

Original Research Article

Comparison of the outcomes of pull through suturing vs. tension band wiring fixation techniques in the management of patellar fractures

Rahul Kadam, Sachin Pandey*, Abhay Challani, Vicky Jain, Akshay Shah, Ankit Agarwal

Department of Orthopaedics, MGM Hospital and Medical College, Navi Mumbai, Maharashtra, India

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***Correspondence:**

Dr. Sachin Pandey,

E-mail: taurusion9@gmail.com

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ABSTRACT

Background: Operative fixation of displaced patella fractures has now become the standard of care. This study aims to assess functional outcomes, as well as identify complications in patients treated with non-absorbable braided suture fixation for patellar fractures. These patients were then compared to a group of patients treated with K-wires with tension band wiring.

Methods: This study was conducted on the patients admitted to orthopaedic ward at MGM medical college and hospital, Kamothe, Navi Mumbai. Total number of patients was taken for this study. Patients were followed up for a period of 6 weeks, 3 months, 6 months and at each visit. Patients were assessed by Lysholm knee score.

Results: The mean age was 43.33 years for TB wiring group and 46.26 years for pull through suturing group. Out of 30, 15 were in TB wiring group in which 14 males and 1 female and, 15 in pull through suturing group 4 females and 11 males. The mean Lysholm knee score at 6 weeks for TB wiring group was 68.2 at 3 months was 81.4 at 6 months was 87. The mean Lysholm knee score for 6 weeks for pull through suturing was 69.2, at 3 months was 72.5 and at 6 months was 79.2.

Conclusions: Patella fracture most common fractures, in this study we have discussed two modalities of treatment one is TB wiring and second is pull through suturing showing results that TB wiring have better results.

Keywords: Patella, Lysholm knee score, Tension band wiring, Pull through suturing

INTRODUCTION

2% or less than 2% are the amount of patella fractures of all skeletal fracture that occur to a human body, and out of that 70–90% of are transverse fracture of the patella bone, which disrupts the extensor mechanism of the knee.¹⁻⁴

Anatomical open reduction and internal fixation is done for most of the transverse fractures with displacement, articular incongruity of 2 mm or more because patella is subjected a lot of tensile force, or a extensor mechanism disruption.^{2,5-7}

Fixation can be achieved in many ways the tension band wiring or TBW as called is a technique is the most commonly used method in the world for most of the patella fracture fixation in the world.^{1,2,5,8-10}

This technique in which two k wires used wounded in figure of eight with a metallic wire, as all technique this technique has certain advantages and disadvantages. Most common disadvantage being long incision with a soft tissue dissection to provide adequate visualization of the fracture as well as the joint surfaces.^{5,6,11,12}

Other major disadvantage being damage to the blood supply of the patella, the need for long term rehabilitation

including physiotherapy such as knee range of motion exercises to reproduce the same extensor mechanism of the knee. Excessive bleeding, increased operative time, and the risk of prolonged anaesthesia time the patient is under.^{7,10,15,17,18}

Postoperative complications with this method, are mostly implant-related. Other major issues include wire breakage and migration of the wire away from the site leading to implant failure, seen after operative procedure limitations are loss of reduction and implant irritation, with increased rates of subsequent implant removal for symptomatic hardware.^{15,17,19}

The complications seen with conventional K wire fixation and tension band wiring, several alternative approaches have been described.

Other studies around the world suggest that the sutures such as 5- ethibond and fiber wire are same in strength to

and also avoid the irritation related with it, K wire can be used to fix transverse or lower pole patella fractures.²⁰⁻²²

In this study we tried to determine outcomes of use of pull through suturing vs. tension band wiring fixation techniques in the management of patellar fracture.

Aim and objective

To study the outcomes by comparison of pull through suturing vs. tension band wiring fixation techniques in the management of patellar fractures

METHODS

Source of data: Patients admitted in MGM hospital, Kamothé

Type of study: Retrospective.

Table 1: Lysholm knee score.²³

Section 1: limp	<ul style="list-style-type: none"> • I have no limp when I walk. (5) • I have a slight or periodical limp when I walk. (3) • I have a severe and constant limp when I walk. (0)
Section 2: using cane or crutches	<ul style="list-style-type: none"> • I do not use a cane or crutches. (5) • I use a cane or crutches with some weight-bearing. (2) • Putting weight on my hurt leg is impossible. (0)
Section 3: locking sensation in the knee	<ul style="list-style-type: none"> • I have no locking and no catching sensation in my knee. (15) • I have catching sensation but no locking sensation in my knee. (10) • My knee locks occasionally. (6) • My knee locks frequently. (2) • My knee feels locked at this moment. (0)
Section 4: giving way sensation from the knee	<ul style="list-style-type: none"> • My knee gives way. (25) • My knee rarely gives way, only during athletics or vigorous activity. (20) • My knee frequently gives way during athletics or other vigorous activities. In turn I am unable to participate in these activities. (15) • My knee frequently gives way during daily activities. (10) • My knee often gives way during daily activities. (5) • My knee gives way every step I take. (0)
Section 5: pain	<ul style="list-style-type: none"> • I have no pain in my knee. (25) • I have intermittent or slight pain in my knee during vigorous activities. (20) • I have marked pain in my knee during vigorous activities. (15) • I have marked pain in my knee during or after walking more than 1 mile. (10) • I have marked pain in my knee during or after walking less than 1 mile. (5) • I have constant pain in my knee. (0)
Section 6: swelling	<ul style="list-style-type: none"> • I have swelling in my knee. (10) • I have swelling in my knee only after vigorous activities. (6) • I have swelling in my knee after ordinary activities. (2) • I have swelling constantly in my knee. (0)
Section 7: climbing stairs	<ul style="list-style-type: none"> • I have no problems climbing stairs. (10) • I have slight problems climbing stairs. (6) • I can climb stairs only one at a time. (2) • Climbing stairs is impossible for me. (0)
Section 8: squatting	<ul style="list-style-type: none"> • I have no problems squatting. (5) • I have slight problems squatting. (4) • I cannot squat beyond a 90deg. Bend in my knee. (1) • Squatting is impossible because of my knee. (0)

Time of study

June 2016 to October 2017.

Method of collection of data

Sample size: 15 patients each in tension band wiring technique group and pull through suturing technique group of patellar fracture fixation.

Cases satisfying the inclusion criteria and exclusion criteria admitted in MGM hospital, Kamothe, Navi Mumbai

Inclusion criteria

Inclusion criteria were patient diagnosed with patella fracture; both males and females; age group: 17-75 years; non union patella fracures

Exclusion criteria

Exclusion criteria were infected knee pathology.

Period of follow-up

After 6 weeks, 3 months, 6 months post surgery.

Parameters for evaluation

Questionnaire was designed to assess outcomes and applied via phone interview by an independent assessor.

Statistical tests

The collected data will be evaluated using appropriate statistical methods.

RESULTS

This study was done on the patients admitted in the orthopaedic ward at MGM Medical College and Hospital, Kamothe, Navi Mumbai. All patients who underwent distal end radius fracture surgery by various modality fulfilling our inclusion criteria were undertaken. Out of 30 patients 25 were males and 5 were females. The mean age was 43.33years for TB wiring group and 46.26 years for pull through suturing group (17-75 years age group). Out of 30, 15 were in TB wiring group in which 14 were males and 1 were female and, 15 in pull through suturing group 4 females and 11 male (Table 2).

Out of two modalities we took under study, mean Lysholm knee score for end of 6 weeks for TB wiring group was 68.24 and end of 3 months was 81.46 and end of 6 months was 87.06. The mean Lysholm knee score for end of 6 weeks for pull through suturing group was 69.2, at end of 3 months was 72.53 and end of 6 months was 79.20 (Table 3).

Table 2: Demographic data.

	Males	Females	Mean age (yrs)
TB wiring	14	1	43.33
Pull through suturing	11	4	46.26
Total	25	5	

Table 3: Lysholm knee score at 6 weeks, 3 months, 6 months.

Operative procedures	Lysholm knee score at 6 weeks	At 3 months	At 6 months
Tension band wiring	68.24	81.46	87.06
Pull through suturing	64.20	72.53	79.20

Total: Lysholm knee score :_/100

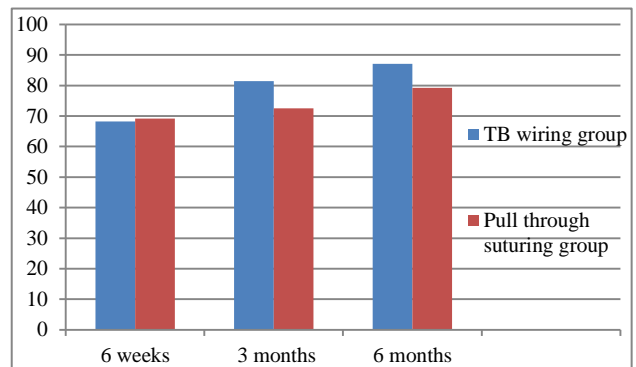


Figure 1: Lysholm knee score at end of 6 weeks, 3 months and 6 months for both groups.

Comparing the two modalaties the Lysholm knee score was better in the group of patients who underwent TB wiring as compared to the group which underwent pull through suturing.

DISCUSSION

Comparing the two modalities the Lysholm knee score was better in the group of patients who underwent TB wiring as compared to the group which underwent pull through suturing.

Gosal et al compared non-absorbable Ethibond and with K-wires and metallic cerclage wire fixation. No complications were present in seven patients treated with non-metallic implants, whereas for the six patients treated with K-wire and cerclage wire complications and reoperations were reported.²⁴

Yotsumoto et al treated transverse patellar fractures using metallic ring pins (RP) and braided poly blend suture (BPS). No postoperative complications or limitations were observed. The primary benefit of this method is ease of operation. Another benefit is the reduced incidence of complications related to metallic materials, as the RP and

BPS do not migrate from the reduction site, being self-locking.²⁵

Comparing the two modalities the Lysholm knee score was better in the group of patients who underwent TB wiring as compared to the group which underwent pull through suturing.²⁶

Comparing our study to Gosal et al and Yotsumoto et al showed that our study Tb wiring has better outcome for Lysholm knee score as compared to pull through suturing but complication rate was more in the TBW group as compared to pull through suturing group.

Complications

There was a complication seen with pull through suture getting infected which was easily treated with oral antibiotic course.

Limitations

Our study is limited by a small patient population, which reduces the statistical analysis.

We require extensive study preferable cohort study to give an accurate result.

CONCLUSION

Patella fracture is one of the most common fracture. It may occur due to low-energy or high-energy trauma.

Extra-articular fractures with minimum displacement can be managed conservatively while intra-articular fracture and more displaced fracture requires fixation by various modalities depending upon surgeons choice of treatment.

In our study we used tension band wiring and pull through suturing.

It was seen that tension band wiring was found better than pull through suturing as the principle of TB wiring shows better reduction in fracture space and alignment than seen in pull through suturing.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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