

Management of Patella Fracture by Tension Band Wire Fixation

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ABSTRACT

Objective: To analysis the out come of patella fracture with tension band wiring fixation regarding its anatomical restoration, union time and functional outcome.

Study Setting& Duration: This Quasi experimental study was designed and conducted in Department of Orthopaedic Surgery of Peoples University of Medical health & sciences Nawabshah (SBA), from January 2015 to July 2016.

Methods: 30 patients having patella fracture were included and divided in two groups. Group A was stabilized with Modified tension band (MTB) fixation and group B for Lotke longitudinal anterior band (LAB) wiring techniques; each group consisted of 15 patients.

Results: Total 30 patients were evaluated in this study equally divided into two . The mean age was 41+5.23 years. Range(20-70) years. 22(73.33%) were male patients and 8(26.66%) were females, with male to female ratio of 2.7:1. 12 cases (80%) achieve union in MTB group while only 7 (46.6%) cases achieve union in LAB group at 6-9 weeks with statistically significant p- value = 0.001. The mean healing time in MTB group was 7.3+ 3.1 weeks while in LAB group it was 9.1+ 2.1 weeks. Functional outcome was excellent in 53.33% patients of MTB group and 40% patients of LAB group, good was seen 26.66% patients in each group, fair in 13.33% patients of MTB group and 20% patients of LAB group and poor was in 6.66% (one) patient in MTB group and 26.66% (four) patients in LAB group.

Conclusion: The modified tension band are more predictable as compare to that of longitudinal anterior band (LAB) in treatment of displaced transverse closed fractures of patella regarding anatomical restoration and functional outcome.

Key words: Patella fractures, Functional Outcome, Modified Tension Band, Longitudinal Anterior Band.

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INTRODUCTION:

There are various sesamoid bones in the human body among patella is the largest one. It play vary important role in knee extension¹. As researcher states that about 1% of all skeletal injuries is patella fractures², commonly in young, adult group 20 to 50 years old³ with males dominancy. Although direct injury is common mechanism but indirect can be happened.

Patella fracture presence with history of direct or indirect injury along with swelling, joint effusion, pain and persistent tenderness^{3,5}.

There are various possibilities to treat patella fracture like immobilization with cast as conservative, surgically we have bands, screws and patellectomy either partial or complete^{6,7}. As literature shows that preservation of patella is more preferable than its resection. Otherwise significant loss happened in its important role in knee joint extensor mechanism^{8,9}. Early surgery gives better results but limitation of joint movement specially with fixation is common¹⁰. The best results after surgical treatment of patella fracture are obtained by osteosynthesis of the fracture by using modified TBW technique¹¹. Ideally tension band wiring technique is used for transverse fractures if fracture is communicated with large enough pieces, it can be used after lagging with screws convert communication in

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transvers fracture. Clinically and according historical background there are various wiring techniques or procedures has been used either as a single or in combination with cerclage, screws and Kirschner wires¹². The aims & objectives of the study are to assess the union time and functional outcome of transverse patellar fracture by two different methods of tension band wire fixation.

METHODS:

This is quasi experimental study consisted of 30 patients conducted at Department of Orthopaedic Surgery of Peoples University of Medical & Health sciences Nawabshah (SBA). from January 2015 to July 2016. Inclusion criteria were displaced transverse closed fractures according to Saunder's classification and patients above 20 years of age of either gender. Exclusion criteria were other methods of fixation, open fracture, associated severe medical problems and patients younger than 20 years of age. Patients were divided in two groups. Group A with modified tension band (MTB) and Group B with Lotke longitudinal anterior band (LAB) wiring techniques. Detailed Clinical examination of the patient was done and systemic review was also done to see any major or minor body injury. Version 16.0 of SPSS were used to analyzed data was analyzed. All the categorical variables like gender, side of fracture, range of motion, functional outcome, time to achieve union and severity of pain was presented in percentage and frequencies. Continuous variables like age presented as mean. The statistical difference was set to ≥ 0.05 with 95% confidence interval.

RESULTS:

Total 30 patients were evaluated in this study. The mean age was 41 ± 5.23 years. ranging from a minimum of 20 year to 70 years. 22(73.33%) were male patients and 8(26.66%) were females, with male to female ratio of 2.7:1. 17 (56.66%) patients had fracture on the right side and 13(43.33%) patients had fracture on the left side. Two mode of injury were noted in present study 20 (66.6%) cases were due to direct trauma to the patella (RTA) and 10 (33.3%) due to indirect mechanism (forceful flexion of the knee against a contracted quadriceps as in fall from height). 12 (80%) cases achieve union in MTB group while only 7 (46.6%) cases achieve union in LAB group at 6-9 weeks with statistically

significant p-value = 0.001. The mean healing time in MTB group was 7.3 ± 3.1 weeks while in LAB group it was 9.1 ± 2.1 weeks. (Table No.I). According to Gaur criteria for knee function. Range of motion was excellent in 60% patients of MTB group and 33.33% patients of LAB group, good was seen 20% patients in each group, fair in 13.33% patients of MTB group and 26.66% patients of LAB group and poor was in 6.66% patients in MTB group and 20% patients in LAB group. Functional outcome was excellent in 53.33% patients of MTB group and 40% patients of LAB group, good was seen 26.66% patients in each group, fair in 13.33% patients of MTB group and 20% patients of LAB group and poor was in 6.66% patients in MTB group and 26.66% patients in LAB group (Figure N0 I). Pain and tenderness declined with progress of postoperative period but persisted in 13.33% of cases in MTB group while 26.66% of cases in LAB group after 12 weeks. In most of patients pain persisted for 4 weeks, which decreased after 8 weeks (Table No. II).

Table No. I: Time to Achieve Union (n=30)

Time	MTB Group (n=15)		LAB Group (n=15)	
	No. of Patients	Percentage	No. of Patients	Percentage
6 to 9 weeks	13	80%	07	46.66%
10 to 12 weeks	3	20%	08	53.33%

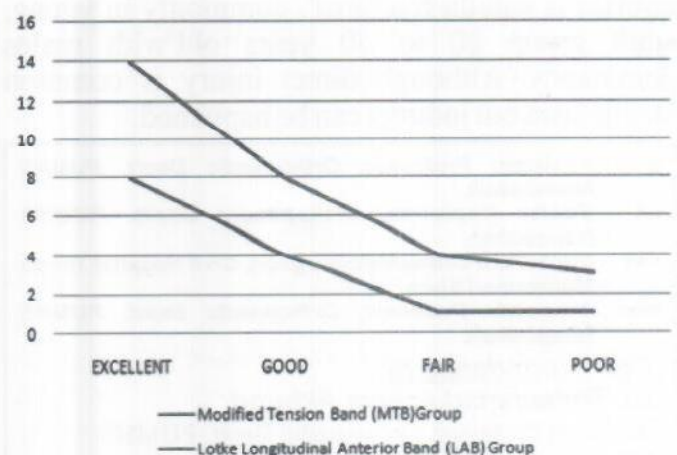


Figure No.1. Functional Outcome (n=30)

Table No. II: Severity of Postoperative Pain (n=30)

Group	Total Patients	4 weeks		8 weeks		12 weeks	
		No. of patients followed	Persistent Pain	No. of patients followed	Persistent Pain	No. of patients followed	Persistent Pain
MTB	15	14	11 (73.33%)	14	4 (26.66%)	15	2 (13.33%)
LAB	15	115	13 (86.66%)	15	7 (46.66%)	15	4 (26.66%)

DISCUSSION:

Patella is the largest sesamoid bone and has an important role in function of the knee extensor mechanism. Patellar fractures account for 1% of all skeletal fractures and results from direct, indirect or combined forces. Because of its subcutaneous location this bone is prone to injury from direct force that usually resulting in comminuted fracture. Indirect injury results from violent contraction of the quadriceps muscle in the flexed knee¹³⁻¹⁴.

In this study male are more affected than female with male to female ratio of 2.7:1. Higher male involvement is directly co-related with our culture, society and life style. Because in our part of the world males are more active and mainly involved in outdoor actives, the young males are more enthusiastic about life. The article of Yu-Chi Huang¹⁵ shows male and female ratios 4.6:1 and study of Mehdi Nasab SA¹⁶ showed 31 male and 13 female with male to female ratio is 2.3:1. In this study 17 patients had fracture on the right side and 13 patients had fracture on the left side. There was no case of bilateral fracture of patella seen in our study. However in some international studies reported by Agarwal S¹⁷ and Hoshino CM¹⁸ shows higher incidence of fracture on left side. It may be due to the fact that the left non-dominant side makes vulnerable for trauma.

Rehabilitation for return of quadriceps strength and knee range of motion is absolutely necessary after surgery. In our study range of motion in both groups were recorded according to Gaur criteria for knee function. Excellent results were observed in modified tension band in 60% patients compared with Lotke longitudinal anterior band 33.33% patients. While good results was seen equally 20% in each group and poor results were observed more in Lotke longitudinal anterior band group 20% patients as compared with modified tension band 6.66% patients because of nonefficient physiotherapy. However

Durrani MA reported in his study quadriceps strength and knee motion was excellent in 66.66% patients while seven patients had good results because of comminution and other elements and 10% patients had poor results. In the present study functional outcome excellent was in 53.33% patients and 40% patients of MTB & LAB group respectively, good was seen 26.66% patients in each group, fair in 6.66% patients of MTB group and 20% patients of LAB group and poor was in 6.66% patients in MTB group and 26.66% patients in LAB group. In the study of Karim MRU¹⁹ reported subjective evaluation 16.67% patients showed excellent, 55.56% good, 22.22% fair and 5.56% patient showed poor result. Time to achieve union in both groups was recorded. Union time range 8 to 12 weeks in both groups. The mean healing time in MTB group was 7.3+ 3.1 weeks while in LAB group it was 9.1+ 2.1 weeks which is comparable with national and international studies¹⁹.

Pain could be due to periarticular adhesions, superficial necrosis, and bursitis over protruding K wires. Pain and tenderness declined with progress of postoperative period but persisted in 13.33% of cases in MTB group while 26.66% of cases in LAB group after 12 weeks. In most of patients pain persisted for 4 weeks, which decreased after 8 weeks. However in some international studies reported by Durani¹⁸, Wang CX¹⁹ and Lin T¹⁶ are reported persistence of postoperative pain 24%, 20% and 15% respectively.

CONCLUSIONS:

The modified tension band are more predictable as compare to that of longitudinal anterior band (LAB) in treatment of displaced transverse closed fractures of patella regarding anatomical restoration and functional outcome.

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