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## Synchronized Legg-Calve Perthes disease and comorbid perforated appendicitis

Alev Süzen<sup>a,\*</sup>, Nazile Ertürk<sup>b</sup>, Gürbüz Akçay<sup>c</sup><sup>a</sup> Muğla Sıtkı Koçman University Training and Research Hospital, Department of Pediatric Surgery, Muğla, Turkey<sup>b</sup> Muğla Sıtkı Koçman University Hospital, Department of Pediatric Surgery, Muğla, Turkey<sup>c</sup> Muğla Sıtkı Koçman University Hospital, Department of Pediatrics, Muğla, Turkey

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## ABSTRACT

Abdominal pain is a very common complaint caused by a variety of conditions. Acute appendicitis is the most common cause of acute abdominal pain in children requiring surgical intervention. Legg-Calve-Perthes disease (LCPD) is a childhood condition that affects the hip, where the thighbone (femur) and pelvis meet in a ball-and-socket joint. The disease is initially asymptomatic or there is painless limp. The pain associated with LCPD is often localized in the inguinal region. The present study is aimed to present a patient with LCPD and comorbid perforated appendicitis and to highlight the importance of the differential diagnosis of abdominal pain as a delay in diagnosis can increase the risk of mortality. Analyzing the imaging technique, from the study it has been found out that clinicians should examine all the field about the diagnosis, not only the field around disease as a patient might have two separate acute problems at same time.

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Acute abdominal pain is a common complaint in children, which can be caused by a wide range of underlying conditions that may or may not require surgical intervention. The most common cause of abdominal pain not requiring surgery is gastroenteritis, whereas the most common cause that does require surgery is appendicitis. Other life-threatening causes of abdominal pain include hemorrhage, obstruction, or perforation of the gastrointestinal tract or intra-abdominal organs. Diabetic ketoacidosis, hemolytic uremic syndrome, myocarditis, systemic viral illness, extra-gastrointestinal tract infections, mesenteric lymphadenitis, and infantile colic are extra-abdominal causes of abdominal pain.

Although acute abdominal pain is usually benign and self-limiting, there are uncommon, but life-threatening conditions that require urgent care. It is essential to accurately determine the cause of acute abdominal pain and to identify children that require surgical treatment. Acute appendicitis is the most common cause of acute abdominal pain in children requiring surgical intervention. Physicians should consider the diagnosis of appendicitis in all causes with a history of abdominal pain and vomiting [1,2]. Legg-Calve-Perthes disease (LCPD) occurs most commonly in males aged

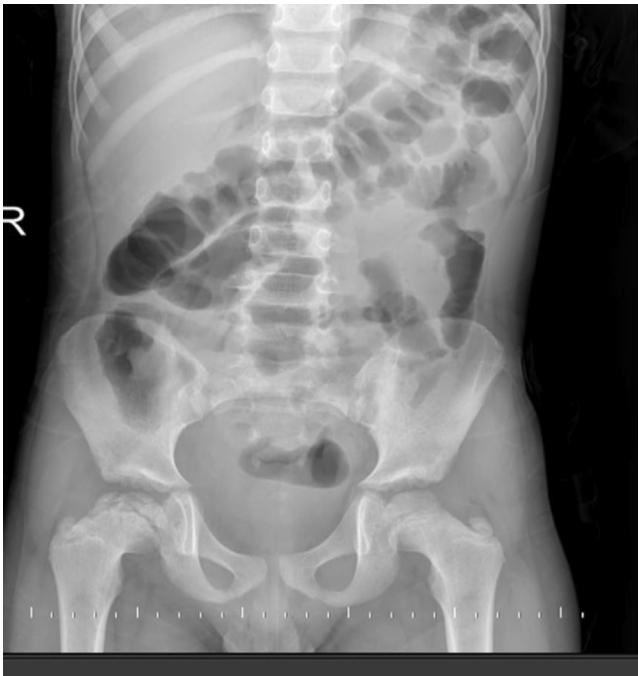
4–9 years. The pain associated with LCPD is often localized in the inguinal region, but may also be localized in the knees and the gluteal muscle. In cases of extra-inguinal pain the diagnosis may be delayed. Plain radiographic imaging is diagnostic, excluding the early stage of disease [3]. Herein we present a patient with LCPD and comorbid perforated appendicitis.

## 1. Case

A 6-year-old male presented to the emergency department. On physical examination there was minimal abdominal guarding. The patient was diagnosed as gastroenteritis and was sent home with medical therapy. The next day, he presented to the pediatric outpatient service with vomiting, diarrhea, abdominal pain, and the sensation of burning when urinating. Abdominal radiography showed aseptic necrosis on the head of the femur (Fig. 1); he was then hospitalized in the pediatric service. Although it was thought that aseptic necrosis was the cause of abdominal pain, he was consulted to the pediatric surgery department because of persistent abdominal pain. Physical examination showed rebound tenderness in the lower left and right quadrants of the abdomen. The patient was then transferred to the pediatric surgery department. There was no specific sign on plain abdominal radiographs, but fragmentation on the femoral head was observed. Femoral head deformity with widening was suggestive of LCPD.

\* Corresponding author.

E-mail address: [alevsuzen@hotmail.com](mailto:alevsuzen@hotmail.com) (A. Süzen).



**Fig. 1.** Plain abdominal radiograph: fragmentation of femoral head.

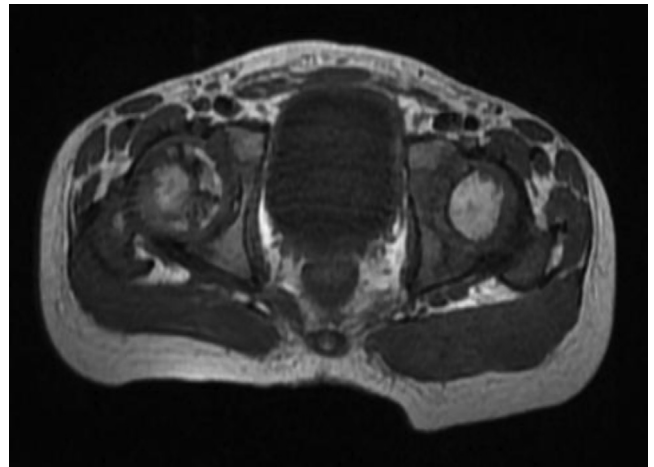
Abdominal ultrasonography showed the appendix with an outer diameter of 19 mm, and a 20 × 23-mm periappendicular fluid collection with intensive content. The patient underwent surgery during which time perforated appendicitis and periappendicular abscess were noted, and appendectomy was performed. Right femoral MRI showed deformity and slimming of the femoral head epiphysis and an expanded medial joint space, suggesting stage 2–3 LCPD (Fig. 2). The patient was then treated and followed-up by the department of orthopedics.

## 2. Discussion

Abdominal pain is a common complaint in children that can be caused by a variety of conditions. It is essential to accurately determine the cause of acute abdominal pain and perform differential diagnosis [1,2]. In pediatric patients with surgical conditions such as appendicitis, plain abdominal radiographs are obtained initially in many of those that present with abdominal pain. Ultrasonography (US) and computed tomography (CT) are often used in emergency departments [4]. Although CT is more accurate than US, US is the preferred imaging modality for initial evaluation of abdominal pain in children, because it is noninvasive, radiation-free, and less expensive [2].

Acute appendicitis is the most common surgical condition that causes acute abdominal pain in children. Usually, children with appendicitis present with visceral, poorly localized periumbilical pain. Subsequently, the pain becomes parietal, as the overlying peritoneum becomes inflamed. Because some of these characteristic manifestations are frequently absent, physicians should consider the diagnosis of appendicitis in all patients with a history of abdominal pain and vomiting [2].

There are some reports of acute appendicitis presenting only with inguinal symptoms [5,6]. They described a syndrome with an empty hernial sac. Peritoneal recess becomes distended with pus because of general peritonitis. Baeza-Herrera et al. [5] reported 8 patients with inguinal symptoms: 4 underwent appendectomy and 4 that was secondary to necrotizing enterocolitis. Graham et al. [6]



**Fig. 2.** Right femoral MRI: deformity and slimming of the femoral head epiphysis and expanded medial joint space.

described a 12-year-old black male that presented with left inguinal and testicular pain, as well as nausea, vomiting, and fever. Left groin exploration showed a markedly inflamed patent process vaginalis containing purulent exudate. Concomitant abdominal exploration showed a perforated gangrenous appendix with diffuse peritonitis.

Ofiaeli [7] reported a patient with right osteomyelitis that was initially misdiagnosed and treated as acute appendicitis. Deep-seated right lower quadrant pain persisted and gluteal abscess developed during the post-operative period. The gluteal abscess was incised, but continued to discharge pus until the correct diagnosis made and appropriate treatment was administered. Ofiaeli [7] further reported that pain due to iliac osteomyelitis is deep-seated and may radiate to the thighs or lumbar region. In 2 patients the authors performed surgery due to symptoms similar to those of acute appendicitis: in 1 patient osteomyelitis of the iliac bone was diagnosed and the other was diagnosed as traumatic rupture of a hydronephrotic right kidney [8].

LCPD is most commonly seen in males aged 4–9 years. The associated pain is often localized in the inguinal region, but can also be localized in the knees and the gluteal muscle. In cases of extra-inguinal localization diagnosis may be delayed [3]. The risk of LCPD is significantly higher in patients with congenital anomalies of the genitourinary and inguinal region, such as hypospadias, undescended testis, and inguinal hernia [9]. The risk of LCPD is also high in patients with renal anomalies [3]. LCPD has a strong association with congenital genitourinary and inguinal anomalies, suggesting that intra-uterine factors may be causative [9]. Plain radiographic imaging is diagnostic, excluding early stage disease [3]. Radiographic evaluation should be performed via a standard technique and the initial imaging should include the anteroposterior pelvis, lateral of the proximal femur, and false-profile of the hip [10]. Staging LCPD can be performed based on plain radiographic findings; scintigraphy and arthrography aren't routinely used. Following the introduction of MRI, LCPD can be evaluated with much greater detail, the disease can be diagnosed earlier, and the prognosis can be estimated more precisely than before.

In conclusion, based on the present findings, we think that clinicians should examine all the field about the diagnosis, not only the field around disease we think on the imaging technique. In the presented case perforated appendicitis comorbid with LCPD was diagnosed via imaging techniques. It can be omitted from a single focus on the other diagnostics identify intended to highlight. To the best of our knowledge the present case report is the first to describe perforated appendicitis comorbid with LCPD.

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