

A CLINICAL STUDY OF SURGICAL MANAGEMENT OF FRACTURE PATELLA WITH MODIFIED TENSION BAND WIRING

Yerakula Ramana¹, Dema Rajaiah², Kuppa Srinivas³, Kolathuru Sudhaker⁴, Bommala Sivaiah⁵, Bandakadi Sreekanth Reddy⁶, Nandyala Vishnu Priya⁷, Bandi Amar Tej⁸

¹Associate Professor, Department of Orthopaedics, Kurnool Medical College, Kurnool.

²Associate Professor, Department of Orthopaedics, Kurnool Medical College, Kurnool.

³Professor, Department of Orthopaedics, Kurnool Medical College, Kurnool.

⁴Postgraduate Student, Department of Orthopaedics, Kurnool Medical College, Kurnool.

⁵Postgraduate Student, Department of Orthopaedics, Kurnool Medical College, Kurnool.

⁶Postgraduate Student, Department of Orthopaedics, Kurnool Medical College, Kurnool.

⁷Postgraduate Student, Department of Orthopaedics, Kurnool Medical College, Kurnool.

⁸Postgraduate Student, Department of Orthopaedics, Kurnool Medical College, Kurnool.

ABSTRACT

BACKGROUND

Fractures of the patella are common and constitute almost 1% of all skeletal injuries. The patella is important for the extension of the knee joint. Several methods of internally fixing the fractured patella have been advocated. This study is directed towards the clinical evaluation of the modified tension band wiring technique for the fractured patella.

MATERIALS AND METHODS

The present study consists of 15 cases with fracture patella treated with modified tension band wiring during the period from October 2014 to October 2016 at govt. general hospital, Kurnool.

RESULTS

All cases were operated using a midline anterior vertical skin incision, 80% had excellent results, with normal squatting, grade-V quadriceps power and complete range of movement at knee joint. 20% of cases had difficulty in squatting, grade-IV quadriceps power and limitation of flexion. Minimal quadriceps wasting seen in 20% of cases.

CONCLUSION

From the analysis of the present study modified tension band wiring is the gold standard technique in management of transverse fracture patella.

KEYWORDS

Patella, Fracture, Modified Tension Band Wiring.

HOW TO CITE THIS ARTICLE: Ramana Y, Rajaiah D, Srinivas K et al. A Clinical study of surgical management of fracture patella with modified tension band wiring. J. Evid. Based Med. Healthc. 2017; 4(63), 3782-3785. DOI: 10.18410/jebmh/2017/755

BACKGROUND

Fractures of the patella are common and constitute almost 1% of all skeletal injuries.¹ The patella is important for the extension of the knee joint. It increases the force of the quadriceps apparatus by improving the leverage. In addition, it protects the anterior articular surface of the distal femur against external violence, but may easily be injured due to its unprotected position. Opinions differ widely as to the proper treatment of a fractured patella. Haxton.¹ in 1945 and kauffer.² in 1971, on the basis of experimental work showed that the patella was not without importance in the

knee joint and was responsible for improving its efficiency. It is because of this that the need to preserve the whole or part of the patella becomes imperative, especially in a country like India where social habits and needs require a full range of knee flexion. Several methods of internally fixing the fractured patella have been advocated. This dissertation is directed towards the clinical evaluation of the modified tension band wiring technique for the fractured patella.

Aims and Objectives- 1. To study the mode of injury for fracture of patella. 2. To assess knee joint motion and stability after the procedure. 3. To clinically evaluate the modified tension band wiring technique for management of fracture patella. 4. To study the functional outcome by early mobilization.

MATERIALS AND METHODS

The study was conducted in 15 patients between October 2014 to October 2016 for a period of 2 years in Government

Financial or Other, Competing Interest: None.

Submission 19-06-2017, Peer Review 24-06-2017,

Acceptance 21-07-2017, Published 05-08-2017.

Corresponding Author:

Dr. Dema Rajaiah,

s/o. Dema Chinna Rajaiah, Gayathri Towers 202,

Gayathri Estate, Kurnool-518002, Andhra Pradesh.

E-mail: rajaiahortho@gmail.com

DOI: 10.18410/jebmh/2017/755



General Hospital, Kurnool. All the cases were fresh fractures and were traumatic in nature. 11 patients were brought to the casualty and 4 cases were admitted through the outpatient department.

Inclusion Criteria- 1) Age more than 16 years. 2) All Closed displaced transverse fracture of patella with displacement of more than 3 mm 3) Open transverse fracture of patella (gustillo type 1) with displacement of more than 3 mm 4) Both male and female patients.

Exclusion Criteria- 1) Age <16 years 2) Old united fractures 3. Compound fracture, gustillo type 2 and 3 4. comminuted fracture patella.

Methodology- 15 patients who had fractures were available for evaluation. Duration of follow up 6 months. The details of the cases were recorded as follows- The name, age sex, occupation, address, family history and past history were noted. The history was elicited from the patients. The nature of trauma, whether due to direct or indirect violence was noted. Whether trauma due to Road traffic accidents, assault, fall in the same plane or fall from a height were specifically asked. Enquiry was made to note pain, swelling its rate of increase and if the patient was able to bear weight on the affected limb and was able to do active movements of the affected joint. General condition was examined as to his build. Nutritional status, the condition of respiratory and cardio-vascular system, central nervous system, abdomen and for associated injuries. Local examination of the knee joint was done thoroughly.

Investigations- Routine examination of blood and urine were done for hemoglobin percentage, total and differential WBC count, bleeding and clotting time and presence of albumin and sugar in urine tests.

X-ray Examination- X-rays in lateral and antero-posterior views were taken for confirmation of diagnosis. X-rays in skyline view were taken in cases suspected to have longitudinal and marginal fractures. Treatment: After the X-rays the limb was immobilized by an above knee (A/K) POP posterior slab. Operations were done at a later date. If abrasions were presents in the skin they were cleaned, dressed and antibiotics given. Patients were prepared for surgery during this period. On the day before the surgery the part was prepared and antibiotics started. Patients were taught static quadriceps drill and straight leg exercises. . All the cases were assessed based on West’s Criteria. 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 power.

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 cases of fractured patella were treated by the modified tension band wiring technique, special attention was given to mobilize the knee early as it helps to regain the quadriceps power. Fracture patella can occur at any age. But the frequency in children and adolescents under 20 years of age is low. In this series the minimum age 21 years and maximum age 66 years. The mean age was 39 years and maximum incidence was between 31 to 40 years. In the present study 12 patients (80%) were males and 3 patients (20%) were females. 12 cases (80%) had excellent results, with normal squatting, grade-V quadriceps power and complete range of movement at knee joint. 3 cases (20%) had difficulty in squatting, grade-IV quadriceps power and limitation of flexion. Minimal quadriceps wasting seen in 20% of cases. None of the cases had difficulty in climbing upstairs and stepping downstairs. None of the cases presented with sense of weakness and giving away sensation of knee. None of the cases had extensor lag.

| Age in Years | Number of Cases |
|--------------|-----------------|
| 0-10 | 0 |
| 11-20 | 0 |
| 21-30 | 3 |
| 31-40 | 6 |
| 41-50 | 3 |
| 51-60 | 2 |
| 61-70 | 1 |
| 71-80 | 0 |

Table 1. Age Incidence

| Nature of Trauma | Number of Cases | Percentage |
|------------------------|-----------------|------------|
| Fall in the same plane | 9 | 60 |
| Road traffic accident | 6 | 40 |
| Assault with stick | 0 | 0 |

Table 2. Nature of Trauma

| Complaints | Number of Cases | Percentage |
|--|-----------------|------------|
| 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 3. Subjective Complaints Following 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 4. Objective Deficiency After Modified Tension Band Wiring

| Sex | Number of Cases | Percentage |
|--------|-----------------|------------|
| Male | 12 | 80 |
| Female | 3 | 20 |

Table 5. Sex Incidence

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

Table 6. Overall Results

DISCUSSION

Age Incidence- Fracture patella can occur at any age. But the frequency in children and adolescents under 20 years of age is low. In this series the minimum age was 21 and maximum age 66 years. The mean age was 39 years and maximum incidence was between 31 to 40 years. Levack B et al³ conducted study on patellar fracture and observed 49 years was average age for patellar fracture. In Bostrom (1972) series, the mean age was 48 years ranging between 16 to 89 years.⁴

Sex Incidence- In the present Study 12 patients (80%) were males and 3 (20%) were females. In the series of S.K. Basu Ray the incidence was 71% males and 29% females⁵. In Jonathan Wilkinson series, the incidence was 68% males and 32% females.⁶

Side of Injury- In the present study, right side patellar fractures (60%) were found more common than left side patellar fractures (40%). which were comparable with study conducted by Maini PS et al⁷ they observed 55% on right side than 45% on left side patellar fractures.

Mode of Injury- In the present study Indirect trauma (9 cases (60%)) was more commonly associated with patellar injury compared to (6 cases (40%)) direct trauma (RTA). which were comparable with study conducted by Maini PS et al⁷ they observed 65% direct trauma was associated with patellar fractures.

Type of Fracture- In the present study included only Transverse fracture pattern of patella, which were displaced. Present study indicating indirect trauma and transverse fractures go hand in hand most of time and this type of fracture pattern showed excellent result with modified tension band wiring irrespective of the subject. Which were comparable with study conducted by Maini PS et al⁷ observed 70% of Transverse fractures in their study.

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 srinivas et al⁸ (1984), series, normal power was in 93% of patients. In the study of jakobsen et al⁹ (1985) and Edwards et al¹⁰ (1989) reduction in quadriceps strength was seen in 33% and 44% cases respectively.

Movements- In this study 3 cases (20%) had limitation of flexion of only 20 degree of knee flexion. All the other 12 cases (80%) had complete range of knee movement. whereas in srinivas et al⁸ (1984), series, all cases (100%) had full range of movements.

Extension Lag- None of the patients had extension lag at the end of 6 months in the present study.

At final assessment, the functional outcome in the present study were graded according to the west criteria out of 15 cases 12 (80%) cases were excellent, 3 (20%) cases were good. The Present study did not encountered any poor result.

CONCLUSION

The clinical data was assessed, analysed, evaluated and following conclusions were made-

1. Patella fractures are more common among middle aged group individuals.
2. The most common mode of injury for fracture patella is accidental fall on the same plane.
3. modified tension band wiring is the gold standard technique in managing the transverse fractures of patella.
4. The procedure will yield very good range of knee joint motion and stability with least complications.
5. Early mobilization after the procedure will result in good functional outcome with good range of joint movements and good quadriceps power.

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