Plateau - Schatzker Type IV fractures.*

Methodology: *This observational cross sectional study was conducted at Department of Orthopaedic Surgery & Traumatology, Liaquat University Hospital, Hyderabad / Jamshoro on 40 patients, selected via consecutive sampling. Patients, with age range 20 – 50 years with closed tibial plateau fracture of Schatzker Type IV, presented at the hospital setting within two weeks after injury were approached. Informed written consent was obtained prior to the enrollment. Semi-structured, interview based proforma was used to obtain detailed history and account of presenting problems. Findings of clinical examination and radiographs were also noted during primary assessment. Data was compiled and analyzed in SPSS-19.*

Results: *The sample comprised of 70% of Male and 30% of Female patients. Mean age was 38.43±8.24 years. 35% of the patients had complaint of pain & swelling, 20% had deformity, 20 % were unable to stand, and 25% were not able to bearing weight on their legs. On examination, 62.5% patients had valgus positions while the rest had varus positions of Leg after fracture.*

Conclusion: *Careful open surgical reduction and stable internal fixation of tibial plateau fractures showed excellent functional and radiologic results at follow-up.*

Keywords: *Tibial Fracture; Schatzker Classification; Type IV fractures; Presentation of leg fractures.*

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INTRODUCTION:

The tibia is a long bone, placed subcutaneously throughout its length, where it is covered only by skin and a thin layer of subcutaneous tissue, with no muscle cuff around. [1] The tibial plateau is one of the most critical load-bearing areas in the human body. Tibial plateau fractures affect knee alignment, stability, and motion. [2] Although tibial plateau fractures are approximately 1% of all fractures, a unified treatment has not yet been established. [3] Fractures involving the tibial plateau can result from forces directed medially, laterally, or axially. Forces directed medially (valgus force moment) are often classic "bumper fractures" (motor vehicle versus pedestrian accidents). In most cases, the medial or lateral femoral condyle acts as an anvil imparting a combination of both shearing and compressive force to the underlying tibial plateau. [4, 5]

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. [6, 7]
Fractures of the tibial plateau are severe injuries, accounting for 5-8% of all fractures of the lower leg. In recent years, the incidences of these fractures have risen due to increase in motorization and alternative sport activities and an increasingly aging population. [8, 9] Studies reported that car accidents account for 40% - 60% of tibial plateau fractures. [10, 11] Recently, the analysis of 1,426 tibial plateau fractures showed that 45% occur as a result of accidents with pedestrians, 13% car accidents, 17% high falls, 12% result from slips and sprains, while sports activities represented 3%, and motorcycle, bicycle and other accidents accounted for 10%.[12] of the proximal tibial fractures. [12, 13]

The Schatzker classification system focuses on standard tibial plateau fractures. In the Schatzker classification, each increasing numeric fracture category indicates increasing severity, reflecting not only increased energy imparted to the bone at the time of injury but also an increasingly worse prognosis. Therefore, orthopedic surgeons find the Schatzker classification useful in assessing the initial injury, planning management, and predicting prognosis. Many authors have reported that initial Schatzker rankings and surgical plans based on plain radiographic findings were modified after preoperative computed tomography (CT) or magnetic resonance (MR) imaging. [14, 16]

Scarcity of research on the pattern of presentations of certain type of fractures hinders in recognizing and treating patterns such as the type IV plateau fractures. Type IV fractures are uncommon and are typically classified as high-energy fractures involving the medial tibial plateau. [4, 17] Schatzker type IV medial plateau fractures are usually caused by high-energy trauma.

Early detection of these fractures are critical in minimizing patient disability and reducing the risk of documented complications, particularly posttraumatic arthritis. [2] Careful and thorough assessment of severity, with particular attention to identifying high-energy injuries, is critical in achieving optimal outcomes and avoiding complications. [18, 19]

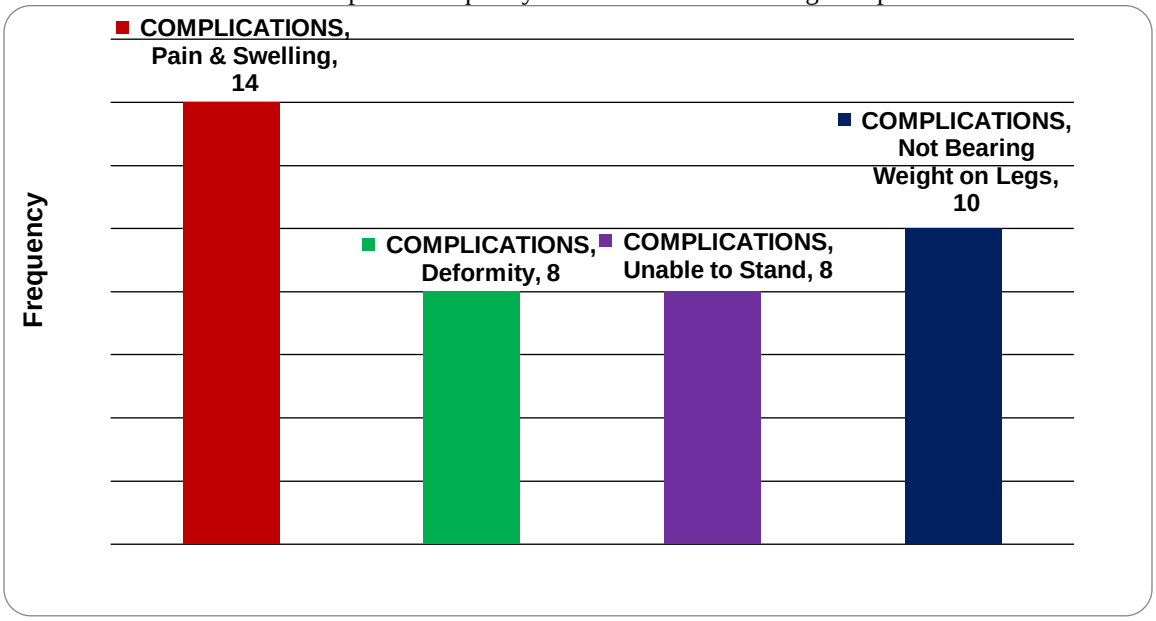
METHODOLOGY:

This observational cross sectional study was conducted at Department of Orthopaedic Surgery & Traumatology, Liaquat University Hospital, Hyderabad / Jamshoro from Jan 2014 to June 2014 on 40 patients, selected via consecutive sampling. Patients, with age range 20 – 50 years with closed tibial plateau fracture of Schatzker Type IV, presented at the hospital setting within two weeks after injury were enrolled in the study. Patients with Infected fractures, Open fractures, Compartment syndrome were excluded. Informed written consent was obtained prior to the enrollment. Semi-structured, interview based proforma was used to obtain detailed history and account of presenting problems. Findings of clinical examination and radiographs were also noted during primary assessment. Data was compiled and analyzed in SPSS-19.

RESULTS:

The sample comprised of 70% of Male and 30% of Female patients with a mean age of 38.43 ± 8.24 years. 35% of the patients had complaint of pain & swelling, 20% had deformity, 20 % were unable to stand, and 25% were not able to bearing weight on their legs.

Graph –1: Frequency Distribution of Presenting Complaints



On local examination, 77.5% had swelling and 22.5% had tenderness while 62.5% patients had valgus positions while the rest had varus positions of Leg after fracture.

Table–1: Frequency Distribution of Local Examination

	n	%
Swelling	25	62.5%
Tenderness	15	37.5%
Total	40	

Table–2: Frequency Distribution of Position of Leg

	n	%
Valgus	25	62.5%
Varus	15	37.5%
Total	40	

The most common mode of injury was found to be Road Traffic Accident (RTA) i.e. 70%, followed by fall from height i.e. 16% and sports injuries i.e. 5%.

Table–3: Frequency Distribution of Mode of Injury

	N	%
Road Traffic Accident	28	70%
Fall From Height	6	15%
Sports	2	5%
Others	4	10%
Total	40	

DISCUSSION:

Fractures of tibial plateau are serious injuries that result in functional impairment. The emphasis in treating these fractures are anatomical restoration of fracture surface, repair of soft tissue injury, rigid fixation to obtain a stable painless knee with normal range of motion. [20, 21]Tibial plateau fractures are often associated with extensive damage of articular cartilage. [22-25] Postoperative gradual joint degeneration typically occurs. Although the pathomechanism of joint degeneration has been continuously investigated and new treatment methods developed, none are absolutely convincing. Mechanical, biological, and biochemical factors for joint degeneration have been identified by various investigators. [26-29]

In normal human anatomy, the knee joint shows 6° valgus in the anatomic axis. [30] However, in a one-legged stance, 60–75% of compressive loads cross the medial tibial plateau. [20] No experimental studies have provided a model that simulates this scenario. One of the study simplified the test by keeping the knee joint 6° varus in the anatomic axis. Thus, in a static situation, the medial plateau sustains an increased compressive loading, which is similar to a dynamic situation during the daily activity.

The time of weight bearing on the affected extremity is associated with the healing of the tibial condylar fracture. Necessary conditions in order to achieve healing are the accurate reduction of the fractured fragments, the stable fixation and the preservation of blood supply to the fracture site. Schatzker type IV tibial plateau fractures may be distributed at different locations on the medial plateau and their fracture lines may run in various directions.

In current study, our focus was on the clinical presentation of the Schatzker type IV tibial plateau fractures. The presentations comprised of pain & swelling, deformity, inability to stand, and not bearing weight on their legs.

Limitations of this study included, that our study is limited by its single location in an urban environment. Small sample size of this study limits the statistical significance. Due the small sample size we cannot generalize the results of the treatment.

CONCLUSION:

In our experience, Schatzker Type IV fractures of the medial tibial plateau are potentially difficult fractures to understand and treat and are mostly associated with localized swelling and severe pain. Moreover the study results show that the etiology of these fractures are found to be mostly related with Road Traffic Accidents which are common in our set up.

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