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Surgical management of transverse fractures of patella by cannulated screws combined with tension band wiring: Prospective study

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Abstract

Introduction: The patella plays an important role in range of motion of the knee joint. In a country like India where the social habits like squatting, sitting cross legged require full range of knee flexion. The most significant effect of patella fracture are loss of continuity of extensor mechanism of knee and potential incongruity of patello-femoral articulation. So it is necessary to preserve the patella and extensor apparatus.

Materials and method: It is a prospective study which was carried out from November 2015 to May 2017 in MVJ Medical College and Research Hospital, Bengaluru. In this study period 30 cases of transverse fracture patella were treated by cannulated cancellous screws with tension band wiring.

Results: In our study, majority of the patients were males, middle aged, with road traffic accidents being the commonest mode of injury. The fractures united in all 30 patients. Excellent results were in 25 patients (84%), 4(13%) patients having good results and 1(3%) patient having fair results.

Conclusion: In view of the above results obtained from our study 84% excellent results: we concluded by mentioning that 4mm Cannulated cancellous screw fixation combined with tension band wiring is an effective treatment modality in the management of transverse fractures of the patella.

Keywords: Cannulated cancellous, patella plays, patello-femoral

Introduction

Fractures of the patella are common and constitute almost 1% of all skeletal injuries [1]. Historically, the treatment of patellar fractures has undergone many changes in operative methods. The patello-femoral joint is the heaviest-loaded joint in the body. Any compromise of the joint surface is likely to lead to degenerative joint disease. It is, therefore, highly desirable, in patellar fractures to strive for anatomical reduction of the joint surface and stable fixation. In addition a treatment goal is restoration of function of the knee extensor mechanism. The patella is of importance for the extension of the knee joint. It increases the force of the quadriceps apparatus by providing leverage. In addition it protects the anterior articular surface of the distal femur against external violence, but may easily be injured due to its unprotected position. Opinions differ widely as to the proper treatment of a fractured patella.

Haxton [2] and Kaufer [3] on the basis of experimental work showed that the patella was not without importance in the knee joint and was responsible for improving its efficiency. It is because of this, need to preserve the whole or part of the patella becomes imperative, especially in a country like India where social habits like squatting or sitting cross legged require a full range of knee flexion. Several methods of internal fixation of transverse fractured patella have been advocated.

This dissertation is directed towards the clinical evaluation of the cannulated screws with tension band wiring for the transverse fracture of patella.

Aims & objectives of the study: To evaluate the results of cannulated screws fixation combined with figure of eight Tension Band Wiring in the treatment of transverse fracture of patella.

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Materials and methods

Prospective study was conducted including the patients of transverse fracture of patella managed by cannulated cancellous screws with modified tension band wiring from November 2015 to May 2017 in the department of orthopaedics at the MVJ Medical college and Research Hospital, Bangalore.

Patients between the age of 18 to 70 years with transverse fracture of patella with displacement of more than 2-3mm and articular incongruity of more than 3 mm were included in the study while those with open fractures, comminuted fractures or uncontrolled systemic co-morbidities were excluded from the study.

On admission of the patient the following details were recorded as follows:

Age, Sex, Occupation, Address, Family History and Past History were noted. thorough history was elicited from the patients which included as following details: a) Nature of trauma: Direct/ Indirect violence b) Cause for trauma: Road Traffic Accidents/Assault/Mechanical fall. Thorough General Physical Examination, Systemic Examination and assessment for other associated injuries were performed. Local Examination of affected joint was done with reference to:

- Condition of overlying skin
- Presence of swelling/heamarthrosis
- Discontinuity/palpable transverse defect
- Crepitus over the patella

Routine preoperative investigation done. Lateral and Anteroposterior views were taken for confirmation of diagnosis. X-rays in skyline view were taken in cases suspected to have Longitudinal and marginal fractures. All necessary preoperative assessment and clearance for surgery obtained from the medical faculty and anaesthetic faculty prior to surgery and consent for surgery was obtained from the patient.

Surgery was performed under general or spinal anesthesia Tourniquet was applied to the upper part of thigh and the part was painted and draped. A vertical midline incision was placed over the anterior aspect of the knee and fascia were retracted to expose the fracture site. The knee was flexed to 30 degree on a roll. The fracture surface was cleaned of all blood clots. The extent of retinacular tears was explored and the joint inspected for any damage to the femur. The joint was then thoroughly lavaged. The fracture is then reduced with reduction clamps. The accuracy of the reduction is checked by inspecting and palpating the anterior and posterior surface of the patella [in case of retinacular tear]. 2 guide wires were passed longitudinally in an antigrade manner through the patella and 3.5 mm cannulated drill bit used to prepare patella through the guide wires. The drill bit is removed and replaced with two 4mm cannulated screws of appropriate length, with or without a washer. A 20 gauge wire is passed through or around the cannulated screws in a figure of 8 pattern so that the eye comes to lie next to the proximal end of the medial screw. The wire is then tightened with the A.O wire tightener. After tightening the wire, it is cut about 1 cm long and the cut end buried in the soft tissues. The cannulated screws are adjusted and tightened proximally into bone. The distal portions are checked and it should not be more than 1 cm from where they exit on bone. The joint capsule and quadriceps retinaculum are meticulously repaired and the fascia repaired with plain sutures. The skin is closed with interrupted mattress sutures and a compression bandage given.

All our patients were followed up at the end of 3rd week, 6 weeks and then at 6 weekly intervals for 6 months or until the fracture is united. Serial x-rays were taken at 6 weekly intervals until fracture union.

Functional assessment of the limb was done using RASMUSSEN'S knee scoring system^[4] at every OPD visit. Based on the above scoring system, the results were graded into four groups Excellent/Good/Fair/Poor depending on knee score.

Discussion

Surgical treatment of the transverse fracture of patella, managed from one advocating removal of the patella to one preserving opinion has changed from preferably the whole patella. If the fragments can be realigned and fixed either part or preferably the whole that once it heals, it is in no way different from its pre-fractured status.

In this series 30 cases of transverse fracture patella were taken and cannulated cancellous screws with modified tension band wiring would be the ideal technique. Treated patient was given special attention to mobilize the knee early as it helps to regain the quadriceps power. The findings, the end results and various other data analyzed and compared in the following discussion.

In the present series 23 patients (77%) were males and 7 (23%) were females. In the series of S.K. Basu Ray and M.S.Ghosh the incidence was 71% males and 29% females^[5]. In Jonathan Wilkinson series, the incidence was 68% males and 32% females^[6]. In general it can be said that the patella fracture commonly occur in males because of an active and vigorous life style. In present series also male sex predisposition was observed. In the present study 25 (84%) had excellent result, 4 (13%) had good results and and 1(3%) patient had fair results following cannulated screws with tension band wiring procedure and Problems commonly associated with the use of K wires are not avoided. Dudani, Sancheti in their study also found similar results 11(73.33%) had excellent result and 4(26.66%) had good result^[7]. Marya, Bhan, Dave found 24(80%) had excellent result, 4(13.33%) had good result and 2(6.66%) had poor result^[8]. Levack, Flannagan, Hobbs found 7(50%) had excellent result, 5(35.71%) had good result and 2(14.28%) had poor result^[9]. Fracture patella can occur at any age. But the frequency in children and adolescents under 18 years of age is low. In this series the range of age was taken between 18 to 55 years.

The mean age was 35 years and maximum incidence was between 31 to 40 years. In Bostrom *et al.* series, the mean age was 48 years ranging in their series of 24 cases between 16 to 89 years^[10]. S.K. Basu Ray and M.S. Ghosh found the range of age between 18 years and 62 years. In R.E. Peoples *et al.* series, the average age was more than 20 years^[11].

Summary

Thirty cases of transverse fracture of patella treated by cannulated screws with tension band wiring technique at MVJ Medical College Hospital & Research Centre, Hoskote have been presented.

Maximum number of cases 16 (54%) were in the age group of 31-40. There was male sex predomination, 23(77%) were males and 7(23%) were females. 18(60%) patients sustained injuries due to an indirect trauma to the knee joint and 12 (40%) patients sustained injuries due to a direct force. 25 (84%) patients had excellent result, 4(13%) patients had good results and 1(3%) patient had fair results following cannulated screws with tension band wiring procedure and Problems

commonly associated with the use of K wires (hardware related issues like migration, bending and breakage of k wires and irritation to skin, soft tissue: adventitious bursa formation) were not encounter with the use of cannulated cancellous screws in our study. Only 1 patient had residual

stiffness in the knee. We did not encounter any complications such as superficial/deep wound infection and implant failure or DVT in our study. The results obtained from our study is similar to other studies conducted.

Table 1: Summary of all cases

Age in Years	Number of Cases	Percentage
18-30	4	13%
31-40	16	54%
41-55	10	33%
Sex Incidence		
Male	23	77%
Female	7	23%
Nature of Trauma		
Mechanical Fall	9	30%
Road Traffic Accident	18	60%
Assault	3	10%
Side Involved		
Right	20	67%
Left	10	33%
Complications		
Superficial Infection	0	0
Deep Infection	0	0
Implant Failure	0	0
Post Traumatic Stiffness	1	3.3%
Result		
Excellent	25	84%
Good	4	13%
Fair	1	3%
Poor	0	0

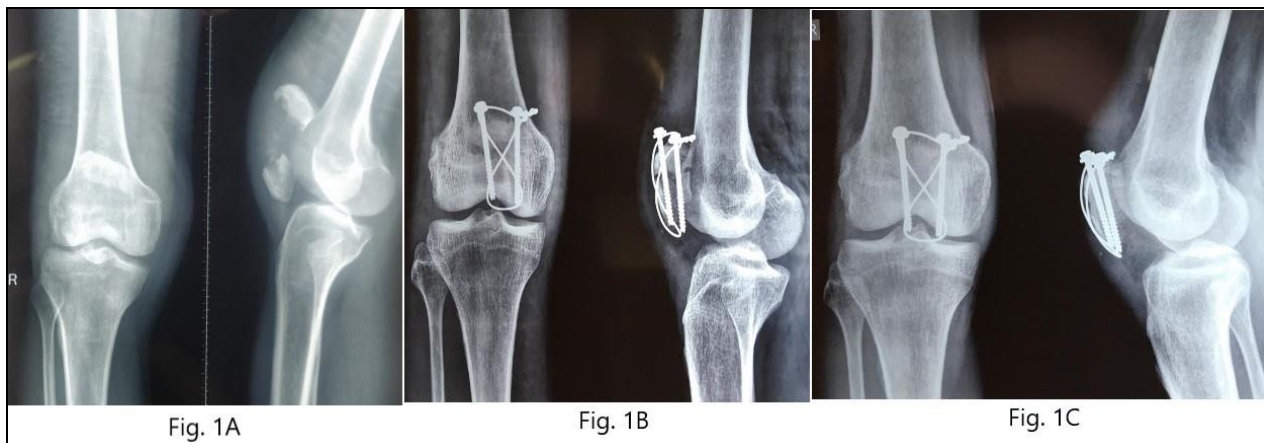


Fig 1: A) Pre-op xray, B) immediate post-op xray, C) xray showing bony union



Fig 2: A) Pre-op xray, B) immediate post-op xray, C) xray Showing bony union.

Conclusion

Transverse fractures of the patella are common though rare below the age of 18 years. Road traffic accidents are the most common cause of transverse fracture of patella. Early mobilization of the knee restores quadriceps power and range of knee motion within a short period of time. Excellent range of movement was achieved in 84% of patients in our studies. Tension band wiring with K-wires is the most common management option for transverse fractures of the patella; but problems commonly associated with the use of K wires (hardware related issues like migration, bending and breakage of k wires and irritation to skin, soft tissue; adventitious bursa formation) are not encountered with the use of cannulated cancellous screws. Early and continuous physiotherapy following the cannulated screws with tension band wiring technique is of paramount importance in determining the end results. In view of the above results obtained from our study [84% excellent results]: we conclude by mentioning that 4mm Cannulated cancellous screw fixation with tension band wiring is an effective treatment modality in the management of transverse fractures of the patella.

References

1. Matthew Rudloff I. Campbell's operative orthopaedics. Chapter 54. 12th edition, Edt. S. Terry Canale, James H.Beaty, Elsevier Mosby. 2013; 3:2681-2688.
2. Haxton HA. The functions of the patella and the effects of its excision. Surg Gynaec Obst. 1945; 80:389.
3. Kaufer H. Mechanical function of the patella. JBJS. 1971; 53(A):1551.
4. Journal of Orthopaedic Trauma. 2006; 20(8):S88.
5. Basu Ray SK, Ghosh MS. Functional end results of patellectomy in fracture of the patella. Ind J Orthop. 1974, 8.
6. Wilkinson J. Fractures of the patella treated by total excision. J Bone Joint Surg (BR). 1977; 59:352-354.
7. Dudani B, Sancheti KM. Management of fracture patella by tension band wiring. Ind. J of Ortho. 1981; 15-1:43-48.
8. Marya SK, Bhan S, Dave PK. Comparative study of knee function after patellectomy and osteosynthesis with a tension band wire following patellar fractures. Int Surg. 1987; 72(4).
9. Levack B, Flannagan JP, Hobbs S. Results of surgical treatment of patellar fractures. JBJS. 1985; 67-B:416-419.
10. Bostrom A. Fractures of the patella: A study of 422 patellar fractures. Acta ortho Scand. 1972; 143:1-80.
11. Peoples RE *et al.* Function after patellectomy. Clinical Orthopaedics and Related Research. 1978; 132:180-6.