

Diagnosing Sever Disease: Overview of the Literature

Sever Hastalığının Tanısı: Literatürün Gözden Geçirilmesi

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ABSTRACT

Calcaneal apophysitis is a condition known also sever disease. Recent knowledge supports overuse injury as an underlying etiology. The typical presentation is bilateral or unilateral heel pain during an activity in an adolescent who had a history of new-onset sports activity. We should take a detailed history, careful examination and simple laboratory tests for the patients with painful heels. If the patient's symptoms and examinations fit with calcaneal apophysitis some authors believe no need for radiography, unlike routine practice. MRI and ultrasound can also provide helpful diagnostic images but are neither cost-effective nor easy accessible at the first stage. We need to improve our knowledge and confidence in the clinical workup. Obviously further investigations require to reveal an ideal diagnostic algorithm.

Keywords: Sever disease, Rear foot pain, Calcaneal apophysitis

ÖZ

Kalkaneal apofizit, Sever Hastalığı olarak da bilinen bir durumdur. Son bilgiler, altta yatan bir etiyoloji olarak aşırı kullanım yaralanması olduğunu desteklemektedir. Tipik prezentasyon, yeni başlayan spor aktivitesi öyküsü olan bir adölesanda aktivite sırasında bilateral veya unilateral topuk ağrısıdır. Topuk ağrısı olan hastalar için ayrıntılı bir öykü, dikkatli bir fizik muayene ve gereğinde basit laboratuvar testleri yapmalıyız. Hastanın semptomları ve muayenesi kalkaneal apofizit ile uyumluysa, bazı yazarlar rutin uygulamaların aksine radyografiye gerek olmadığına inanmaktadır. Manyetik rezonans görüntüleme ve ultrason da yardımcı tanılama görüntüleri sağlayabilir, ancak ilk aşamada ne düşük maliyetli ne de kolay erişilebilirdir. Klinisyenin bu konu ile ilgili bilgi ve deneyimini artırması önemli olup optimal tanısal algoritma için daha ileri çalışmalara gerek vardır.

Anahtar Sözcükler: Sever hastalığı, Arka ayak ağrısı, Kalkaneal apofizit

INTRODUCTION

Foot and ankle problems can be seen in childhood and skeletally immature adolescents. Bones, muscles, tendons, nerves, joints and soft tissues can be the cause of the pain. The hindfoot is one of the functional parts of the foot and consists of talus and calcaneus bones and surrounding tissues proximally to ankle mortise. One of the hindfoot related problems in childhood or adolescents is heel pain (1). While examining heel pain, acute conditions like friction blisters, plantar puncture wound, laceration, contusion, calcaneal fracture and, Achilles tendon rupture, overuse injuries (calcaneal apophysitis, plantar fasciitis, painful heel pad syndrome, Achilles tendinitis, retrocalcaneal bursitis, calcaneal stress fractures), bone conditions (bone cyst or tumors, deformities like tarsal coalition) and infectious or inflam-

matory diseases should be kept in mind (2-9). To discover the exact etiology, careful history and physical examination and appropriate imaging studies should be done. Among this long list, thankfully, critical conditions such as tumors, infectious or inflammatory diseases are rarely seen. The most common diagnosis was based generally on overuse trauma. Physically active children, especially those who interest in sports like soccer, tennis, basketball, etc. are more prone to get overuse injuries(10). Apart from adults in childhood one of the differential diagnose, related overuse or obesity, "calcaneal apophysitis" should be kept in mind.

While exploring the heel pain in childhood remembering the epiphyseal growth plates of the calcaneus will be useful. Calcaneal bone has two ossification centers. The first one known as the primary ossification center is located in the calcaneal tuberosity and presents at birth. The secondary ossification center develops later in early childhood and the appearance time differs in boys and girls. This secondary ossification center provides an attachment for the achilles tendon. Girls tend to start the development of apophysis 2-3 years earlier than boys. While developing, apophysis grows up from multiple centers and by this process it becomes irregular shaped. This irregular apophysis is the weakest part of the tendon-bone compaund and tends to injured by an overuse activity. Apophysis-metaphysical fusion continues until 15-17 years in both gender(11, 12).

Calcaneal apophysitis is a condition known also Sever disease. Wiegerinc et al. reported incidence rates 3.7/1000 among the population between ages 6 and 17 (13). Although calcaneus pain in adolescents firstly described by Hugland MD in 1907, the typical clinical condition was reported by Sever in 1912 (14). The term "apophysitis" has been used by Sever to describe an inflammatory originated process of chondrocalcinosis apophysitis of the calcaneus. Over a hundred years after Sever, cumulative evidence support that this is a mechanical issue rather than an inflammatory process. Repetitive trauma and overuse activities, especially in athletic teenagers, cause the micro failure of the apophyses-metaphyseal compound. Like stress fractures, bone bruising occurs and this edema can be visualized by MRI easily (15). Although overuse injury seems a great explanation there are also children despite athletic performance ever developed calcaneal apophysitis. James et al. analyzed 124 children with calcaneal apophysitis and reported that they were anthropometrically different from their healthy peers. They had higher weight, taller and also foot posture and ankle joint range of motion were different from the healthies (16). Controversy Scharfbilling et al compared 2 groups and reported that there was not enough evidence to claim that body weight and activity levels are risk factors. But they said forefoot and rearfoot malalignment was significant either statistically or clinically, so the exact problem

could be biomechanic (17). James et al. also argued some biomechanical issues and orthotic treatments. If there is the worst balance of the impact forces and pressures related muscle and tendons anchoring calcaneus (flat foot, high arch, overpronation of the rare foot) these biomechanically abnormal conditions will help repetitive trauma and developing of apophysitis will be getting easier (18).

A study compared 28 sever disease and 28 healthy controls and resulted in higher heel plantar pressures under dynamic or static conditions that are associated with calcaneal apophysitis (19). Hendrix et al. also summarized factors believed to contribute to the calcaneal apophysitis development. Besides the issues explained above, he highlighted that improper footwear can also be the underlying problem (20). However Weiner et al. believe that neither foot condition nor footwear can be related to symptomatology (21).

Most authors accept that diagnosis of calcaneal apophysitis is a clinical decision (11, 20, 22, 23). Perhamre et al. reported that one leg standing, squeeze test and palpation test had %100, %97, %80 sensitivity respectively and all of them had %100 sensitivity (23). Although examination and clinical suspicion can be done easily and reliably we need to rule out other conditions. First and easy imaging modalities are x-rays. Increased density, sclerosis and fragmentation of apophysis are the most reported radiologic signs. However Volpon et al. analyzed 392 normal children, 69 of them diagnosed calcaneal apophysitis and compared lateral roentgenograms. They reported that the sclerotic aspect was a completely normal sign on the other hand fragmentation of apophysis significantly differs between groups. They also comment this is evidence for the mechanical cause of condition (24). Kose et al. hypothesized blind testing of lateral calcaneal roentgenograms would be inconclusive and study resulted in radiologic signs insufficient without clinical information (25). Although radiologic examination not required to diagnosing calcaneal apophysitis most physicians ordered, to exclude other pathologies. Rachel et al. analyzed retrospectively 98 patients with clinically calcaneal apophysitis and 134 (36 patients bilateral) lateral x-ray. Pozitive radiological finding rate is %5.1 (3 calcaneal bone cysts, 2 stress fractures and 1 distal tibial non-ossifying fibroma). They also analyzed common findings in the history and physical examination and none of them were valuable to predict positive radiological signs (26).

Kose et al. also analyzed 61 clinically diagnosed patients and 71 lateral plain radiographs of them prospectively. He reported only one lateral x-ray which changed the patient's diagnosis as a calcaneal bone cyst. Routine order of the roentgenograms seems not cost-effective and because of the radiation risk not safe for children. The author recommends funder evolution with imaging studies only for recalcitrant patients. Because of calcaneal apophysitis self-limited and

good responder condition to treatment (27). In the absence of diagnostically pathognomonic signs in roentgenograms, in order to avoid radiation exposure alternatively Hosgoren et al. reported preliminary results of ultrasonographic evolution of sever disease. They reported that fragmentation of the ossification center can be visualized by sonography (14). MRI can also diagnose calcaneal apophysitis clearly (15). However, discussed above the diagnosis of calcaneal apophysitis should be based on clinical findings. Typical presentation is bilateral or unilateral heel pain during activity in adolescent who had a history of new onset sport activity (12). We should carefully examine patients and note the important signs which can alert us for differential diagnosis such as arthritis, color changes, skin changes, etc. Although squeeze and palpation tests are sensitive and specific, posterior calcaneal pain can easily interfere with

Achilles tendon enthesopathy. Entesalgia also common in childhood and Achilles tendon insertio is one of the enthesopathic sites in seronegative enthesopathic arthropaties (28). Even major clinical feature is pain over posterior aspects of the heel, this condition separated from calcaneal apophysitis by characteristic inflammatory pain which is being worsened in mornings and alleviated by activities. Arthritis and abnormal serological tests also accompanied.

We should take a detailed history, careful examination and simple laboratory tests for the patients with painful heels. If the patient's symptoms and examinations fits with calcaneal apophysitis some authors believe no need for radiography, unlike routine practice (25-27). This approach seems cost-effective and prevents radiation but depends on limited evidence. We need further investigations to reveal an ideal diagnostic algorithm.

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