

Review Article

ACUTE PATELLAR DISLOCATION IN SPORTSMEN

***Deepinder Kaur Gandhi¹, Seema², Anupama Mahajan², Jaswinder singh³**

¹Department of Physiology Sri Guru Ram Dass Institute of Medical Sciences, Amritsar

²Department of Anatomy, SGRDIMSR, Amritsar

³Govt. Medical College, Amritsar

**Author for Correspondence*

ABSTRACT

Acute patellar dislocations are relatively common problems in both athletic and non athletic individual. Among athletics, men tend to present with more patellofemoral problems including traumatic dislocations than women. In the non athletic population, women present more commonly with patellar disorders. Patellofemoral dislocations are mainly diagnosed by obtaining a thorough history and performing the physical examination. Imaging studies help in confirming the diagnosis. Magnetic resonance imaging (MRI) is the most sensitive test for patello femoral dislocations.

Key Words: *Patellar, Dislocations, Athletic, Patellofemoral*

INTRODUCTION

The patella is the largest sesamoid bone in the body. It develops in the tendon of the quadriceps femoris muscle (Kanagasumtheram et al, 1987). It articulates with the femur to form a sellar joint known as femoropatellar articulation (Williams et al, 1995). Recurrent dislocations of the patella can follow a violent initial dislocation but it occurs often in knees with one or more underlying anatomical abnormalities that predisposes the patella to dislocation or subluxation. Less trauma is required in these cases as the underlying pathological condition causes abnormal excursion of extensor mechanism over femoral condyles (Philips, 1998). The knee consists of three articulations- the patellofemoral, the tibio femoral and the proximal tibio fibular joint. Any of these joints can dislocate. The lateral patellofemoral dislocations in acute case is typically an injury of young athletes and spontaneously reduce at the time of trauma. The tibiofemoral dislocations are rare and are associated with high impact trauma. Dislocations of proximal tibio fibular joint are also rare and are classified according to the location of fibular head. Patellar instabilities are commonly seen in Down syndrome (Mendez et al., 1988) or Kluwiter syndrome (Kurosawa et al., 1993). Lateral patellar dislocation is a common injury in young athletic individual and is associated with chondral defects. These injuries involve non weight bearing portion of the lateral trochlear margin and medial patellar margin thus corresponding to impaction injuries (Callewiler et al., 2009) osteochondral fractures of the patella are common especially in adolescent and athletics. Their causes may be impact or direct blow, avulsing or shearing forces caused by a traumatic patellar dislocation. The patella dislocates laterally and medial side of patella may hit the anterior aspect of a lateral femoral condyle (Batt et al., 2011)

Mechanism of Patellar Dislocation

Because of obliquity of long axis of the femur, there is an open angle on outer side of knee towards which the patella tends to dislocate. But normally it is prevented by

1-Forward projection on the lateral condyle of femur

2-Low attachment to patella of lowest fibres of vastus medialis draws the patella medially. The patella in later degrees of extension improves the efficiency by holding the patellar tendon away from the axis and thereby increasing the extending momentum of the quadriceps pull (Haxton, 1945).

Review Article

Mechanism of knee extension was given by Lieb and Berry, 1968. Vastus lateralis pulls the front of femur at 7-10 degree angle. The vastus medialis counteract this pull and stabilize the patella. These act as dynamic stabilizers of the patella. Static stabilizers are shape of patella, shape of femoral condyles and normal patellofemoral distance. Most important factor in the patellar dislocation is Q-Angle. It is the angle between the line of pull of quadriceps mechanism and patellar tendon formed at the centre of the patella. In males it is 8-10 degrees and in females it is 15 degrees (Brattstrom, 1970; Insall, and Salvati, 1976) Any factor which increases the Q angle can be a contributing factor for recurrent patellar dislocation. The factors are genu valgum, increased femoral anteversion, external tibial torsion, a laterally positioned tibial tuberosity, tight lateral retinaculum. Other factors are small or dysplastic patella, high riding patella (patella alta), dysplasia of femoral condyles, atrophy of vastus medialis, hypertrophy of vastus lateralis, generalized ligamentous laxity (Philips, 1998) Medial patellar ligament is the main force preventing the lateral patellar subluxation (Hautamaa et al., 1998; Desio et al., 1998; Caplan et al., dysplasia is a common culprit for the patellar dislocation. In these cases the trochlear groove become significantly less deep (Christian, 2000). Medial patellar retinaculum can be a cause for abnormal patellar tracking which can be restored by the reconstruction of the medial patellar ligament (Sandmeier, 2000; Avikainen et al., 1993; Muneta et al., 1999). Three layer fascial structure of dial side of the is described. The layer one is the fascia investing the Sartorius. Layer two is superficial medial patellar ligament anterior to which the layer two fuses with layer one forming patellar retinaculum which insert into medial margin of patella. Layer three is the true capsule. Superiorly the layer three form medial patellar ligament which arises from adductor tubercle (Warren and Marshall, 1979)

Diagnosis

Lateral patellar dislocation are common causes of the hemarthrosis in young people (Atkin et al., 2000) but it is usually transient and may not be initially suspected at the clinical examination in 43-73% of cases (Kirsch et al., 199; Lance et al., 1993) MRI findings which are characteristics of patellar dislocation can help in the diagnosis of patellar dislocations. These are the joint effusion and contusion or osteochondral injury of the anterior portion of lateral femoral condyle and medial patella (Lance et al., 1993; Quinn et al., 1993; Virolainen et al., 1993) These osseous impaction defects of medial patella have been described at conventional radiographs (Freiberger and Kotzen, 1967; Rorabeck and Bobeck, 1976; Grogan et al., 1990; Rogers, 1992). Injury to these structures were found in the patients prior to lateral patellar dislocation. (Nomura, 1999; Sallay et al., 1996) Subluxation was defined as patellar apex lying lateral to the plane of trochlear apex (Elias et al., 2002). In lateral radiographs the diagnosis of acute patellar dislocation can be made (Insall and Salvati, 1971; Blackburne and Peel, 1977; Merchant et al., 1974). Minimum subluxation can be determined by CT (Inoue, 1988) and medial dislocation by MRI (Shellock et al.,) Transient lateral patellar dislocations showed disruption of medial retinaculum in 96% of patients (Kirsch et al., 1993) Traumatic patellar dislocations are associated with haemarthrosis in 100% patients and contusion of lateral femoral condyle in 98% of patients. (Kreitner et al., 1995) Bone marrow contusions are frequently identified at magnetic resonance imaging after injury to the musculoskeletal systems. These osseous injuries are due to direct blow to the bone from the compressive forces of adjacent bone impacting one another or from traction forces which occur during an avulsion injury (Sander et al., 2000). Even the volumes of bone brushing of femur and patella can be evaluated separately by musculoskeletal radiologists (Paakkala et al., 2010). On study showed quantitative differences in the shape and distribution of the articular cartilage on the femoral trochlea between the patients with dislocation of patella and normal subjects (Yamada et al., 2001).

Review Article

DISCUSSION

Acute primary patellar dislocations are common in young and role of overweight and sedentary habits is contraindicated. The patient usually have limitation of kneeling and squatting (Atkin et al, 2000). A positive family history is a risk factor for recurrence and for contralateral patellofemoral instability (Palmu et al., 2008). The cases of acute patellar dislocation showed the frequency of intra articular fragments to be between 11% and 25% in adults (Nietosvaara et al., 1994) and between 54% and 74% in adolescents and young adult athletes (Stanitski and Palutta, 1998). Ofluoglu et al., 2000 gave a classification into two groups depending on the location of the patella in patellofemoral joint. In intraarticular dislocations, the patella remain in its anatomical position and is only rotated around its vertical or horizontal axis. In extra articular dislocations, the patella is displaced outside the patella femoral joint. Previous studies reported about up- 60% of patients with first time patellar dislocations has progressed to recurrent dislocations (Lai et al., 2000). Causes are trochlear dysplasia, genu-valgum, ligament, hyperlaxity, external tibial torsion and increased Q angle (Moenpaa and Lehto, 1996; Arendt et al., 2002 Nomura et al., 2003) Habitual dislocations are associated with abnormal attachment of iliotibial tract to patella (Jeffreys, 1963), quadriceps contracture, (William, 1968) quadriceps fibrosis due to muscular injections (Bose and Chong, 1995, Lai KA et al., 2000). Osteochondral fractures in patients of patellar dislocation are located on medial facet of the patella. Magnetic resonance imaging showed a tear of the medial patellofemoral ligament or medial retinacular ligament (Stanitski, 1968). Elias, 1968 found MRI finding after acute patellar dislocation. There were contusions within the lateral femoral condyle anterolaterally in 80% of cases, a concave deformity of the inferomedial patella in 44% and medial patellofemoral ligament injury in 49% of cases. Superior dislocation of the patella is a rare anomaly. Patients with this condition often have a high patella and degenerated disease of femoropatellar joint with osteophytes (Saleemi et al., 2007). Differential diagnosis must be with the rupture of patellar tendon. Acute patellar dislocations can result in anterior knee pain, recurrent dislocation and patellofemoral arthritis but rarely in habitual dislocation. But cautious physical examinations regarding patellar tracking are essential since radiological examinations including skyline new do not always reveal the pathophysiology of patellar instability.

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Review Article

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Review Article

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