Focal herniation of Hoffa’s fat pad through a retinaculum defect

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Section: Musculoskeletal system
Area of Interest: Anatomy Musculoskeletal soft tissue
Imaging Technique: MR
Imaging Technique: Ultrasound
Special Focus: Hernia Case Type: Clinical Cases
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Patient: 14 years, male

Clinical History:

14 year-old boy with a right knee mass since childhood in the anterolateral aspect of the infra-patellar region, not painful, best visualised during flexion of the knee and disappearing during its extension. There was no restriction to range of motion and he denied any traumatic event.

Imaging Findings:

Ultrasound and MRI images: the patient was in a supine position and a right knee dynamic study (flexion-extension) of the antero-lateral aspect of the infrapatellar region was performed.

The images demonstrate a focal retinaculum defect that is best visualised during knee flexion (Fig. 1, 4) resulting in herniation of Hoffa’s fat pad that is also visualised during knee flexion. During knee extension the retinaculum fibres get closer to each other, the defect between them becomes smaller and Hoffa’s fat pad herniation is not so clearly depicted (Fig. 2, 5).

The MR images (Fig. 4,5) show with more detail the soft tissue components of the knee and also reveal the more pronounced retinaculum defect during knee flexion. There is no bone marrow edema suggesting the absence of recent traumatic event.

Figure 3 is a parasagittal T1 weighted MR image that reveals the anatomy of the surrounding structures.

Discussion:

Anterolateral stabilisation of the knee is provided by the capsule (capsular ligament) and iliotibial tract. The anterior part of the capsule is reinforced by the superior and inferior retinacula and the vastus lateralis muscle [1]. The lateral retinaculum appears as a hyperechoic band originating from the iliotibial band and the vastus lateralis muscle. It runs obliquely and transversely and inserts on the patella and the patellar tendon, and is composed of two layers.

A tear of the retinaculum is mostly seen after dislocation of the patella. The retinaculum may either tear completely or partially. A history of direct trauma resulting in a focal retinaculum defect or simple inspection of the skin for surgical scarring will determine the cause of the lesion. If the repair of the retinaculum is insufficient, herniation of Hoffa’s fat pad can occur and is best visualised and accentuated during flexion of the knee. The fat pad should be
clearly seen as a heterogeneous hypoechoic mass bulging through the retinaculum. In acute impingement of fat, the overlying subcutaneous fat becomes hyperechoic, consistent of inflammatory changes. Rarely, direct impact can lead to a focal defect in a retinaculum [2].

Although in our case no history of trauma or previous surgery was mentioned, probably this focal retinaculum defect was originated by an old traumatic event that the patient did not remember. Our patient did not mention any pain either, probably because there is no impingement of fat nor vascular restriction.

Although the current literature rarely mentions the herniation of Hoffa's fat pad associated with retinaculum defect, we believe that this kind of presentation with a bulging mass overlying the retinaculum that becomes more conspicuous during knee flexion is very suggestive of this pathology.

Careful anamnesis of the patient (medical history of previous traumatic episode or surgery) may already suggest the correct diagnosis [2]. Magnetic Resonance provides high resolution images for the different soft tissues of the knee, and in cases of recent trauma can depict bone marrow edema however, due to its dynamic capabilities, ultrasound is the imaging modality of choice to confirm this diagnosis. Furthermore, ultrasound is more widely available, faster and less expensive.

**Differential Diagnosis List:** Retinaculum partial defect/rupture with herniation of Hoffa's fat pad, Lipoma, Localised nodular synovitis, Ganglion cysts of the infrapatellar fat pad, Angiomyolipoma of the knee (rare)

**Final Diagnosis:** Retinaculum partial defect/rupture with herniation of Hoffa's fat pad

**References:**


Description: MR T1 weighted image. As the knee bends the images depict a progressive disruption of the fibres of the retinaculum with subsequent herniation of Hoffa's fat pad (yellow arrow). Origin:
Description: MR T1 weighted image. During knee progressive extension the defect of the retinaculum becomes smaller and herniation of Hoffa's fat pad almost disappears. The yellow arrow indicates the fat pad herniation. Origin:
Description: Longitudinal view of the lateral knee in extension showing a smaller herniation of Hoffa’s fat pad (yellow star). Origin:
**Description:** Longitudinal view of the lateral knee in flexion showing herniation of Hoffa’s pad (yellow star) through a focal defect in the lateral retinaculum (white arrows) **Origin:**
Description: Knee anatomy. Parasagittal T1 weighted MR centered in the anterolateral aspect of the infrapatellar region.

Origin: