



Original Research Article

EFFICIENCY OF PATELLA FRACTURE MANAGED SURGICALLY WITH MODIFIED TENSION BAND WIRING

Dema Rajaiah¹, Maruthi Prasad², Alle Naga harshavardhan Reddy³, Venkat Ramudu Naik⁴, Bodanapu Sandeep⁵

¹Associate Professor, Department of Orthopaedics, Government Medical College, Nandyal, India.

²Assistant Professor, Department of Orthopaedics Government Medical College, Nandyal, India.

³Senior Resident, Department of Orthopaedics, Government Medical College, Nandyal, India.

⁴Senior Resident, Department of Orthopaedics, Government Medical College, Nandyal, India.

⁵Senior Resident, Department of Orthopaedics, Government Medical College, Nandyal, India.

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Corresponding Author:

Dr. Dema Rajaiah

Associate Professor, Department of Orthopaedics, Government Medical College, Nandyal, India.
Email:rajaiahortho@gmail.com

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ABSTRACT

Background: Patellar fractures are common and account for nearly 1% of all bone injuries. The patella is important for extending the knee joint. Several methods have been proposed for internal fixation of a fractured patella. The aim of this study is the clinical evaluation of a modified tension band wire technique for comminuted patellar fracture.

Materials and Methods: This study includes 15 patellar fracture cases treated with a modified tension band wiring between October 2022 and October 2023 at Government General Hospital, Nandyal.

Results: All cases were operated through a midline anterior vertical skin incision, with 80% achieving excellent results with normal squatting, Grade V quadriceps strength, and total knee range of motion. 20% of cases had difficulty squatting, grade -IV quadriceps strength. and bending restraint. Minimal quadriceps atrophy is observed in 20 percent of cases.

Conclusion: Based on the analysis of this study, modified tension band wiring is the gold standard in the treatment of transverse patellar fractures.

Keywords: Patella, Fracture, Modified Tension Band Wiring.

INTRODUCTION

Patellar fractures are common and account for nearly 1% of all bony injuries.¹ The patella is important for knee extension. This increases quadriceps strength by improving leverage. In addition, it protects the anterior articular surface of the distal femur against external violence, but can be easily injured due to its unprotected position. Opinions on the proper treatment of a broken patella vary widely. Haxton.¹ in 1945 and Kaufer.² in 1971, showed from experimental work that the patella is not unimportant in knee joint and was responsible for improving its performance. Therefore, the need to preserve the entire patella or part of it becomes imperative, especially in a country like India, where social customs and needs require any bending of the knees. Several methods have been proposed for internal fixation of a fractured patella. This doctoral thesis aims at the

clinical evaluation of modified tension band wiring for patellar fracture.

Aims and Objectives

1. To study the mechanism of injury of the patellar fracture.
2. Assessment of knee joint movement and stability after the procedure.
3. To clinically evaluate a modified tension band wiring technique for the treatment of patellar fracture.
4. To study the functional outcome of early mobilization.

MATERIAL AND METHODS

This study includes 15 patellar fracture cases treated with a modified tension band wiring between October 2022 and October 2023 at Government General Hospital, Nandyal.

All the cases were fresh fractures and were traumatic in nature. 13 patients were brought to the casualty and 2 cases were admitted through the outpatient department.

Inclusion Criteria

1. Age > 16 years.
- 2) All Closed displaced transverse fracture of patella with displacement of more than 3 mm
- 3) Open transverse fracture of patella (gustillo-anderson type 1) with displacement of more than 3 mm
- 4) any gender.

Exclusion Criteria

2. Age less than 16 years
- 2) Old united fractures
3. Compound fracture, gustillo type 2 and 3
4. comminuted fracture patella.

Methodology

15 patients with fractures were evaluated. The duration of follow-up is 6 months. Details of the cases were recorded as follows: name, age, sex, occupation, address, genealogy and history were recorded. History was obtained from the patients. The nature of the trauma, whether of direct or indirect violence, was noted. In particular, whether due to traffic accidents, assassinations, fall on the same plane or fall from a height. The study looked at pain, swelling, how quickly it increases, and whether the patient is able to bear the weight of the affected limb and make active movements in the affected joint. The overall general condition of the patient is recorded and head to toe assessment was done for any associated injuries. A local examination of the knee joint was performed thoroughly.

Investigations- basic surgical routine like complete blood picture, renal function test, urine examination, serological tests(HIV,HBsAg, HCV)were done.

X-ray Examination- AP & lateral xrays were taken for diagnosis and further plan of management. Skyline xrays were taken if there are any suspicious longitudinal and marginal fractures.

Treatment

Once diagnosis is confirmed the affected limb is immobilized by above knee slab and limb elevation is maintained to reduce edema. And patient is prepared for surgery by pre-anesthetic evaluation. After obtaining surgical fitness, the parts were

prepared. West's Criteria is used for assessment of cases, which is graded as

Excellent

1. Patient do not have any limitation of activities.
2. No loss of flexion.
3. No extensor lag.
4. No subjective complaints.
5. No quadriceps wasting or subsequent reduction in

Good (1 OR >1 Criteria)

1. Moderate limitation of activity.
2. Extensor lag of 5-10 degrees.
3. Minimal wasting of quadriceps and power of grade 4.
4. Some subjective symptoms.
5. Flexion loss not >30 degrees.

Poor (1 or >1 Criteria)

1. Marked limitation of activities with significant.
2. Complaints of pain and weakness.
3. Marked quadriceps wasting and power <3.
4. Extensor lag >10 degrees.
5. Flexion loss >30 degree.

RESULTS

In this study, 15 patellar fractures were treated with modified tension band-wire technique. Special attention was given to early mobilization of the knee, as this helps to restore quadriceps strength. A patellar fracture can occur at any age. But the prevalence among children and young people under 20 is low. In this series, the minimum age limit is 21 years and the maximum age limit is 66 years. The average age was 39 years and the highest morbidity was 31-40 years. In this study, 09 patients (60%) were male and 6 patients (40%) were female. 12 of the cases (80%) achieved excellent results with a standard squat, Grade V quadriceps strength, and full knee range of motion. Three cases (20%) had difficulty squatting, quadriceps strength and flexion limitations. Minimal quadriceps atrophy is observed in 20 percent of cases. In no case was there any difficulty in climbing up and down the stairs. In no case was there a feeling of weakness and knee pain. There was no limitation in extension.

Table1: Incidence according to AGE

Age group in Years	No. of Cases
0-10	0
20-Nov	0
21-30	3
31-40	6
41-50	3
51-60	2
61-70	1
71-80	0

Table 2: Mode of Trauma

Mode of Trauma	No. of Cases	%
Fall in the same plane	9	60
Road traffic accident	6	40
Assault with stick	0	0

Table 3: Subjective Complaints

Complaints	No. of Cases	%
Pain		
Mild Difficulty in Squatting	3	20
Difficulty in Climbing Stairs	None	None
Difficulty in Stepping Down stairs	None	None
Sense of weakness or Giving away of knee	None	None

Table 4: Objective Deficiency After Modified Tension Band Wiring

Deficiency	Number of Cases	Percentage
Limitation of Flexion	3	20
Minimal Quadriceps wasting	3	20
Quadriceps power of Grade IV	3	20
Extension lag	None	None

Table 5: Incidence according to Gender

Sex	Number of Cases	Percentage
Male	9	60
Female	6	40

Table 6: Final Results

Result	Number of Cases	Percentage
Excellent	12	80
Good	3	20
Poor	0	0

DISCUSSION

Age Incidence- A patellar fracture can occur at any age. But the prevalence among children and young people under 20 is minimal. In this series, the minimum age was 21 years and the maximum age was 66 years. The average age was 39 years and the highest morbidity was 31-40 years. Levack B et al [3] did a study of patellar fracture and found that 49 years was the mean age of patellar fracture. In Bostrom's (1972) series, the mean age was 48 years and ranged from 16 to 89 years.^[4]

Sex Incidence- In this study, 9 patients (60%) were male and 6 (40%) were female. In the series S.K. Basu Ray the prevalence was 71% in males and 29% in females.^[5] In the series of Jonathan Wilkinson, the incidence was 68% in men and 32% in women.^[6]

Side of Injury- In this study, right patellar fractures (60%) were more common than left patellar fractures (40%). which were comparable to the study by Main PS et al,^[7] they found 55% right-sided and 45% left-sided patellar fractures.

Mode of Injury- In this study, indirect trauma (9 cases (60%)) was more often associated with patellar injury than direct trauma (RTA) (6 cases (40%)). which were comparable to a study by Main PS et al,^[7] who found that 65% of direct trauma was associated with patellar fractures.

Type of Fracture- This study includes transverse patellar fracture that were displaced.

Current studies shows that indirect trauma and transverse fractures often go hand in hand, and this type of fracture pattern showed better results with modified tension band wiring regardless of subject. These were comparable to the study by Maini PS et al,^[7] which found 70% transverse fractures.

Power of the Quadriceps- Quadriceps strength was graded 0-5 from no muscle activity to full strength. It was assessed by comparing with the normal side. In this study only 3 cases (20%) had grade IV strength. All the other cases (80%) had grade V.

In the series by Srinivas et al,^[8] (1984), 93% of patients had normal performance. In a study by Jakobsen et al,^[9] (1985) and Edwards et al,^[10] (1989), quadriceps muscle strength was weakened in 33% and 44% of cases, respectively.

Movements- In this study, three cases (20%) had a flexion limitation of only 20 degrees. All remaining 12 cases (80%) had full knee motion. while in Srinivas et al (1984), all cases (100%) in the series had full range of motion.

Extension Lag- In this study, no patient had extensor lag at the end of 6 months.

The final evaluation assessed the functional outcome of this study according to Western criteria, 12 out of 15 (80%) cases were excellent, 3 (20%) cases were good. No adverse outcome was found in the present study.

CONCLUSION

The clinical data were evaluated, analyzed, evaluated and the following conclusions were drawn

1. Patellar fractures occur more frequently among middle-aged groups.
2. The most common patellar fracture injury is an accidental fall on the same level.
3. Modified tension band wiring is the gold standard for the treatment of transverse patellar fractures.
4. The procedure provides very good range of motion and stability of the knee joint with minimal complications.

5. Early post-procedure mobilization leads to a good functional outcome with good joint motion and good quadriceps strength.

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