

Functional Outcome of Modified Tension Band Versus-Longitudinal Anterior Band Wiring Techniques in the Management of Patella Fractures.

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ABSTRACT

Objectives: To compare the functional outcome of Modified tension band (MTB) versus Longitudinal anterior band (LAB) wiring techniques regarding anatomical restoration and functional outcome of displaced transverse closed fractures of patella.

Methods: A hospital based comparative cross-sectional study conducted at Department of Orthopaedic Surgery and Traumatology Liaquat University Hospital Hyderabad/Jamshoro, from January 2014 to July 2015. The totals of 30 study subjects of fractured patella were randomly enrolled in the study. 30 patients were divided in two groups, each group consist of 15 patients A who were stabilized with Modified tension band comprising (MTB) and group B who have longitudinal anterior band (LAB) wiring techniques. Data was documented on preassigned questionnaire and analyzed by SPSS Software.

Results: Study results revealed, the mean age was 41 ± 5.23 years. Range was 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 (80%) cases achieve union in MTB group out of 15, while only 7 (46.6%) cases in total 15 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 in MTB group was excellent in 53.33% patients, good was seen in 26.66% patients, fair in 13.33% patients and poor in 6.66% & in LAB group's patients excellent was 40%, good in 26.66%, fair in 20% and poor in 26.66%.

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

Keywords: Patella fractures, Functional outcome, Modified tension band, Longitudinal anterior band.

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INTRODUCTION:

Patella is the Biggest sesamoid bone of the human skeleton, and is an important functional

Component of the knee extensor mechanism¹. Patellar fractures account about 1 to 2% of all traumatic injuries of human body², present a more prevalence in the young age group in between 20 to 50 years old³ and males are commonly affected than females. The direct injury is more common than indirect as mechanism injury A fracture of the patella should be considered when the patient presents with persistent patellar tenderness and pain or a joint effusion and a history of a direct or indirect injury³⁻⁵. As therapy options are conservative, surgical as wiring or screw fixation, encircle band, and patellectomy either complete are partial^{6,7}. Past events shows patella preservation, is seen as a choice of treatment verse patellar resection, due to loss of the extensor

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Mechanism occurs^{8,9}. If surgery is performed properly without delay, the results are usually good, but limitation of knee flexion is common¹⁰. The best results after surgical treatment of patella fracture are obtained by osteo-synthesis of the fracture by using modified TBW technique¹¹. Tension band procedures are most common option for patella fractures. if the pieces are large enough, screws fixation, is one of the option. There are variable techniques have been introduced under heading of wiring / tension band i.e. encircle wiring, tension band wiring, modified with longitudinal Kirschner wires or screws; Magnusson wiring; and Lotke longitudinal anterior band wiring¹². These procedures are used alone are along with each any other one. 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 b and wire fixation.

METHODS:

A hospital based cross- sectional study conducted at Department of Orthopaedic Surgery and Traumatology Liaquat University Hospital Hyderabad/ Jamshoro, from January 2014 to July 2015. The totals of 30 study subjectsof fractured patella were randomly enrolled in the study. Inclusion criteria were displaced transverse closed fractures according to Saunder's classification and patients above 20 years of age of either gender or exclusion criteria other methods of fixation, open fracture, associated severe medical problems and patients younger than 20 years of age. 30 patients were divided in two groups, each groups consist of 15 patients A who were stabilized with Modified tension band comprising (MTB) and group B who have 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. Data was analyzed and tabulated. 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 and Standard Deviation. The statistical significance 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. Range 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). (Table No.I) 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. 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. (Figure N0 I). 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. (Table No.II). 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 patient's pain persisted for 4 weeks, which decreased after 8 weeks.

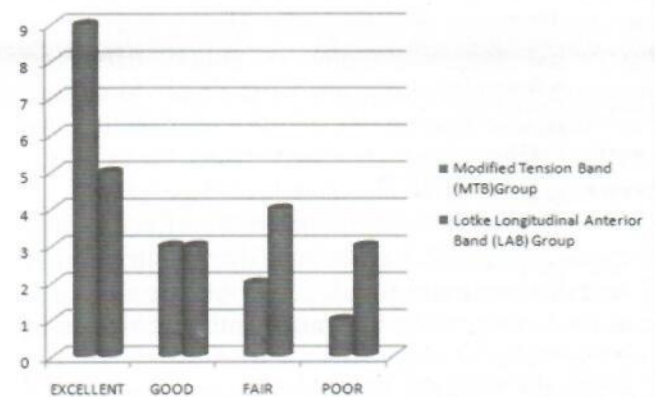


Figure No. 1: Range of Motion n=30

Table-I: Demographic Profile n=30

Variables		No of patient	Percentage
Age	Mean (range) years	41+5.23 (20-70)	
Gender	Male	22	(73.33%)
	Female	8	(26.66%)
Site	Right	17	(56.66%)
	Left	13	(43.33%)
Mode of injury	RTA	20	(66.6%)
	Fall	10	(33.3%)

Table No.II FUNCTIONAL OUTCOME n=30

Functional Outcome	Modified Tension Band (MTB) Group (n=15)		Lotke Longitudinal Anterior Band (LAB) Group (n=15)	
	No: of Patients	%	No: of Patients	%
EXCELLENT	8	53.33%	6	40%
GOOD	4	26.66%	4	26.66%
FAIR	1	6.66%	3	20%
POOR	1	6.66 %	2	13.33%
Total	15	100%	15	100%

DISCUSSION:

Although Patella is sesamoid bone but functionally it has important role in knee joint moment. About 1% total human body fractures are patella fractures resulting either direct, indirect or combined forces. Patella is subcutaneous in location so prone to injury from direct force that resulting in comminuted fracture. Indirect trauma results transverse fracture due to violent contraction of the flexor muscle of knee joint¹⁸⁻¹⁹.

In this study male are more affected than females, ratio of 2.7:1. Because due to our culture. The males are more involved in outdoor activities and the young male are more enthusiastic about life. However the male to female ratio given by Yu-Chi Huang¹⁶ is 4.6:1 & study of Mehdi Nasab SA¹⁷ 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 S¹³ and Hoshino C.M¹⁴ 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.

Post-operative quadriceps exercise are essential to gain full knee range of motion. 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 were 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 non efficient physiotherapy. According study of Durrani MA¹⁸ knee movements were excellent in 66.66% patients, 7% had good outcome due to comminution along 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 MRU¹⁵ 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 studies¹⁶⁻¹⁸.

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 Durani¹⁹, Wang CX¹⁶ and Lin T¹⁷ are reported persistence of postoperative pain 24%, 20% and 15% respectively.

CONCLUSIONS:

Fracture of patella is most common among young males. The right side was more affected than left side. The management with modified tension band is better method of treating displaced transverse closed fractures of patella.

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