

Tripartite Patella: A Rare Case Report

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Learning Point of the Article:

Although an incidental diagnosis, a multipartite patella can cause symptoms after a trivial injury. It should always be differentiated from its traumatic counterparts and, in most patients, can be treated conservatively. However, surgery should be considered in resistant patients.

Abstract

Introduction: Multipartite patella is an incidental diagnosis, rarely symptomatic, and described scantily in the literature. Symptoms are secondary to direct injury or repetitive micro-trauma, resulting in the separation of fibro-cartilaginous joints across the multiple patellar components. Treatment is usually conservative, and occasionally, in resistant cases, surgery is advised.

Case Report: We present a 50-year-old with a tripartite patella who presented after a history of falls and incidentally discovered a bipartite patella of the other knee. The symptoms of the tripartite patella were managed conservatively.

Conclusion: Symptomatic multipartite patella should be distinguished from traumatic patella fracture. In old patients, a high index of suspicion is required to differentiate between a traumatic disruption of the multipartite patella with quadriceps avulsion and an avulsion fracture of the patella. Suppose there is a high index of suspicion. In that case, magnetic resonance imaging should be preferred to explain the signs and symptoms by noting bone marrow edema, partial or complete rupture of quadriceps, and quadriceps fat pad edema. We suggest that surgical decisions to either fix the fragment or excise be taken intraoperatively based on size, site, amount of articular surface, and associated tendon avulsion.

Keywords: Knee, Tripartite patella, Bipartite patella

Introduction

The patella is an integral component of the knee extensor mechanism and functions as a fulcrum for effective quadriceps function. Multipartite (Bi/Tri) patella is an embryological anomaly emanating from an aberration in the fusion of ossification centers [1]. The ossification center of the patella appears at the age of 3–5 years, and the accessory ossific nucleus appears by 8–12 years. These ossification centers fail to unite, and eventually, synchondrosis develops [2]. Multipartite patella is an incidental diagnosis and rarely symptomatic. The reported

incidence of the bipartite variant is around 0.6–2%, of which 50% are bilateral [3]. Only 2% of these patients with multipartite patella may present with primary anterior knee pain [4]. Symptoms are secondary to direct injury or repetitive micro-trauma resulting in the separation of fibro-cartilaginous joints across the multiple patellar components. Friction between these patellar fragments due to abnormal movement causes bone and soft tissue edema. The anterior knee pain is typically localized to abnormal free fragments accentuated with knee extension [4].

Treatment of symptomatic multipartite patella should begin

Author's Photo Gallery



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Figure 1: Anterior-posterior radiograph of the right knee shows tripartite patella.



Figure 2: Lateral radiograph of the right knee.

follow-up, regained full strength of the extensor mechanism without any residual extensor lag. Follow-up radiographs were unremarkable. The patient was symptom-free by the end of 3 months.

Discussion

A tripartite patella is a peculiar congenital anatomical variant emanating from a deviation of normal patellar ossification. Mostly, this is an incidental diagnosis characterized by well-corticated, rounded edges of the ossified segments, contrary to a patella fracture in a radiograph. The synchondrosis between patellar fragments is composed of fibro-cartilaginous tissue. Multipartite patellae are mostly asymptomatic. However, strenuous

with non-operative measures; however, when it fails, the further line of management is surgery to address primary anterior knee pain, traumatic disruption of synchondrosis, or associated tendon avulsion. There are only a handful of case reports on tripartite patella in the literature.

Case Report

Our patient was a 50-year-old male who presented with a history of a fall from stairs (5 feet) and reported pain, swelling, and abrasion over the right knee. On clinical examination, there was no ligament instability. Although there was a 20° extensor lag, we were not able to comment on the disruption of the extensor mechanism as the patient was in pain. We suspected a right patella fracture with possible disruption of the extensor mechanism. Standard radiographs (Fig. 1 and 2) showed rounded and sclerosed cortical edges of patellar fragments. Computed tomography (Fig. 3) scan confirmed the presence of tripartite patella involving the superolateral and lateral part (type 3 – according to Oohashi classification [5]) of the right patella, with an irregular appearance of the synchondrosis. In addition, we went on to review the left knee (Figs. 4) which showed type III bipartite patella (according to Saupe classification [6]) patients had been asymptomatic before the traumatic event.

Non-operative management, including rest, non-steroidal anti-inflammatory drugs, and immobilization in a cylindrical cast for 2 weeks, was advised. The cast was discontinued after 2 weeks, and physical therapy was started, including hamstring and quadriceps strengthening exercises. Extracorporeal shock wave therapy was also prescribed. The patient was compliant with physical therapy despite having mild knee pain and, at 6 weeks

activities or repetitive micro injuries might cause separation of synchondroses, thus causing anterior knee pain [4]. Exaggerated motion between the disrupted fragments leads to a combination of impaction and friction, which eventually results in bone and soft-tissue edema and pain [7]. The other lesser-known reasons for pain were patellofemoral maltracking and dysplastic trochlea [8]. In our patient, the tripartite patella was diagnosed after trauma, and the other side bipartite patella was an incidental diagnosis.

Maras Ozdemir et al. [9] successfully correlated anterior knee pain in multipartite patella with edema in the fat pad of the quadriceps. The symptomatic multipartite patella is often managed conservatively by activity modification, immobilization, non-steroidal anti-inflammatory drugs, physical therapy, and local corticosteroid injections [10, 11]. In our patient, the symptoms of multipartite patella were managed conservatively.

Surgical procedures, reserved for resistant cases, include open or arthroscopic excision of the accessory patella, releasing the vastus lateralis insertion, lateral retinacular release, or surgical fixation with or without bone graft and should be considered after a trial of conservative treatment [12, 13, 14]. Felli et al. [12] reported a case of arthroscopic excision of the superolateral fragment. In addition, they released the lateral retinaculum to decrease traction force on the patella. McKee reviewed all the possible treatment options being used for the multipartite patella and suggested that accessory fragment excision, release of vastus lateralis offer the greatest alleviation of symptoms than the screw fixation [15]. They strongly recommend arthroscopy as it offers careful evaluation and



Figure 3: Computed tomography of the right knee shows tripartite patella.



Figure 4: Computed tomography of the left knee shows a bipartite patella.

traumatic patella fracture. In old patients, a high index of suspicion is required to differentiate between a traumatic disruption of the multipartite patella with quadriceps avulsion and an avulsion fracture of the patella. Suppose there is a high index of suspicion. In that case, magnetic resonance imaging should be preferred to explain the signs and symptoms by noting bone marrow edema, partial or complete rupture of quadriceps, and quadriceps fat pad edema. We suggest that surgical decisions to either fix the fragment or excise be taken intra-operatively based on size, site, amount of articular surface, and associated tendon avulsion.

management of associated lesions and allows dynamic analysis of the lateral retinaculum before release [16]. Open reduction and internal fixation should be considered following traumatic disruption if the fragment is large enough with a considerable amount of articular cartilage. In our patient, the bipartite patella was an incidental diagnosis, and the tripartite patella was first diagnosed post-trauma, and the complaints were resolved with conservative treatment.

Conclusion

Symptomatic multipartite patella should be distinguished from

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

Clinical Message

Traumatic disruption of patellar synchondrosis, repetitive strain injury, or associated malalignment could be the possible explanation of symptoms in the multipartite patella, and most of the time, the diagnosis is incident and can be treated conservatively.

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