

Multipartite Patella: Diagnosis Trap

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Abstract Our study reports a case of a multipartite patella that was initially diagnosed as a patellar fracture in a traumatic context but in view of the smooth, regular and dense appearance of the fracture traits, a comparative radiological evaluation of the other knee was necessary, which precluded the diagnosis of fracture in favor of a multipartite patella with knee sprain treated by immobilization and treatment anti-inflammatory with a good evolution, hence the interests of performing a comparative radiological assessment of the contralateral knee in front of any patellar fracture. The multipartite patella is recognized as a developmental anomaly of ossification. Most of them are asymptomatic and are discovered incidentally. The multipartite patella is sometimes misdiagnosed as a patellar fracture, because the x-ray images of both these conditions may appear very similar.

Keywords: knee joint, multipartite patella, misdiagnosed, patella fracture, anomaly

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1. Introduction

The patella is located on the anterior part of the knee joint and is the largest sesamoid bone in the human body [1].

The major ossification center appears at the age of 4-6, and accessory ossification centers appear around the age of 12 [2]. Twenty-three percent of children have two to three accessory ossification centers, and the main center fuses with accessories during childhood and adolescence.

However, in 2% of children, the centers do not coalesce [3,4]. This lack of fusion can cause a bipartite patella, a tripartite patella or a multipartite patella.

It should be noted that the multipartite patella can give the appearance of a comminuted fracture [5].

2. Case Report

This is a 32-year-old man who presented to the emergency department for a closed trauma of the right knee with pain and total functional impotence. The examination found an intra-articular effusion with pain to mobilization and extensive bruising on the anterior aspect of the knee.

Radiographic evaluation of face and profile of the knee demonstrated a multi-fragmented aspect of the right patella initially orienting the diagnosis to a comminuted fracture of the patella (Figure 1).

However, in view of the smooth, regular and dense aspect of the fracture traits, a comparative radiological assessment of the other knee was necessary (Figure 2), which ruled out the diagnosis of a fracture in favor of a multipartite patella with sprained knee that was treated by

immobilization and anti-inflammatory treatment with a good evolution. This radiological assessment was completed by a CT scan of both knees with 3D reconstruction (Figure 3); not for a diagnostic purpose but especially for an iconographic complement; and which showed the presence of three ossicles of oval shape (not ossified to the main body of the patella) measuring approximately 1 to 2.5 cm diameter. The ossicles had opposite, smooth, regular surfaces with condensation of cortical margins. The ossicles were located on the supero-lateral edge of the patella.



Figure 1. Frontal x-ray (a) and profile (b) of the traumatized knee showing a multi-fragmented appearance of the right patella



Figure 2. Comparative X-ray of face of both knees: right (a) and left (b) objectifying a bilateral multipartite patella

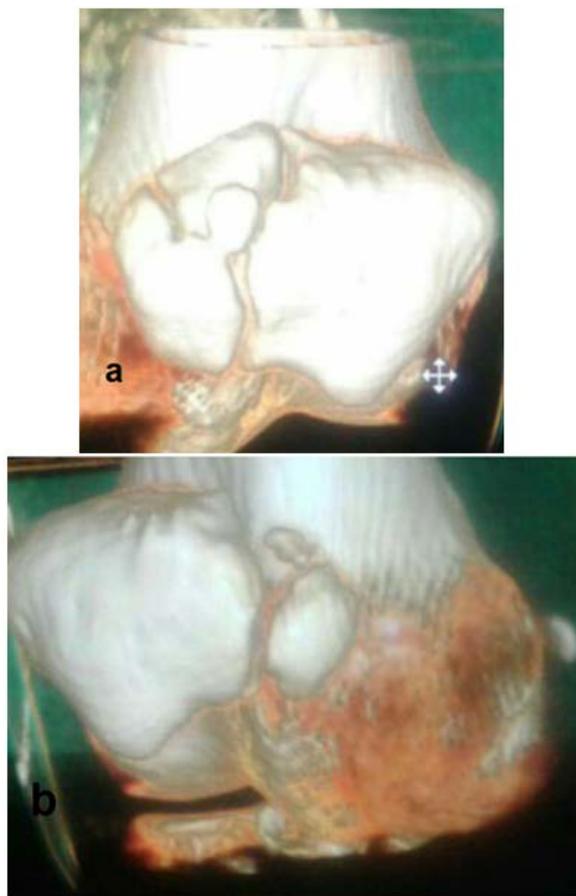


Figure 3. CT with 3D reconstruction of both knee: right (a) and left (b) showing a bilateral multipartite patella

3. Discussion

The supero-lateral angle of the patella is the privileged site for the development of one of the multipartite forms. It has been speculated that this may be due to the scarcity of vascular supply during developmental stages. This phenomenon is usually bilaterally symmetrical (80%) [6] and asymptomatic.

Some characteristics differentiate a multipartite patella from a fracture and which are [7]:

- The site that is usually on the super-lateral part of the patella;
- Bilateral and symmetrical character;
- Generally asymptomatic abnormality;
- The curved, dense and smooth appearance of the cortical margins of the patella.

On the other hand, fracture surfaces are usually irregular, unilateral, have no dense margins and are often related to a traumatic episode [7].

Frequently, fracture fragments move from their host sites [7].

Practitioners should also be prepared to differentiate Larsen-Johansson's disease, which is an osteochondritis from an infrequent accessory ossification center at the lower edge of the patella [8].

There are three main factors that could prevent these ossification centers from fusing. One is the abnormal development of the ossification center of the patella. When ossification in the center appears initially, it is often multifocal and fuses rapidly. A granular or irregular margin may appear in the process of expansion of the ossification center in the cartilage [2]. This irregular margin may play an important role in the abnormal development of the ossification center [9]. The second factor is the interposed tissue that is observed between the accessory fragment and the main body of the patella. The predominant composition of the interposed tissue is fibrous tissue and fibrocartilage [10,11]. Degeneration and necrosis of the fibrocartilage of the interposed tissue was observed in patients with painful bipartite patella [10] and also an absence of blood vessels in the central region of the interposed tissue was found in all patients. Scapinelli [12] also observed a lack of arterial penetration into the osteochondral fragment. This can decrease the regenerative capacity of the cartilaginous tissues and prevent the accessory fragment from combining with the main body of the patella. The third factor is the tensile forces on the separated fragment. Batten and Menelaus [13] have assumed that quadriceps mechanism traction can lead to separation of fragments, and that continuous traction forces on the accessory fragment can also prevent union.

In conclusion, we diagnosed the patient with a multipartite kneecap with supero-lateral localization instead of a patellar fracture. The multipartite patella is a normal anatomical variant, not a human body injury. Hence the interests of performing a comparative radiological assessment of the contralateral knee in front of any patellar fracture.

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