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Rehabilitation of Isolated Patella Fracture: A Case Report

Mohd Asif [1], Zuheb Ahmed Siddiqui[2]

[1]MPT Scholar, Department of Rehabilitation Sciences, HIMSR, Jamia Hamdard, New Delhi, India

[2]Lecturer, Department of Rehabilitation Sciences, HIMSR, Jamia Hamdard, New Delhi, India

Abstract: ***Fracture of the patella is a common injury among adults having higher prevalence among males population. The mechanism of injury involves direct and indirect mechanisms. The most common fracture pattern occurring is the transverse fracture followed by comminuted and vertical fractures. Treatment of patellar fractures depends on fracture type, integrity of extensor mechanism and size of fragment. Conservative management includes splinting and rest. Surgical techniques involve anterior tension band wiring and partial/total patellectomy. In our case a 27 year old underwent anterior tension band wiring after suffering a fracture of the left patella. Physiotherapy management included early weight bearing followed by gradual mobilization and strengthening of extensor compartment of the knee joint.***

Keywords: patella fracture, rehabilitation, tension band wiring

1. Introduction

Patellar fractures occur more commonly in the age group of 20 – 50 years, affecting the males twice more than females [1, 2]. The mechanism of injury involves direct and indirect mechanisms. High energy injuries may be associated with hip dislocations, femoral fractures and fractures of the tibia [3]. The treatment of patellar fractures was extremely controversial before 20th century. In 1950s, treating patellar fractures with anterior tension band wiring was advocated as treatment of choice for transverse patellar fracture [4]. Non operative management has been associated with poor result, weakness of extensor mechanism and permanent disability [5]. Surgical management allows early weight bearing and range of motion (ROM) exercises [6]. This case portrays physiotherapy management following anterior tension band wiring in a healthy male subject.

2. Case Report

A 27 year old male injured his left knee following a motorbike accident. The subject reported to the hospital with complaints of pain around left knee and difficulty in walking. During initial examination, left knee was grossly swollen and knee movements were painful and restricted. There was a superficial abrasion over both knees. On primary evaluation, no evidence of facial injuries, abdominal and pelvic injuries was found. The radiograph revealed a comminuted fracture of the left patella [Figure 1]. Also radiological screening of spine, pelvis and femur showed no soft tissue swelling or fracture. The patient underwent tension band wiring with two Kirschner wires [Figure 2]. After surgery the knee was kept in extension and an above knee posterior slab was applied.

Figure 1: Preoperative X-ray (Lateral view)

Figure 2: Post-operative X-ray (AP view)

The patient underwent a rehabilitation program starting with in-patient physiotherapy from next post operative day. In the initial phase, physiotherapy goals aimed to achieve good mobility at knee, improve knee extensor strength and gait training. The patient performed vigorous ankle toe movements and hip ROM exercises for both lower limbs. The patient was encouraged to do partial weight bearing

ambulation with a walker. After 2 weeks, sutures were removed and cast was replaced with a hinged knee brace. Knee ROM exercises were initiated on a continuous passive motion (CPM) unit. This was followed by isometric strengthening exercises for glutei, quadriceps and hamstrings.

At 4 weeks postoperatively, CPM range was gradually increased to 90 degrees of knee flexion. Supine heel slides and heel props were performed to achieve and maintain knee mobility. Strengthening for hip and ankle was progressed using elastic resistance bands. Knee flexion was measured as having 100^0 of flexion and full extension. By 6 weeks patient was able to walk without crutches. Strengthening of quadriceps was progressed with weights on a quadriceps table. Full knee extension was not performed to avoid stress on the patellofemoral joint. Patient progress was noted with knee ROM as 120^0 of flexion.

After 4 months post operatively full ROM was achieved at knee. Patient was able to squat and perform cross legged sitting without any discomfort. Strengthening of hip muscles were continued to avoid discomfort while climbing stairs. A home program was prescribed for improving strengthening and minimizing functional limitation.

3. Discussion

Patella is the largest sesamoid bone embedded in the quadriceps tendon [1, 7]. The anterior subcutaneous location of the patella along with the soft overlying tissue makes it vulnerable to injury from direct trauma [8]. Patellar fractures account for 1% of all skeletal injuries [9]. It is a common fracture in adults, occurring two times more in males than in females [7]. Bilateral patellar fractures are rarer, primarily occurring in subjects with underlying pathologic frangibility [3, 10]. Fractures of the patella may occur as a result of direct or indirect trauma. Direct trauma may include fall from a height, motor vehicle collisions resulting in undisplaced crack or comminuted stellate fracture [3]. These may be associated with dislocation of hip and/or proximal femoral fractures. Indirect mechanisms involve violent contraction of quadriceps with knee flexed resulting in a transverse fracture [11].

The commonest fracture patterns are the transverse and stellate, whereas less common patterns include vertical and marginal fractures [12]. Sleeve fractures are common among paediatric population and accounts for 60% of paediatric patellar fractures [13]. Anteroposterior (AP) and lateral radiographs is the preferred imaging modality for evaluating such fractures [3]. Although computed tomography (CT) scan is recommended in patients with normal radiographs.

The treatment of patellar fractures includes both conservative and operative approaches. Until 19^{th} century, conservative method was used which included splinting in knee extension along with rest [9]. Operative methods used were total or partial patellectomy, patella reconstruction along with repair of the extensor mechanism [8]. However, conservative treatment and total excision have been associated with decreased quadriceps strength, prolonged recovery, residual pain and functional disability [5, 6, 14]. The treatment has evolved with preference shifting from patellectomy to reconstruction and preservation of patella and restoration of extensor mechanism [2, 8].

In our case, a young male suffered a patella fracture following a direct blow. The patient underwent anterior tension band wiring. Following suture removal, exercises were initiated and hinged knee brace was advised. Isometric strengthening of quadriceps and hamstrings were performed. CPM was used to focus on increasing and maintaining knee ROM [7]. Early active ROM exercises and early weight bearing were essential to achieve good functional outcome. After 12 weeks patient was able to walk without crutches, perform squatting and cross legged sitting.

4. Conclusion

Fracture of patella is common among middle age group individuals. The treatment depends on type of fracture, extensor mechanism and articular congruence. Operative management mainly tension band wiring followed by early rehabilitation program expedites the functional outcome. Early weight bearing, ambulation, range of motion exercises followed by strengthening exercises of extensor mechanism helps to avoid unwanted complications and achieve good functional status.

5. Conflict of Interest

There is no conflict of interest to declare.

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Author Profile

Mr. Mohd Asif is MPT (Sports) scholar in Department of Rehabilitation Sciences, HIMSR Jamia Hamdard.

Dr. Zuheb Ahmed Siddiqui (PT) (Corresponding Author) is Lecturer in Department of Rehabilitation Sciences, HIMSR Jamia Hamdard.