



ORIGINAL RESEARCH PAPER

Orthopaedics

CLINICAL STUDY OF MODIFIED TENSION BAND WIRING FOR FRACTURE PATELLA

KEY WORDS: Modified tension band wiring, fracture patella, knee joint

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ABSTRACT

Fractures of the patella are common and constitute almost 1% of all skeletal injuries. The patella is of importance 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. 20 cases of fractured patella were selected to study the mode of injury for fracture of patella, to assess knee joint motion and stability after the modified tension band wiring technique for fracture patella. Early and continuous physiotherapy following the modified tension band wiring technique is of paramount importance in determining the end results.

INTRODUCTION

A patellar fracture is a break in the patella, or kneecap, the small bone that sits at the front of your knee. Because the patella acts as a shield for your knee joint, it is vulnerable to fracture if you fall directly onto your knee or hit it against the dashboard in a vehicle collision. A patellar fracture is a serious injury that can make it difficult or even impossible to straighten your knee or walk. Some simple patellar fractures can be treated by wearing a cast or splint until the bone heals. In most patellar fractures, however, the pieces of bone move out of place when the injury occurs. For these more complicated fractures, surgery is needed to restore and stabilize the kneecap and allow for the return of function. Fractures of the patella are common and constitute almost 1% of all skeletal injuries. The patella is of importance 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 position¹. Opinions differ widely as to the proper treatment of a fractured patella. Haxton² in 1945 and Kaufer in 1971³ 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.

MATERIALS AND METHOD

The present study consists of 20 cases of fractured patella treated by modified tension band wiring at the Sree Siddhartha Medical College, Tumkur from July 2006 to October 2008. 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 history violence was noted. Whether trauma due to road traffic accidents, assault, fall in the same plane or fall from 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 cardiovascular systems and for associated injuries.

Local examination was done in the following steps:

a) On inspection the following points were noted. Whether the knee was swollen. If so the size and extent of the swelling, condition of the skin over the swelling and presence of any contusion, abrasion or laceration. Whether any sulcus present in the middle of the swelling. b) On palpation the following points were noted. Any local rise of temperature,

tenderness over the bone a palpable transverse Sulcus. crepitus, fluctuation and broadening of patella. c) Active extension movements of the affected knee noted compared with normal side. It was also noted whether the patient was able to stand on his injured limb. d) The circumference of both the thighs were measured to note any reduction in the bulk of the quadriceps.

INVESTIGATIONS:

Routine examination of blood and urine were done for haemoglobin percentage, total and differential WBC count, bleeding and clotting time and presence of albumin and sugar in urine and HbsAg, HIV 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 POP posterior slab. Operations were done at a later date. If abrasions were present 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 raising exercises

OBSERVATION AND RESULTS

Since the advent of surgical treatment of the fractured patella, opinion has changed from one advocating removal of the patients to one preserving either part or preferably whole of the patella. If the fragments can be realigned and fixed in such a way that once it heals, it is in no way different from its pre-fractured status, it would be the ideal treatment. In this series 20 cases of fractured patella were treated in patients between the age group of 20-50 years by the modified tension band wiring technique, special attention was given to mobilize the knee early as it helps to regain the quadriceps power.



Case No.1. Pre & Post Operative stage

TABLE NO: 1: Age incidence

Age in Years	No.of Cases	Percentage
20-30	5	25
31-40	9	45
41-50	6	30

Fracture patella can occur of any age. But the frequency in children and adolescents under 20 years of age is low, In this series the range of age was taken between 20 to 50 years. The mean age was 45 years and maximum incidence was between 31 to 40 years.

TABLE NO .2: Sex incidence

In the present series 10 patients (50%) were males and 10 (50%) were females. In this series no sex predomination was observed.

sex	No of Cases	Percentage
Male	10	50
Female	10	50

TABLE.NO:3:Nature of Trauma

Nature of trauma	No of Cases	percentage
Fall in the same plane	15	75
Road traffic accident	4	20
Assault with stick	1	5
Transverse fracture	20	100

In this series 5 cases were due to direct injury and 15 cases due to indirect injury. Fall in the same plane was the most common (75%), assault with sticks directly over the patella 5% and road traffic accident 20%.

RESULTS AND DISCUSSION

In this 10 cases were male and 10 cases were female, 15 cases were having indirect injury and 5 were having injury. Fourteen cases graded as excellent, cases graded as good and one case as poor.

Criteria to grade the cases mentioned below:

- 1. Excellent:** This knee was functionally normal. The patient has to subjective complaints like pain, difficulty is squatting and climbing steps and objective deficiencies like quadriceps wasting and flexion and extension and normal quadriceps power.
- 2. Good:** There was occasional pain. Patient can squat and climb steps with some difficulty. Limitation of flexion less than 20 quadriceps wasting, less than 1 cm, and reduction of quadriceps power from grade V to grade IV.
- 3. Poor:** Cases which failed to attain the above standards.

Since the advent of surgical treatment of the fractured patella, opinion has changed from one advocating removal of the patella to one preserving either part or preferably whole of the patella. If the fragments can be realigned and fixed in such a way that once it heals, it is in no way different from its pre – fractured status, it would be the ideal treatment. In this series 20 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. The findings, the end results and various other data will be analyzed and compared in the following discussion.

In the present series 10 patients (50%) were males and 10 (50%) were females. In the series of S.K.Basu Ray and M.S. Ghosh the incidence was 71% males and 29% females. In Jonathan Wilkinson series, the incidence was 68% males and 32% females. In general it can be said that the patella fracture commonly occur in males because of an active and vigorous life style. In present series no sex predisposition was observed.

CONCLUSION

Fractures of the patella are common. It is rare are below the age of 20 years. Fall in the same plane is the most common

cause of fractures of the patella. Vertical incision is more helpful to mobilize the patient early. Early mobilization of the knee restores quadriceps power and range of knee motion within a short period. Excellent range of movement was achieved in 70% of cases. Early and continuous physiotherapy following the modified tension band wiring technique is of paramount importance in determining the end results. Modified tension band wiring is the choice of the fractured patella.

REFERENCES

1. Page Whittle, "Campbell's operative orthopaedics", Chapter 74.9 edition, Edit. S.Terry Canale, St.Louis, Mosby, Vol.3, 1998; 2111-2119pp.
2. Haxton H.A. "The functions of the patella and the effects of its excision". Surg Gynecol Obst, 1945; 80:389pp.
3. Kaufer H. Mechanical function of the patella". JBJS, 1971; 59(A):1551.
4. Cameron HC. "Transverse fracture of the patella". Glasgow Med J, 1878; 10: 289-294pp.
5. Heineck AP. The modern operative treatment of fracture of the patella: I. Based on the study of other pathological states of this bone. II. An analytical review of over 1,100 cases treated during the last ten years, by open operative method. Surg Gynecol Obstet, 1909; 9:177-248pp.
6. Thompson JEM. "Fracture of the patella treated by removal of the loose fragment and plastic repair of the tendon". Surg Gynecol Obstet, 1942; 74: 860-866pp.
7. Brooke R. "Treatment of fracture patella by excision. A study of morphology of function". Br.J Surg, 1936-37; 24:733pp.
8. Cohn BNE. "Total and Partial patellectomy". Surg Gynecol Obstet, 1994; 79: 526-536.
9. Douglas CD., Netto. "Fractures of the patella". PGMJ, 1963; 39:83.
10. Smile I.S. "Injuries of the knee joint". 4th edition, Churchill Livingstone, London, 1978.
11. Muller ME, Aigower M, Willenegger H. "Technique recommended by the AO group. In Manual of internal fixation". New York: Springer-Verlag, 1972; 249-250pp.
12. Weber M.J., Janecki C.J., McLeod P. et al. "Efficacy of various forms of fixation of transverse fractures of the patella". JBJS, AM, March 1980; 62(2);
13. Dudani B, Sancheti K.M "Management of fracture of the patella by tension band wiring". Ind. Jof Ortho. 1981; 15-1:43-48pp.
14. Ma Y.Z., Zhang Y.F., Qu K.F. et al. "Treatment of fracture of the patella, with percutaneous suture". Clin Ortho, 1984; 191: 235-241pp.
15. Marya S.K., Bhan S., Dave P.K. "Comparative study of knee function after patellectomy and osteosynthesis with a tension band wire following patellar fractures". Int Surg, oct-Dec. 1987; 72(4)
16. Benjamin J, Bried J, Dohmm et al. "Biomechanical evaluation of various forms of fixation of transverse patellar fracture". J Ortho Trauma, 1987; 1:219pp.
17. Carpenter JE, Kasman RA, Patel N. et al. "Biomechanical evaluation of current patella fracture fixation techniques". J Orthop Trauma, 1997; 11:351-356.
18. Grays Anatomy, 37th edition, Churchill Livingstone, 1995: 439-442pp.
19. Cunningham's manual of practical anatomy, 15th edition, ELBS, Oxford University Press, Vol.1, 1984: 215-221pp.