

Synchondrosis Bither Block: A New Addition in the Diagnosis of Symptomatic Bipartite Patella

Abstract

Symptomatic bipartite patella is uncommon, and to ensure good outcome, patient selection is the key. Mostly assigning the pain origin to the nonfused fragment is easy though, in few cases, can be a serious dilemma, especially in the absence of direct tenderness over nonfused fragment. The decision of surgical intervention is solely made on the criteria of exclusion of other causes in the presence of persistent anterior knee pain. The literature focuses on different treatment techniques and outcomes with a rare attempt to add to the currently available supporting tests to affirmatively ascertain the cause–pain relation to the bipartite fragment. This article defines the synchondrosis block to assist the surgeon in isolating the source of pain to bipartite fragment in symptomatic knee.

Keywords: Bipartite patella, new test, synchondrosis block

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Introduction

The developmental variation in patella, wherein the accessory ossification center fails to fuse with the main body, leads to the formation of bipartite patella. Bipartite patella is usually an asymptomatic and incidental finding with <2% being symptomatic. Majority suffices with a nonoperative intervention, but a small and significant group requires an operative intervention.^{1,2} The decision of surgical intervention is based on the criteria of exclusion of other causes in the presence of a persistent anterior knee pain.^{3,4} The existing series of diagnostic tests are rather suggestive than diagnostic in nature.

The condition is easily identified on plain radiograph with the presence of well-demarcated fragment usually on the superolateral aspect of patella. The plain radiograph, however, fails to assign the cause of pain to bipartite fragment in the setting of symptomatic knee. Magnetic resonance (MR) imaging is the current investigation of choice for a symptomatic knee. The largest series reported by Kavanagh *et al.* retrospectively reviewed the MR findings of symptomatic anterior knee pain in the setting of bipartite patella. The presence of bony edema as reported is suggestive rather diagnostic of not so

benign nature of the bipartite fragment. Nevertheless, MR imaging is vital to rule out any other internal derangement of the knee causing symptoms.⁵ Bone scintigraphy is a valuable tool in orthopedic diagnosis, but its role in symptomatic bipartite patella is questionable because of its low specificity. Furthermore, Oohashi and Koshino recommended against considering surgical intervention solely on the basis of bone scintigraphy findings as it has overlapping findings in both symptomatic and asymptomatic groups.⁶

The weight-bearing squatting skyline views as described by Ishikawa *et al.* in 1994 are stress views depicting the mobility of the fragment and did show positive clinical correlation following surgical excision.⁷ The synchondrosis block described directly blocks the origin of pain, thus affirmatively marking the fragment as the cause of pain. This report initiates and acquaints this new test to the surgeon.

Case Report

A 30-years-old male with no comorbidities presented with nonlocalized anterior knee pain since 3 years. The pain was only on squatting and climbing up and down the stairs. He reported no pain on regular daily activities. The body mass index was 23.4. Clinical examination was unremarkable, except for a significant bump on the superior lateral aspect of the right knee. Before the

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presentation, he had been treated with anti-inflammatory, physiotherapy, and local steroid infiltration in the knee with failure to relieve his symptoms.

On the current presentation, plain radiographic study anteroposterior (AP, lateral and skyline views) revealed a bipartite patella fragment. MR imaging confirms the absence of any other significant pathology [Figure 1]. There is no bony edema on the fragment. Squat stress skyline view was done and demonstrated separation of fragment [Figure 2]. However, in the absence of direct tenderness on the superolateral aspect, equivocal radiological findings, and high suspicion, another test was performed.

The test performed to the best of my knowledge had not been reported earlier. The pull of the lateral

structures causes a repetitive strain and relative motion on the synchondrosis and generates pain, forming the pathophysiological basis of this test. The pain arising from the synchondrosis was blocked using the 2% lidocaine infiltration. The test was performed using an image intensifier using three (26 gauge, 13 mm) Dispovan needles. The three needles were inserted in the synchondrosis using an image intensifier and checked in AP and skyline views. Inject 0.75 ml lidocaine 2% in all three needles [Figure 3]. After a latent period, the patient was allowed to do pain-generating activities, which in this case was squatting and stair climbing. The absence of pain in performing the activities was considered to be a positive confirmatory test.

The patient underwent the test as described with a positive result. The surgical diagnosis was achieved, and arthroscopic excision of the bipartite fragment was performed with successful outcome [Figure 4]. The patient was pain free at 1-year followup with no restriction of activities.

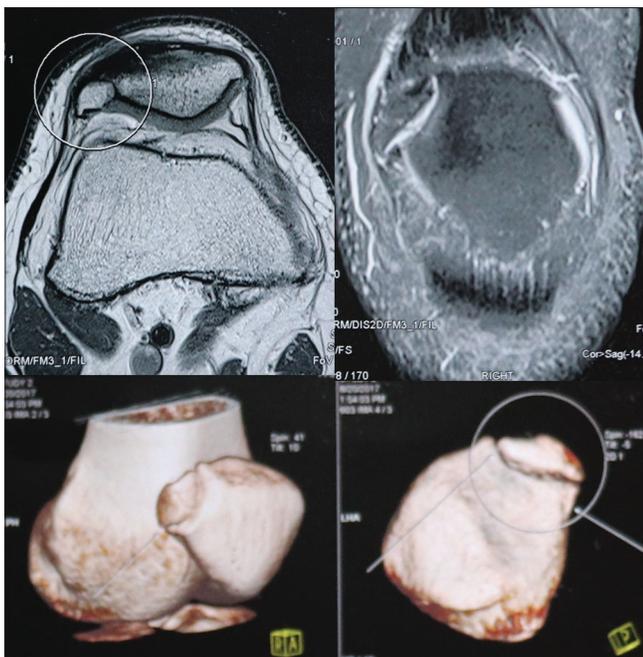


Figure 1: Magnetic resonance imaging and computed tomography scan showing the superolateral bipartite fragment

Discussion

There is a clear neglect in the literature on the diagnostic front when the symptomatic bipartite patella is concerned. The existing indication of surgical treatment is failure of conservative treatment in the setting of a persistent pain.



Figure 2: Skyline view and stress view demonstrating the separation of bipartite fragment

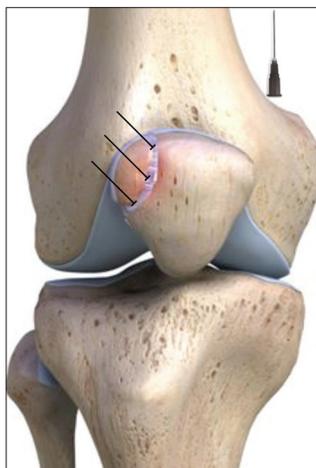


Figure 3: Illustration showing the placement of three needles in the synchondrosis



Figure 4: Arthroscopic pre- and postexcision of the bipartite fragment with an intact capsule. The postoperative outcome showing pain-free squat and sit cross-legged

The conservative treatment is not well defined, but is anything not involving surgery. The use of intraarticular steroids in the presence of bipartite fragment as a part of conservative management is an attempt to exclude other causes before surgical intervention.^{8,9}

MR imaging was considered being a gold standard for the evaluation of knee pain. Kavanagh *et al.* reported bone marrow edema in the absence of other findings in a case of anterior knee pain to be a marker of symptomatic bipartite fragment. Although being the largest series reported, only 49% of symptomatic knee patients had bone marrow edema as a sole finding. Furthermore, one-third of the symptomatic patients had no edema and 17% with edema had other significant pathologies. The correlation of these findings with clinical outcome is not known.⁵ Computed tomography scans confirm bipartite fragment, but have no role in establishing the cause-symptom relation. Bone scintigraphy as a promising tool for the evaluation of symptomatic bipartite fragment could not be established because of its low specificity.⁶

The pathophysiology of pain generation is attributed to relative motion between the two fragments. This occurs following disruption, partial, or complete of the fibrocartilaginous zone between the patella and the accessory bipartite fragment either directly or indirectly by trauma. The other possible generation of pain is due to the pull by the lateral structures causing traction and repetitive strain to the fibrocartilaginous zone leading to pain.^{10,11} The synchronosis block is based on directly blocking the origin of pain generation. The index case described had a nonlocalized persistent knee pain and tested positively following the block. The block findings correlated well with excellent outcome following arthroscopic excision.

The apparent limitation of our report includes the test is based on a single case. The test is invasive with theoretical chances of infection and requires special equipment (C Arm), which are other possible limitations. However, the rarity of symptomatic bipartite patella practically makes it difficult to conduct randomized studies and large series. Majority of literature of bipartite patella is based on single case reports and small case series. Furthermore, the use of lidocaine blocks is not new to orthopedic surgeons and has been using them since years dependably without any major issues.^{12,13}

There is a lack of existing affirmative tests at present and the synchronosis block described in the article is a valuable adjunct to the existing series of tests in the diagnosis of symptomatic bipartite patella. The article can be read as an introduction of a new test along the existing

armamentarium to facilitate better preoperative diagnosis and patient selection.

Declaration of patient consent

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

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Nil.

Conflicts of interest

There are no conflicts of interest.

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