

FRACTURE PATELLA - OUTCOME OF EARLY MOVEMENT OF KNEE AFTER STABLE FIXATION

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Abstract

The study was carried out at Combined Military Hospitals of Jessore and Dhaka over a period of three and half years. The aim of this study was to evaluate the functional status of the knee joint by allowing early knee movement after stable fixation of fracture patella in 18 patients.

The commonest age group involved in fracture patella was at the fourth and fifth decade (66.66 %). Road traffic accident (RTA) and domestic injuries like fall in the slippery ground were the major causes of fracture and the incidences were similar (44.44%). Stable fixation was achieved by applying modified tension band wiring in 7 patients but remaining 11 patients required additional cerclage wiring. Postoperatively (within 48 to 72 hours) when the pain was tolerable, assisted active movement of the knee was started. Subsequently assisted active, active and passive movement of knee along with quadriceps exercise was continued. The functional status of the knee was assessed according to a predecided subjective and objective evaluation chart. 13 patients (72.23%) found satisfactory (Excellent and good) in subjective evaluation and 16 (88.89%) in objective evaluation. One patient who did not follow the post operative advice adequately, developed more than 2 mm displacement at the fracture site and about 25° extension lag.

It has been revealed that initiating early postoperative knee movement after stable fixation of fracture patella could prevent stiffness of knee and thereby confers better function.

Key Words: Fracture patella, Early movement, Stable fixation.

Introduction

Patellar fracture account for approximately one percent of all fractures¹. In Bangladesh though there is no accurate data, however the disease is not uncommon. Fracture patella is an intraarticular fracture involving the patello-femoral joint. Loss of knee movement or knee stiffness is a common sequela to patellar fracture². Prolong immobilization sometime as part of treatment and sometimes for the sake of soft tissue healing is one of the important causes of knee stiffness. Stiff joints, persistent oedema, wasted muscle and atrophic bones are some of

the factors which can produce an aftermath of functional disability persisting long after the fracture has healed³. With the advent of new technique of fracture treatment and with advances in the use of internal fixation, methods of immobilization have changed and no longer demand prolong periods in plaster to obtain fracture union. Modified tension band wiring alone or sometimes in combination with cerclage wiring gives stable fixation of fracture patella and so early post operative knee movement can be given, there by disastrous complication like knee stiffness can be avoided. So, postoperative management without cast and early movement gives better functional status of knee joint.

Materials and Methods

The study was conducted at Combined Military Hospital (CMH) of Jessore and Dhaka during the period of January 2003 to June 2006. The patients for the study were selected on random basis after fulfilling the following criteria:

- Transverse displaced fracture.
- Closed fracture.
- Presented within two weeks of injury.
- Adult (>18 years)

Each patient was designated by a case number. Initially, 20 cases were included in the study. However among them, 2 patients had inadequate follow up and excluded from the study. Finally 18 patients (n=18) were included in the study. Subjective and objective evaluations of all patients were carried out postoperatively for about 6-12 months. In this study results obtained to compare the functional status of the knee were analyzed by the method as shown by Hung et al⁴.

Open reduction and internal fixation of the fractures were done by modified tension band wiring within two weeks of fracture. Stability of fixation was checked per operatively and in 11 cases additional cerclage wiring was required. Post operatively when pain was within tolerable limit (within 48 to 72 hrs) assisted active movement of knee and isometric quadriceps exercise were started. The patients were allowed to walk with crutch (non weight bearing) within first week and gradual weight bearing started after 3 weeks. The patients were followed up at the end of 3rd, 6th, 12th, 24th and 52nd week. Every time the functional status of knee was assessed and looked for any complications.

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Results

Male (15, 83.33%) patients were more frequently affected than female (03, 16.67%). Age of the patients varied from

Table-I: Age incidence of patients (n= 18).

Age group (years)	Number of patients	Percentage
18-30	4	22.22
31-40	6	33.33
41-50	6	33.33
51-60	2	11.11

19-60 years. The mean age (\pm SE) of the patients was 38.08 ± 1.68 years. Commonest age group in this study was between 31-50 years ((12, 66.66 %) (Table-I).

In subjective evaluation 3 (16.67%) patients showed excellent, 10 (55.56%) good, 4 (22.22%) fair and 01 (5.56%) patient showed poor result (Table-II). Hung et al designated the excellent and good results as satisfactory outcome on the basis of functional status of the knee. In this study satisfactory results (excellent + good) were in 13 (72.23%) cases.

Table-II: Results of subjective evaluation (n = 18).

Grading	Number of patients	Percentage
Excellent	03	16.67
Good	10	55.56
Fair	04	22.22
Poor	01	05.56
Combined (excellent + good)	13	72.23

In objective evaluation 12 (66.67%) cases showed excellent result and 4 (22.22%) came as good .The number

Table III: Results of objective evaluation (n = 18).

Grading	Number of patients	Percentage
Excellent	12	66.67
Good	04	22.22
Fair	01	05.56
Poor	01	05.56
Combined (excellent + good)	16	88.89

Table-IV: Comparative proportions of satisfactory and unsatisfactory results.

Results	Subjective evaluation No %	Objective evaluation No %
Satisfactory	13 (72.23)	16 (88.89)
Unsatisfactory	05 (27.78)	02 (11.12)

of fair and poor result was 1 (5.56%) in each grade. In this study satisfactory results were observed in 16 (88.89%) cases (Table- III). Satisfactory and unsatisfactory results are compared and shown in the Table-IV.

In this study 3 (16.67%) patients had broken wire loop, 2 (11.11%) patients were complicated by protrusion of K-wire. One patient had more than 2 mm displacement with extension lag of about 25° . After 9 month it decreased to 5° and functional status was also improved. In 3 cases there was superficial wound infection. This complication was overcome by repeated dressing and antibiotic therapy



Fig -1 : Fracture of patella.



Fig -2 : Three months after operation.



Fig -2 : Six months after operation.

after culture and sensitivity of the wound discharge. Gross joint stiffness and reflex sympathetic dystrophy, which hampers the knee function were absent in this study.

Discussion

Fracture of the patella is a common injury in the adult and constituting approximately 1% of all skeletal injuries⁵. Many patellar fractures are not displaced and may be treated conservatively⁶. Indications for surgical management include displacement >2mm, a step off involving the articular surface, or inability to extend the knee actively⁷. As with any intra-articular fracture, the goals of surgical treatment are to obtain an anatomic reduction and restore normal joint function while achieving bony union.

Many surgeons maintain cast immobilization for three to six weeks⁶. Previous result have demonstrated that patient with diminished range of motion had experienced prolong cast immobilization⁶⁻⁸. This can best be avoided by initiating early knee movement. Ideally knee movement should be started in the immediate postoperative setting since motion aids in the prevention of intra and periarticular fibrosis and having salutary effects on healing articular cartilage^{9,10}.

Internal fixation of patellar fracture is to achieve fixation that is strong enough to allow immediate range of motion⁸. Several techniques have been described for internal fixation of fracture of patella¹¹⁻¹³. Satisfactory compression at a fracture site reduces the risk of failure of fixation, loss of reduction (inter-fragmentary gap > 2mm) and subsequent risks of mal-union, delayed union and ultimately non-union from exercise movement¹⁴. The strength and ease of application of four different forms of patellar fracture fixation were evaluated. Modified tension band, screw fixation, Lotke longitudinal anterior band (LAB) and Magnusson wiring were examined by using cadaveric lower extremities. Of the four techniques of fracture fixation tested, modified tension band wiring gave the most consistent result, followed by screw fixation. The simple wiring techniques i.e. Lotke and Magnusson yielded less consistent result⁸.

Modified tension band wiring is commonly used method to treat transverse patellar fracture¹⁵. This technique also give better results¹⁶. In this study, open reduction and internal fixation was done by modified tension band wiring and few cases were fixed with additional cerclage wiring. Early knee movement was initiated in all the cases post operatively along with other physiotherapy measure. In Bangladesh some surgeon still keeping the limb in posterior cast for 3-4 weeks after stable fixation at the cost of poor knee function. Lotke demonstrated that patients with diminished range of motion had experienced prolong cast immobilization⁶. In this study satisfactory result showed in 72.23% and 88.89% cases in subjective and objective evaluations of knee function respectively. Hung et al, also studied the efficacy of early knee movement after stable fixation and found a similar

satisfactory result⁴. So after stable fixation of fracture patella early knee movement gives better functional status of knee than keeping in long leg posterior cast for 3 or more weeks.

Displacement in the fracture by less than 2 mm does not produce symptomatic impairment in patellofemoral function¹⁷. In this study, 3 (16.67%) cases showed displacement of fracture of which in 1 patient there was more than 2 mm displacement with initial extension lag 25°.

Conclusion

Fracture patella is not an uncommon injury in Bangladesh. There are several methods of treatment of this fracture. However, for transverse fracture modified tension band wiring gives stable fixation. Better stability confers with additional cerclage wiring. However, sometimes, for fear of delayed soft tissue healing movement of the knee is deferred for 3-4 weeks, during which time, limb is kept in long leg posterior cast. This affects an individual in the following way:

- Achievement of satisfactory knee function delayed.
- Prolong hospital stay.
- Not cost effective.
- Delay in return to work.

It has been revealed that after stable fixation of fracture patella all the above disadvantages could be overcome by initiating early postoperative movement of the knee joint and thereby confers better knee function.

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