ORIGINAL ARTICLE

Post Operative Functional Outcome of Modified Tension Band Wiring in Patients with Transverse Fracture of Patella

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ABSTRACT

Aim: To determine the post operative functional outcome (range of motion) in patients with transverse fracture of patella managed with tension band wiring.
Study design: It was a descriptive cross sectional survey.
Duration: From 20th December 2008 to 25th June 2011.
Settings: Department of Orthopaedic Surgery, DHQ Hospital, Bhakkar.
Material and methods: A total of 30 patients were included in the study to determine the post operative functional outcome in patients with transverse fracture of patella managed with tension band wiring.
Results: Majority of the patients were between 41-50 years 76.67% male patients and 23.33% were female, follow up at 3rd month revealed 36.67% were found with excellent range of motion, 56.67% were found with good, and 6.67% (n=2) were found with fair range of motion.
Conclusion: The post operative functional outcome (range of motion) in patients with transverse fracture of patella managed with tension band wiring is found better.
Keywords: Transverse fracture of patella, management, tension band wiring

INTRODUCTION

The Patella, or knee cap, is a triangular seasamoid bone about 5cm in diameter, which is embedded in the tendon of insertion of quadriceps femoris muscle. The tendon of quadriceps femoris in continuation from lower pole is inserted to upper tibia[1]. Patella is an important component of extensor mechanism of knee[2].

Facture of the patella was known since Hippocratic time, which constitutes approximately 1% of all fractures, present a higher prevalence within the age group of 20 to 50 years old and males are twice more affected than females[3,4]. The anterior subcutaneous location of the patella makes it vulnerable to direct trauma, such as the knee striking the dashboard of an automobile or from a fall on the anterior knee. Fracture of the patella can occur either by direct or by indirect force. The direct force often results in comminuted or displaced fractures, whereas the indirect force such as sudden violent contraction of quadriceps muscles with knee flexion causes transverse fracture of patella. But usually the fracture patella results from combination of both direct and indirect violence[5].

The treatment of fracture of patella is subject of controversy. Options available are conservative management, open reduction and internal fixation by different methods. If fracture fragment shows less than 3mm separation and no displacement in articular surface, it can be treated conservatively in Plaster of Paris cylinder cast. While in communited fracture of patella where repair is not possible, patellectomy is an option. Fragments displaced more than 3 mm, should be fixed in patella fractures.[3] Different options are available but anterior tension band wiring has been proven effective of all[3,6].

I, therefore planned to conduct this study with the view to determine the functional outcome (range of motion) in patients managed with tension band wiring, so that a better treatment for functional outcome may be determined. The significance of this study was the rehabilitation protocol post operatively after modified tension band wiring in transverse fractures of patella, the better function would be determined earlier.

MATERIAL AND METHODS

A total of thirty (30) patients coming to the emergency department fulfilling the inclusion/exclusion were enrolled on the basis of their consent to include their data in the study. We enrolled all closed displaced transverse patellar fracture with intra articular incongruity of more than 2mm and displacement of more than 3 mm, between 16-55 years of both gender, and fit for spinal anesthesia while patients with compound fractures, Gustillo any type, comminuted fractures, fracture involving other ligamentous and bony injuries in the knee region and any established knee deformities prior to fracture were excluded. History was taken in detail, all preliminary general, local and radiographic evaluation

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was done. After general or spinal anaesthesia in the operation theatre, single surgeon gave midline incision over themed portion of the patella, anatomically reducing the fracture fragments and fixing with two 2mm kirschner wires from inferior to superior borders, about 5mm deep to the anterior surface of the patella and then by passing an 18-gauge wire in figure-eight fashion and tightened at the upper end, proper reduction of the patella checked by palpating the undersurface of the patella with the knee extended, Retinacular tears repaired with multiple interrupted sutures by vicryl 2-0 skin was closed by prolene 2-0 or silk 2-0 and bandaging with Robert Jones bandage. Post operative follow up was conducted by the researcher, each patient was counseled to follow strictly the post operative rehabilitation protocols. Patients were asked to do Stairmaster (forward/retro) exercise on 2nd follow up (4th week). The patients were followed in 2nd week, 4th week, 2nd month and 3rd month. In each follow up, range of motion was recorded, Good fellow's grading of range of motion was done, check x-ray was taken to assess fracture union. All this information was recorded on pre-designed proforma.

The collected data was entered in SPSS version 12 for analysis. The age was presented as Mean±SD. Gender distribution and functional outcome was assessed in terms of Excellent, good and fair presented as frequency and percentage.

RESULTS

Total 30 patients were included in the study to determine the post operative functional outcome (range of motion) in patients with transverse fracture of patella managed with tension band wiring.

In my study, 41-50 years of age was found common as we recorded 40% (n=12) and 30% (n=9) was found with 31-40 years of age, while 16-20 years was found in 20%(n=6) and only 20%(n=3) were found with 51-55 years. Mean and s.d. was 36.33±4 (Table 1). Regarding gender distribution of the patients, 76.67% (n=23) were found male and 23.33% (n=7) were found female (Table 2).

Functional outcome was assessed in terms of excellent, good and fair according to Goodfellow's criteria range of motion, on first follow up at 2nd week we found 86.67%(n=26) with fair range of motion, while 13.33% (n=4) were found good, on 2nd follow up at 4th week, 63.33% (n=19) were found with fair and 36.67% (n=11) were found with good range of motion, and on third follow up at 2nd months, 16.67%(n=5) were found with excellent range of motion, 46.67% (n=14) were found with good, and 36.67% (n=11) were found with fair while at 3rd month follow up 36.67% (n=11) were found with excellent range of motion, 56.67%(n=17) were found with good, and 6.67% (n=2) were found with fair range of motion (Table 3).

Table 1: Age distribution of the subjects (n=30)

Age (in years)	=n	%age
16-20	6	20
31-40	9	30
41-50	12	40
51-55	3	10

Mean and S.D.= 36.33±4.60

Table 2: Gender of the subjects (n=30)

Gender	=n	%age
Male	23	76.67
Female	07	23.33

Table 3: Functional range of motion at knee

Good fellow's criteria	2nd week	4th week	2nd month	3rd month
Excellent			05	11
Good	04	11	14	17
Fair	26	19	11	2

DISCUSSION

Fracture of the patella is a common injury in the adult and constituting approximately 1% of all skeletal injuries.[7] The treatment of fracture of patella is subject of controversy. Options available are conservative management, open reduction and internal fixation by different methods. If fracture fragment shows less than 3 mm separation and no displacement in articular surface, it can be treated conservatively in Plaster of Paris cylinder cast. While in communited fracture of patella where repair is not possible, patellectomy is an option. Fragments displaced more than 3mm, should be fixed in patella fractures[3]. Different options are available but anterior tension band wiring has been proven effective of all[3,6].

However, the current study was planned with the view to determine the functional outcome (range of motion) in patients managed with tension band wiring, so that a better treatment for functional outcome may be determined. The significance of this study was the rehabilitation protocol post operatively after modified tension band wiring in transverse fractures of patella, the better function would be determined earlier. Age of the patients was ranging from 16-55 years with an average age of 36.33±4.60 years. In the present study there were 23 males (76.67%) and 7 females (23.33%).

In the present study we have included only closed transverse pattern of patellar fractures which were displaced and this type of fracture pattern

showed excellent results with modified tension band wiring irrespective of the age of the subject.

In this study we followed patients upto three months, where as in Einolas et al[8] and Dudani et al[9] studies the average follow up was 12 to 18 months.

However, the results of their study showed 74% excellent and 26% good results while in the current study we recorded excellent results in 36.67%(n=11) and 56.67% (n=11) with good results, the reason behind this difference may be long follow up in Dudani et al's study. While our results are in contrast to another study conducted by Shrestha B[10] who found 21.9% excellent results. Our results are slightly better than their, the reason behind this slight difference may be due to good follow up for physiotherapy in our patients. Another common findings between the current study and the study by Shrestha B is "gradually improved outcome" in patients treated with tension band wiring in patients with transverse fracture of patella.

So, the results of the current study and other studies showed that functional outcome (range of motion) in patients managed with tension band wiring is a better treatment for transverse fracture of patella and the rehabilitation protocol post operatively after modified tension band wiring, the better function is determined earlier.

Thus for complete assessment of outcome and for seeing any late complications like patello femoral arthritis we need an extended follow up of 6 months to one year.

CONCLUSION

The post operative functional outcome (range of motion) in patients with transverse fracture of patella managed with tension band wiring is found better

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