

Original Research Article

To compare functional outcomes and determine complications associated with both the techniques and their management of two part patella fractures treated with conventional tension band wiring fixation and CC screw fixation.

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Abstract:

Background & Method: The aim of the study is to compare functional outcomes and determine complications associated with both the techniques and their management of two part patella fractures treated with conventional tension band wiring fixation and CC screw fixation. All patients reported to OPD/emergency room with history of trauma, swelling in knee. Primary and secondary survey was done to rule out any other injuries. After necessary intervention like fluid and analgesics standard anteroposterior and lateral radiograph of affected knee were ordered.

Result: The distribution of patients according to comorbidities. In TBW Group, 1 (6.7%) patient had diabetes mellitus and 1 (6.7%) patient had hypertension. In CC Group, 2 (13.3%) patient had hypertension and 1 (6.7%) patient had infection. In both the groups comorbidities were seen in only few of the patients. The distribution of patients according to complications. In TBW group, 1 (6.7%) patients had implant failure, and 2 (13.3%) patients had migration of wire. In 12 (80%) patients no complications were seen. In CC group, none of the patients had any complications.

Conclusion: There are no major complications in the form of loss of reduction, or soft tissue irritation due to hardware in CC screw group. The final results in the form of functional outcome after six month of surgery are satisfactory.

Keywords: functional, techniques management.

Study Designed: Observational Study.

1. Introduction

Treatment of patellar fractures was revolutionized with the introduction of the tension band wiring (TBW), based on tension band principle, by the AO group[1]. The first edition of the AO manual described the standard TBW which was passed through the Sharpey's fibres to provide fixation[2]. The second edition described modified TBW where stainless steel wire is supplemented with Kirschner wires. This method of fixation employs a tension band applied anteriorly over the parallel K-wires. This technique, designed to resist the forces across the patella in bending, has been shown in some studies to be superior to circumferential wiring or screw fixation alone, but probably is not as effective in pure distraction when the knee is in full extension[3].

The principle behind tension band wiring of patellar fractures is to resist bending loads across the fracture as the knee is flexed. If the tension on the anterior surface is carried by the tension band, then there are compressive loads at the articular surface that improve fracture stability and healing[4]. In extension, the tension band does not resist displacement at the articular side of the fracture site as effectively as it can in flexion. Screw fixation better resists this displacement. Other problems with this fixation technique include loss of reduction and

implant migration caused by soft tissue atrophy and lack of fixation rigidity which leads to loss of congruity of the bone[5]. Prominent kirschner wire and twisted wire ends in this subcutaneous location often cause soft tissue irritation and require removal.

With the introduction of the cannulated cancellous screws with S.S. wire for fracture treatment, a new opportunity exists which causes interfragmentary compression with decreased subcutaneous irritation. Since there are not many literatures in comparison of these two modalities, this makes the basis of our study and we want to evaluate and compare the functional outcomes of both the modalities[6].

2. Material & Method

We prospectively studied 30 patients with displaced two part transverse patella fractures that presented to the OPD or emergency room between Sept 2019 to August 2021. The patients were treated at department of Orthopaedics and Traumatology, M.G.M Medical College and M.Y Hospital, Indore.

All patients reported to OPD/emergency room with history of trauma, swelling in knee. Primary and secondary survey was done to rule out any other injuries. After necessary intervention like fluid and analgesics standard anteroposterior and lateral radiograph of affected knee were ordered. Posterior slab was given. The patients who completed the following criteria were included in the study:

- All patients diagnosed with two part transverse patella fracture
- Age >18 years
- Patients presenting within 2 weeks of injury
- Closed Fractures
- Open Fractures Gustilo Anderson Type I

Exclusion Criteria

- Age < 18 years and >60 years
- Presence of other ipsilateral fractures in the same lower limb
- Pathological fractures
- Compound fractures Gustilo Anderson Type 2 and 3
- Comminuted fracture patella

3. Results

Table No. 1: Distribution of patients according to age

Age	TBW Group		CC Group	
	No.	%	No.	%
18-20 years	0	0.0	2	13.3
21-40 years	10	66.7	6	40.0
41-60 years	5	33.3	7	46.7
Total	15	100.0	15	100.0
Mean age	35.27 ± 11.11		37.67 ± 13.59	
't' value, df	-0.530, df=28			
P value	0.601, NS			

Unpaired 't' test applied. P value = 0.601, Not significant

The above table shows the distribution of patients according to age. In TBW Group, 10 (66.7%) patients were in the age group 21-40 years and 5 (33.3%) patients were in age group 41-60 years. In CC Group, 2 (13.3%) patients were in the age group 18-20 years, 6 (40%) patients were in the age group 21-40 years and 7 (46.7%) patients were in age group 41-60 years.

The mean age in TBW group was 35.27 ± 11.11 years and in CC group was 37.67 ± 13.59 years. The difference was found to be statistically not significant ($P=0.601$), showing a comparable mean between the two groups.

Table No. 2: Comparison of VAS score

VAS Score	TBW Group	CC Group	't' value	P value
2 weeks	8.27 ± 0.46	8.07 ± 0.26	1.474, df=28	0.152, NS
6 weeks	5.20 ± 0.68	5.13 ± 0.52	0.303, df=28	0.764, NS
3 months	2.67 ± 0.82	2.6 ± 0.83	0.222, df=28	0.826, NS
6 months	2.13 ± 0.83	1.93 ± 0.7	0.71, df=28	0.484, NS

Table No. 3: Distribution of patients according to comorbidities

Comorbidities	TBW Group		CC Group	
	No.	%	No.	%
None	13	86.7	12	80.0
Diabetes Mellitus	1	6.7	0	0.0
Hypertension	1	6.7	2	13.3
Infection	0	0.0	1	6.7
Total	15	100.0	15	100.0

The above table shows the distribution of patients according to comorbidities.

In TBW Group, 1 (6.7%) patient had diabetes mellitus and 1 (6.7%) patient had hypertension.

In CC Group, 2 (13.3%) patient had hypertension and 1 (6.7%) patient had infection.

In both the groups comorbidities were seen in only few of the patients.

Table No. 4: Distribution of patients according to complications

Complications	TBW Group		CC Group	
	No.	%	No.	%
None	12	80	15	100.0
Implant failure	1	6.7	0	0.0
Migration of wire	2	13.3	0	0.0
Total	15	100.0	15	100.0

The above table shows the distribution of patients according to complications.

In TBW group, 1 (6.7%) patients had implant failure, and 2 (13.3%) patients had migration of wire.

In 12 (80%) patients no complications were seen.

In CC group, none of the patients had any complications.

4. Discussion

In TBW group 7(46.7%) had left side fracture and 8(53.3%) had right side fracture, in CC screw group 9(60%) had left side and 6(40%) had right side fracture. One patient with bilateral fracture reported. No statistically significant association seen between side involvement.

Muralidhar BM et al[6] (2017) right side involvement was 70% and left side was 30%. A B Jab Shetty in their study male were (75%) and (25%) females.

In both the groups road traffic accident is main cause of trauma in 46.7% patients. In Muralidhar et al[6] (2017) 60% of fracture are due to RTA. Shreshtha P et al[7] (2019), 70% fracture in TBW and 90% fracture with CC screw with ss wire is due to RTA. Two wheelers and motorcycles are very common mode of transportation in India.

In both the groups 73.3 % patients had knee flexion >120 degrees. Similar study by Muralidhar et al[6] (2017), 80% patients had knee flexion of >120 degrees. Knee ROM was achieved by allowing early joint mobilization in both the groups[8&9].

In our series, majority of the patients had minor symptoms of pain, knee swelling and stiffness in the first two weeks of follow up. After those period symptoms subsided with the passage of time, and almost gone by 1 month[10].

5. Conclusion

There are no major complications in the form of loss of reduction, or soft tissue irritation due to hardware in CC screw group. The final results in the form of functional outcome after six month of surgery are satisfactory.

6. References

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