



OUTCOME ANALYSIS OF SURGICALLY MANAGED FRACTURE PATELLA.

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ABSTRACT

One of the most notorious fracture is fracture patella and it counts around 1% of skeletal fracture. It is mainly classified as displaced and displaced. The management varies from conservative management for undisplaced patella fractures to surgical management for displaced patella fracture. So we have conducted a study to evaluate the functional outcome of fracture patella after the operative management. 24 cases meeting the inclusion criteria were included in the study. Each patient would be evaluated according to GAUR criteria which included quadriceps wasting, Quadriceps functional loss, extension lag, knee ROM, knee pain and functional restoration for knee function evaluation on post-operative day 1, 4 weeks, 8 weeks and 12 weeks. Every function was categories as excellent, good, fair or poor depends upon function and severity. 70.8% of the cases TBW was underwent were as encirclage wiringin 29.2%. According to GAUR criteria 66.7% had excellent, 25% good, 8.3% fair restoration of knee function. Our study conclude that fracture patella managed surgically with tension band wiring/encirclage wiring gives more superior outcomes than en circlage wiring alone. Tension band wiring/encirclagewiring is simple and inexpensive method of surgical management of fracture patella. Early knee mobilization with knee range of motion exercises should be started early to avoid quadriceps muscle wasting.

KEYWORDS : Encirclage wire, GAUR Criteria, Quadriceps Muscles, Patella fracture Tension Band Wiring (TBW)

Introduction:

One of the most notorious fracture is fracture patella and it counts around 1% of skeletal fracture. It is mainly classified as displaced and displaced. The management varies from conservative management for undisplaced patella fractures to surgical management for displaced patella fracture. The conservative management includes cylindrical cast application for six weeks. Prolonged cast immobilization for 6weeks will led to diminished knee range of motion and muscle wasting and this can beovercome by starting early knee range of motion exercises. The needs and Indications of surgical management for fracture patella includes displacement of fracture fragment by more or equal to 2mm, involvement of articular surface, or extension lag activity. In case of intra-articular fractures, to obtain anatomical reduction and restoration of normal joint function there is need of surgical management. Internal fixation of patellar fracture, the fixation should be strong so as to allow immediate range of motion, ideally knee movement should be started in the immediate postoperative period to prevent intra and periarticular fibrosis. Aim of internal fixation is to have satisfactory compression at a fracture site to reduce the risk of failure of fixation, loss of reduction (inter-fragmentary gap > 2mm) and risks of mal-union, delayed union and ultimately non-union from early mobilization and subsequent patello femoral arthritis.⁽¹⁾ So we have conducted a study to evaluate the functional outcome of fracture patella after the operative management.

Material and method

This is prospective study being conducted at the tertiary care rural hospital in India, during the period from June 2017 to August 2018. 24 cases meeting the inclusion criteria were included in the study. Adult patients(more than 18 years) withclosed and compound grade I and II fracture patella either simple or communiated with displacement equal to or more than 2 mm came within a period of 2 weeks of injury were included into the study. Skeletally immature patients, patients with compound grade III or more and patella fracture treated with partial or total patellectomy where excluded.Written and informed consent were taken. Each patient would be evaluated according to GAUR criteria which included quadriceps wasting, Quadriceps functional loss, extension lag, knee ROM, knee pain and functional restoration for knee function evaluation on post-operative day 1, 4 weeks, 8 weeks and 12 weeks. Every function was categories as excellent, good, fair or poor depends upon function and severity

Observation and Results

Total 24 patients were included in the study. The mean age (mean ± s.d.) of the patients was 42.00±14.40 years with range 19 – 72 years and the median age was 39 years. 83.3% were males and 16.7% were female.

Most of the patients (66.7%) were with age >35 years which was significantly higher than other age group.

Thus patellar fracture was more prevalent among the patients with age >35 years.

Distribution of mode of injury of the patients

Road traffic accident was the most common cause of injury (58.3%) which was significantly higher than that other modes 29.2% and 12.5% were slip with fall and assault respectively

Table-1: Distribution of type of patella fracture of the patients

Type of patella fracture	Number	%
Stellate	7	29.2%
Transverse	17	70.8%
Total	24	100.0%

Table 2: Distribution of type of surgery underwent of the patients

Type of surgery underwent	Number	%
Encirclage Wiring	7	29.2%
TBW(Tension band wiring)	17	70.8%
Total	24	100.0%

Table 3: Comparison of quadriceps muscle wasting at different time intervals

Descriptive Statistics	Pre-operative	Quadriceps muscle wasting at different post-operative time intervals (in cm)					
		After 4 weeks		After 8 weeks		After 12 weeks	
		Number	%	Number	%	Number	%
Excellent	Nil	4	16.7%	5	20.8%	18	75.0%
Good	Nil	14	58.3%	19	79.2%	6	25.0%

Fair	Nil	6	25.0%	0	0.0%	0	0.0%
Total		24	100.0%	24	100.0%	24	100.0%

Our Test showed that proportion of patients with recovery of quadriceps muscle wasting at 12th week increased significantly to excellent score.

Table 4: Comparison of Quadriceps muscle function loss at different time intervals

Descriptive Statistics	Pre-operative		Quadriceps muscle function loss at different post-operative time intervals					
			After 4 weeks		After 8 weeks		After 12 weeks	
	Number	%	Number	%	Number	%	Number	%
Good	0	0.0%	24	100.0%	24	100.0%	24	100.0%
Poor	24	100.0%	0	0.0%	0	0.0%	0	0.0%
Total	24	100.0%	24	100.0%	24	100.0%	24	100.0%

Our test showed that proportion of patients with quadriceps muscle function loss had recovered significantly as compared to pre-operative level at 12th week postoperatively.

Table 5: Comparison of functional restoration of knee joint at different time intervals

Functional restoration	Pre-op		Post-operative					
			4th Week		8th Week		12th Week	
	Number	%	Number	%	Number	%	Number	%
Normal	0	0.0%	0	0.0%	0	0.0%	16	66.7%
Poor	24	100.0%	0	0.0%	0	0.0%	0	0.0%
Restricted	0	0.0%	24	100.0%	24	100.0%	8	33.3%
Total	24	100.0%	24	100.0%	24	100.0%	24	100.0%

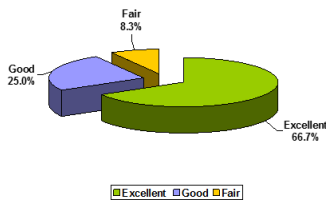
Table 6: Comparison of extension lag at knee joint at different time intervals

Descriptive Statistics	Pre-operative		Extension lag at knee joint at different post-operative time intervals					
			After 4 weeks		After 8 weeks		After 12 weeks	
	Number	%	Number	%	Number	%	Number	%
Excellent	0	0.0%	0	0.0%	9	37.5%	16	66.7%
Fair	0	0.0%	12	50.0%	14	58.3%	8	33.3%
Poor	24	100.0%	12	50.0%	1	4.2%	0	0.0%
Total	24	100.0%	24	100.0%	24	100.0%	24	100.0%

Our study showed that patients with knee extension lag at 12th week postoperatively had improved to excellent level as compared to pre-operative level.

70.8% of the cases were treated with tension band wiring which was significantly higher than that of encirclage wiring done in 29.2% of the cases. In a similar study done by Tien Yu Yang, Tsan-Wen Huang, Po-Yao Chuang and Kuo Chin Huang where they also used tension band wiring as most preferred surgical procedure than encirclage wiring^[4].

Graph 1: Final outcome as per Gaur criteria



Discussion

In our study most of the patients i.e 66.7% were with age >35 years which was significantly higher than other age group. The mean age of the patients was 42 years with range 19 –72 years. This shows patella fracture was more prevalent among the patients with age >35 years. In a similar study conducted by Sudheendra P.R, Krishna Prasad. Reported that the age group which was more prevalent was between 21-69 years with a mean age of 42.4^[2]

There was accountable difference in mean quadriceps muscle wasting at different time intervals. The mean quadriceps muscle wasting improved significantly over time interval postoperatively. In a similar study done by Shrinivaset al. study shows that there was quadriceps muscle wasting in immediate postoperative period but quadriceps muscle wasting improved significantly over the time^[5].

The ratio of male to female was 5:1.i.e(83.3%) males which was significantly higher than that of females (16.7%) Thus the males were at higher risk of having patellar fracture than females. In a similar study conducted by Anand. B. Jab Shetty which shows out of 20 cases, there were 15 patients were males (75%) and 5 patients were females (25%)^[3].

There was accountable difference in mean quadriceps muscle function loss at different time intervals. The mean quadriceps muscle function loss recovered significantly over time interval. But there was no difference in mean quadriceps muscle function loss after 8 weeks and after 12 weeks of surgery. In a similar study done by Shrinivaset al. study shows that there was significant difference in mean quadriceps muscle function loss at different time intervals. The mean quadriceps muscle function loss recovered significantly over time interval.^[5]

Road traffic accidents is the most common cause of injury (58.3%) which was significantly higher than that other modes i.e.29.2% and 12.5% were slip with fall and assault respectively. In a similar study conducted by A.B.Jab Shetty^[3] Which states that road traffic accident accounts for only 40 % of the cases and 60% of the cases were due to fall on knee.

There was significant difference in mean knee extension lag at different time intervals. The mean knee extension lag decreased significantly over time interval. In a similar study done by Subrat Mohapatra, Pulin Bihari Das, R.V Krishnakumar, Sibanarayan Rath, Rabindra N Padhy which shows similar results as the mean extension lag decreased significantly over time interval^[6]

There was significant restriction in mean knee range of motion at different time intervals The mean knee range of motion increased significantly to almost full over time interval. In a similar study done by Sudheendra P.R, Krishna Prasad. S] mentioned only one patient having knee range of motion of less than 90 degrees and was associated with a poor outcome and in rest of the cases the mean knee range of motion increased significantly to almost full over time

interval.^[2]

In our study proportion of patients with normal functional restoration at 12th week increased significantly and also proportion of patients with restricted functional restoration at 12th week decreased significantly. None of the patients was with poor knee function after 12th week postoperatively. In a similar study done by Sudheendra P.R, Krishna Prasad .which shows normal knee functional restoration after 12th week postoperatively^[2]

The maximum number of patella fractures were transverse fractures which constitutes around 70.8 % which was significantly higher than that of stellate fracture i.e around 29.2 %. In a similar study done by Sudheendra P.R, Krishna Prasad S had found that similar prevalence i.e occurrence of transverse fracture patella is higher than that of stellate fracture^[2] In our study maximum number of patella fracture were managed by tension band wiring surgical procedure i.e around 70.8 % which was significantly higher than that of encirclage wiring procedure i.e around 29.2 %. In a similar study done by Subrat Mohapatra, Pulin Bihari Das, R.V Krishnakumar, Sibanarayan Rath, Rabindra N Padhy had preferred tension band wiring as superior method of surgical management than encirclage wiring^[6]

According to Gaur's criteria for knee function states that, in 66.7% i.e 16 patients has final outcome as excellent knee function at the end of 12 weeks postoperative follow up which was significantly higher than other outcomes i.e 25% (6) patients had good knee function at the end of 12 weeks postoperative follow up and only 8.3% of the cases i.e 2 patients had fair knee function at the end of 12 weeks postoperatively. In a similar study done by Rajesh V. Chawda, Parag M Tank, Vijay J Patel, Yash Shah show that 25 % of the patients shows excellent result, 46.87 % of the patients shows good result, 12.5 % of the patients shows fair result and 15.62 % patients shows poor result^[7]

Conclusion

Our study conclude that fracture patella managed surgically with tension band wiring/encirclage wiring gives more superior outcomes than encirclage wiring alone. Tension band wiring/encirclage wiring is simple and inexpensive method of surgical management of fracture patella. Early knee mobilization with knee range of motion exercises should be started early to avoid quadriceps muscle wasting.

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