Profile of Patients with Transverse Patellar Fracture Presenting to a Tertiary-Level Hospital in Bangladesh

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Abstract

Background: Patellar fractures are relatively uncommon, accounting for about 1% of all skeletal injuries and transverse fracture pattern is the most common pattern. Early and appropriate management is essential to restore knee function and minimize long-term complications. This study aimed to describe the profile of patients with closed transverse patellar fractures managed in a tertiary-level teaching hospital in Bangladesh.

Materials and methods: The prospective study of 20 closed transverse patellar fracture cases was conducted at the Department of Orthopaedics of Chittagong Medical College Hospital from January 2019 to December 2020. Patients were managed by open reduction and internal fixation with Tension Band Wiring (TBW) using parallel Cannulated compression screws.

Results: The mean age of the patients was 38.91 ±12.01 years, ranging from 19 to 60 years. Most (80%) of the patients were male and farming was the predominant occupation (30%). Thirteen patients (65%) presented with right-sided fractures and the majority of the injuries were caused by either motor-vehicle accidents (45%) or accidental falls (45%). After six months of injury, 15 (75%) and 5 (25%) patients had full extension and 120 degree and 90-120 degree Range of Motion (ROM) respectively. The main complication was knee stiffness, observed in 10% of patients.

Conclusion: Transverse patellar fractures are most commonly seen in young adult males and result from direct trauma to the knee. Six-month outcomes were favourable with appropriate management.

Key words: Closed; Patellar fractures; Profile; Transverse.

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Introduction

One of the most significant sesamoid bone in our body is the patella, protects the fron of the knee joint, serves as the site for attachment for the quadriceps tendon, and act as a fulcrum to enhance the efficiency of the extensor mechanism.[1,2] Both direct or indirect forces amy results in fracture patella, however, the the fracture pattern depends on the mechanism of injury. Due to the its subcutaneous position, a direct injury over patella may result from a blow to the anterior knee, such as impact from the dashboard in a motor vehicle accident or from a fall.[3]

The conventional classification of fractures of patellar categorizes them into seven fracture patterns: 'non-displaced, transverse with displacement, inferior pole, comminuted without displacement, comminuted with displacement, vertical, or osteochondral'.[1] Approximately 75-95% of the fractures involve the middle third of the patella and are transverse patterns.[4] Surgeries are often required for such fractures. Conventionally, for most transverse patellar fractures (With fragment displacement of >3 mm, articular incongruence of >2 mm or a disrupted extensor mechanism) open reduction with internal fixation using TBW is the surgical method of choice. The surgery aims to facilitate reduction of the articular surface and patellar fragments to allow stable fixation.[5]

A local study of the patients with closed transverse patellar fractures is essential for healthcare providers, as they can understand these fractures comprehensively within Bangladesh, ultimately leading to improved patient care and outcomes.With this background, the present study was conducted to describe the profile and outcome of patients closed transverse patellar fractures managed in a tertiary-level teaching hospital in Bangladesh. The study could help identify specific risk factors and vulnerable groups. It allows for comparison with global data to see if unique

patterns or trends are specific to the region. Evaluating the outcomes can guide resource allocation and improve the planning of healthcare services, ensuring that necessary equipment and expertise are available.

Materials and methods

A prospective observational study was conducted from January 2019 to December 2020 in the Department of Orthopedics, Chittagong Medical College Hospital, Chattogram, Bangladesh. The institutional review board (Chittagong Medical College) approved the study protocol (Memo No. CMC/PG/2019/620, Dated 26/12/2019) and informed consent was obtained from the patients.

Consecutive admitted patients with closed patellar fractures with a transverse fracture line within three weeks of injury and aged between 18 and 65 years were included in this study. Patients with open patellar fracture, comminuted patellar fracture, poly-trauma and unfit for anaesthesia were excluded.

Sociodemographic characteristics including age, sex, occupation and history regarding the mechanism of injury with duration were taken by using a structured case record form. Patients were managed by open reduction and internal fixation under general anaesthesia with TBW using parallel Cannulated compression screws.

Clinical follow-up was done to assess complications and ROM achieved in the knee. After collection, data were analyzed using Microsoft Excel. Only descriptive analysis in the form of mean (Standard deviation) and frequency (Percentage) was used in the study.

Results

During the data collection period, 65 patients with patellar fractures were admitted to the hospital. Among them, 30 cases had transverse fractures. Of whom, 22 had closed fractures and were managed by tension band wiring using Cannulated screws. Among these 22 operated cases, 20 patients were available for final follow-up after 6 months of surgery for outcome evaluation. Table I shows that the age range from 19 to 60 years with a mean age of 38.91 ±12.01 years. The majority of the patients (30%) were in the 31-40 years, followed by 25% in the 21-30 years age group. Majority of the patients were male (80%) with a male-to-female ratio of 4:1.

Table I Age distribution of the study patients (n=20)

Variables	Frequency	Percentage
Age category, Years		
≤20	2	10.0
21-30	5	25.0
31-40	6	30.0
41-50	3	15.0
51-60	4	20.0
Sex		
Male	16	80.0
Female	4	20.0
Occupation		
Farming	6	30.0
Business	3	15.0
Housewife	3	15.0
Student	3	15.0
Service	3	15.0
Laborer	2	10.0

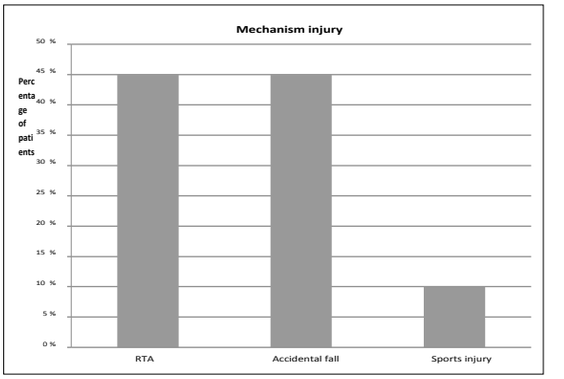

Figure 1 The mechanism of injury of the study patients (n=20)

Figure 1 shows that mechanism of injury in majority of the cases were either Road Traffic Accident (RTA) (45%) or accidental fall on slippery ground (45%). The rest 10% were sports injury. Thirteen (65%) patients had right side involvement and 7 (35%) patients had left side involvement.

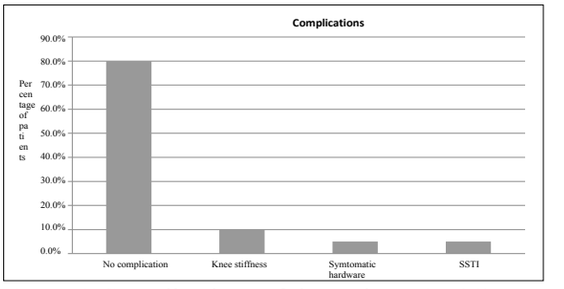

Figure 2 Complications of the patients (n=20)

Majority of the patients 16 (80%) had no complication in the 6 month follow-up period. Most common complication was knee stiffness observed in 2 (10%) patients. One (5%) patient had superficial surgical site infection and other had symptomatic hardware.

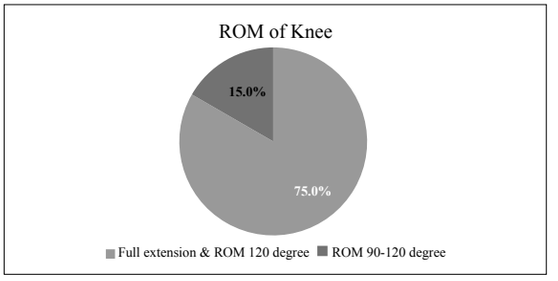

Figure 3 ROM of the knee joint at final follow-up (n=20)

Figure 3 shows that, at final follow-up majority of the patients 15 (75%) had either full ROM or ROM 120º of the affected knee joint. Five (25%) patients had ROM 90º- 120º at final follow-up. ≥120º.

Discussions

In this present study, age range between 19 to 60 years and majority of the patients were in their third and fourth decade with a mean age of 38.91 ±12.01 years. Other study conducted in our neighbor also reported such age distribution. Ramu et al. from India reported that 60% of their patients was in the age group of 21-40 years with a mean age of 37.[6] Shrestha et al. from Nepal reported the mean age of 38.97 years in their cohort.[7] Tan et al. studied patients with age range of 18-54 with mean of 35.96 years.[8]

There was male predominance in the present study with 80% male and 20% female. The male majority consistent with other studies.[6,7] Male predominance in the fracture of patella could be attributable to our cultural setup where females stay mostly indoor and whilemales have a more active lifestyle and remain out-door more often to earn their living. Identifying common causes and risk factors can inform public health initiatives aimed at preventing such injuries.RTAs and simple fall were the major cause of injury in the present study which is consistent with most other studies.[8-10] RTAs in LMICs like in Bangladesh are very severe due to and weak enforcement of road safety the lack of traffic sense and responsibility by pedestrians and the drivers.[11]

Understanding the typical recovery trajectories and complications can help in developing better rehabilitation programs tailored to the needs of the local population. In the current study only four complications were observed. One case of superficial surgical site infection subsided with meticulous wound care and prolonged antibiotic administration. In different studies, the rate of infections after surgical treatment in patella fractures is 2-12% and studies describing the technique of Cannulated screw reported comparatively lower rate of infection.[7-10] The other two cases had knee stiffness. One of these two patients had an attack of acute pancreatitis for which she was hospitalized for a prolonged duration. This patient also gained useful ROM over a period of six months. There were no complications in the form of material failure,loss of reduction, or implant migration. Rate of hardware removal is relatively less in this technique as compared with modified TBW.[6-8] Implant loosening and migration can lead to skin irritation, which are the main reasons for the removal of hardware, besides TBW whose knots may also cause irritation. Only one patient had skin irritation due to tension wires and larger screws, and required hardware removal in our series.

Regarding ROM of the knee joint after 6 months of surgery, majority of the patients (75%) had either full ROM or ROM 120^0 of the affected knee joint. Five (25%) patients had ROM 90^0-120^0 at final follow-up. Khan et al. reported that average ROM at three months was 113.8 degree and it was improved to 125.4 degree at one year follow up.[10] Shrestha et al. reported that out of 20 patients 12 had full ROM and other 8 had >120^0 ROM at 24 weeks follow-up.[7]

Limitation

Single centre study with small sample size.

Conclusion

In light of the study's findings, transverse patellar fractures usually occur in early middle age, with a male preponderance, primarily due to RTAs or simple falls. Cannulated screws with anterior TBWis a safe and effective method in the management of transverse patellar fractures, with less chance of implant failure and soft tissue irritation.

Recommendations

Data from the study can support the development of healthcare policies and protocols that improve patient outcomes and reduce the burden on the healthcare system. It can serve as a foundation for further research, potentially leading to innovations in treatment and care. However, further prospective comparative studies with a randomized design and longer follow-up are necessary to determine the best treatment method for transverse patellar fracture.

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Contribution of authors

MRA-Acquisition of data, Data analysis, drafting & final approval.
MMRC-Conception, interpretation of data, critical revision & final approval.
KM-Design, interpretation of data, critical revision & final approval.
ATN-Data analysis, drafting & final approval.
AC-Acquisition of data, interpretation of data, critical revision & final approval.
SG-Data analysis, drafting & final approval.

Disclosure

All the authors declared no conflict of interest.

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