Transient synovitis of the hip: Ultrasound appearance. Mini-pictorial essay

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KEYWORDS

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Abstract We describe the ultrasound (US) appearance of transient synovitis. Transient synovitis of the hip typically occurs in 3 to 8-year-old children. The onset is clinically characterized by acute hip pain and limp with limited joint mobility, and the leg is usually held in a position of flexion and external rotation to avoid pain. US image is characterized by joint effusion in the hip joint anterior recess, as described in the literature. Our experience confirms the importance of the technique with which the US examination is performed. In order to obtain the best diagnostic information the hip must be examined with the patient in the supine position and the hip joint in a neutral position (abduction of the hip with extension and slight external rotation) by means of an anterior approach along the long axis of the femoral neck in the parasagittal plane.

Sommario Viene descritto l'aspetto ecografico della sinovite transitoria dell'anca. La sinovite transitoria dell'anca colpisce tipicamente i pazienti di età pediatrica, compresa tra 3 ed 8 anni; il suo esordio è clinicamente caratterizzato da un'insorgenza acuta di dolore all'anca e zoppicamento con limitata motilità articolare ed atteggiamento antalgico in flessione ed extra-rotazione. L'aspetto ecografico è caratterizzato da versamento articolare a livello del recesso anteriore dell'anca, come descritto in letteratura. La nostra esperienza conferma l'importanza della tecnica di esecuzione dell'ecografia, infatti per ottenere le migliori informazioni diagnostiche l'anca deve essere esaminata a paziente supino con l'articolazione in posizione indifferente (estensione e lieve extra-rotazione) mediante una scansione anteriore secondo un piano para-sagittale rispetto all'asse lungo del collo del femore.

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Introduction

Transient synovitis of the hip is a self-limiting acute inflammation of the synovial lining of this joint. The causes are still unclear. Some authors have suggested a viral etiology (particularly related to Parvovirus B-19 and Herpes simplex virus 6 infections) because of the association with previous respiratory tract infections observed in some cases. Other authors propose a post-traumatic etiology with subsequent development of chemical synovitis, and others again have suggested that an allergic predisposition is related to this disease [1]. Transient synovitis of the hip is clinically characterized by acute hip pain and limp. It typically occurs in 3 to 8-year-old children, and males are affected twice as often as females. Pain is generally localized to the groin region, anterior thigh or medial knee. Motion is limited and the hip is usually held in a position of flexion and external rotation to avoid pain. In 5% of cases the lesion is bilateral and it is sometimes associated with a low-grade fever usually not exceeding 38 °C. Diagnosis is essentially by exclusion because imaging is similar to that of other causes of acute hip pain in children. The main differential diagnosis is septic arthritis [2] and juvenile rheumatoid arthritis. Also cases of Lyme arthritis of the hip [3] with clinical and imaging characteristics identical to transient synovitis of the hip are described in the literature.

Ultrasound examination

Ultrasound (US) examination performed for suspicion of transient synovitis of the hip is aimed at identifying effusion in the hip joint anterior recess [4] (Fig. 1). The hip must therefore be examined with the patient in the supine position and the hip in neutral position (extension and slight external rotation) by means of an anterior approach along the long axis of the femoral neck in the parasagittal plane. It may be useful to compare the image with that of the contralateral normal hip (Fig. 2). At US examination, the anterior joint capsule can be seen as a tissue band between the anterior surface of the femoral neck and the fascial layer of the iliopsoas muscle. It consists of two layers:

Fig. 1 Patient with transient synovitis: sagittal US image. The anterior (A) and posterior (P) layers of the joint capsule are separated by anechoic effusion.

Fig. 2 A healthy child. US image of the anterior joint shows the femoral neck, the iliopsoas muscle and both layers of the anterior joint capsule (arrows).

anterior and posterior. In the absence of joint effusion, a linear reflection can be observed in the center; it is the interface between the two layers indicating the absence of effusion ("stripe sign").

A significant variation in thickness or echogenicity of the two layers of the anterior joint capsule in children with transient synovitis of the hip has not been demonstrated as compared to asymptomatic patients (Fig. 3). This can be explained by the fact that the thickness of these layers, measured at histological examination, is approximately 0.025 mm, which exceeds the spatial resolution of US [4]. A US sign that is always present in patients affected by this pathology is joint effusion in the hip joint anterior recess (Fig. 4). This does not occur if the anterior joint capsule border is concave.

In some patients with transient synovitis of the hip (2%) pseudodiverticula (herniation of the synovial membrane through a joint capsular defect) have been observed in the space between the iliopsoas muscle and the anterior border of the joint capsule. The appearance of a small hypo-echogenic band between the joint capsule insertion on to the labrum and the labrum itself may lead to misdiagnosis, but this image corresponds to the normal anterior recess.

Another US appearance, a hump of the posterior layer of the anterior joint capsule, previously considered suggestive

Fig. 3 Sagittal US image shows effusion and local thickening (line) of the posterior (P) layer of the joint capsule.

Fig. 4 Patient with transient synovitis. Sagittal US image shows the superior articular recess (SAR).

Fig. 5 Patient with transient synovitis. Sagittal US image shows effusion with small particles floating in the effusion.

of septic arthritis, is actually the insertion of the joint capsule on to the femoral neck, and not a sign of turbid effusion. Turbid effusion is not only a sign of septic arthritis, and some authors [6] correlate this diagnostic sign with a long duration of the effusion also in cases of transient synovitis (Fig. 5). In transient synovitis of the hip, a 2-view standard x-ray examination (anterior–posterior and frog-leg lateral views) yields a negative outcome or is only indicative of joint effusion [1,5]. According to some authors [2] gadolinium-enhanced magnetic resonance has proven useful in the differential diagnosis between transient synovitis and septic arthritis because septic arthritis presents a reduced perfusion of the femoral head in gadolinium-enhanced images. However, this sign is not always present. According to some authors [6] also arthroscopy may be a valid tool in the diagnosis and possible treatment of patients with uncertain diagnosis.

Discussion and conclusions

Transient synovitis of the hip is one of the most common causes of hip pain and limp in young children. It has an acute onset without trauma and is self-limiting after

conservative therapy. The incidence of this pathology, confirmed by our experience over a short period of time in an Institution not devoted to pediatric radiology, has shown that familiarity with the iconographic features, particularly the US features of the hip, is required. US is the best imaging method in the diagnosis of transient synovitis also because the patient is not exposed to ionizing radiation, US is widely available, examination time is short, and it is appreciated by parents. US examination is aimed at identifying effusion in the anterior recess of the joint capsule, and the hip is therefore examined with the patient in the supine position and the hip joint in a neutral position (abduction of the hip with slight external rotation) by means of an anterior approach along the long axis of the femoral neck in the parasagittal plane. It may be useful to compare the image with that of the contralateral normal hip. In our opinion, US follow-up 10–15 days after the acute onset of the pathology is necessary to verify disappearance of joint effusion and thereby definitively exclude other diagnostic hypotheses. If the symptoms do not regress, further imaging such as magnetic resonance imaging with intravenous administration of contrast medium may be required to reach a differential diagnosis.

Conflict of interest statement

The authors have no conflict of interest.

Appendix Supplementary material

Supplementary data related to this article can be found online at [doi:10.1016/j.jus.2011.03.003](https://doi.org/10.1016/j.jus.2011.03.003).

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