Ultrasonography of the Calcaneus in Sever's Disease

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Sever's disease (calcaneal apophysitis) is a self-limiting condition seen in physically active children. Although there is controversy about the radiographic appearance, some reports propose the importance of fragmentation of the secondary nucleus in the diagnosis of Sever's disease. We studied secondary nucleus of the calcaneus with ultrasonography. Twenty-one symptomatic heels of 14 children were examined. All these heels showed fragmentation of the secondary nucleus on both conventional radiograph and sonography. Ultrasonographic examination also showed 2 retrocalcaneal bursitis. Our initial data showed that sonography may be valuable in the diagnosis of Sever's disease.

Key words: *Apophysitis, Calcaneus, Sever's disease, Ultrasonography*

IN 1907, Haglund described calcenodynia in children and adolescents(1). In 1912, Sever reported this clinical condition as osteochondrosis as ischemic changes of the secondary nucleus(2). Similar to Osgood-Schlatter disease (OSD) (tibial tuberosity apophysitis), Sever's disease is an overuse syndrome frequently seen in physically active children and adolescents between the age of 8 and 10 years in girls and 10 and 12 years in boys(3,4).

The radiographic aspect of the secondary nucleus of the calcaneus in children with heel pain remains controversial. The recent studies stated that the fragmentation of the calcaneal secondary nucleus was the most typical finding and also showed the disappearance of the areas of disintegration after treatment of the apophysitis(5,6).

In this study, we report our preliminary results showing the ultrasonographic aspect of Sever's disease and emphasizing that sonography might be a diagnostic tool without radiation hazard to the children.

Material and Methods

Twenty-one symptomatic heels of 14 children (2 girls, 12 boys) age 9-15 years (mean; 12.7) who were active in sports were studied with ultrasonography because of the typical clinical Sever's disease. The ultrasound examination was performed with 10 MHz linear transducer (Acuson EUB 6000). In addition, lateral radiographs of the heel were taken for all children. Heels were evaluated for the soft tissue changes and fragmentation of the secondary nucleus of the calcaneus.

Results

The radiographs of 21 symptomatic heels showed fragmentation (*Fig. 1*). All of these heels (100%) had abnormal sonographic

Fig. 1. X-ray of the heel with fragmentation of the secondary nucleus.

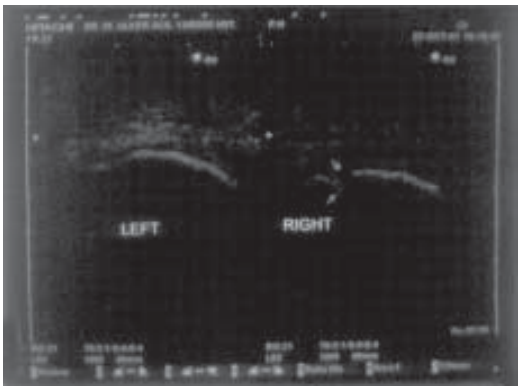

Fig. 2. Ultrasonography showing normal left heel and right heel with fragmentation (arrows).

examination showing the fragmentation of the secondary nucleus (*Fig. 2*). Two of them also had retrocalceneal bursitis demonstrated by ultrasonography. All 21 heels had normal achilles tendon on sonographic examination. Only 3 heels were examined by ultrasonography after one month's treatment by the same person and decreased fragmentation was observed.

Discussion

Sever's disease, or apophysitis of the calcaneus is a common cause of heel pain. The apophysis of the os calcis is an epiphyseal plate that develops along the posterior border of the bone. The achilles tendon inserts in the calcaneus apophysis. The growth plate is weak and subject to injury. The most significant etiologic factor in Sever's disease is overuse and microtrauma in sports(7).

When Sever reported this condition as osteochondrosis, sclerosis and fragmentation were demonstrated as diagnostic *X*-ray findings. However, years later, there is still controversy about the radiographic aspect of the calcaneal apophysitis. Some authors showed that sclerotic changes could be observed in normal children (7-9). Nery, *et al.* (1996) and Volpon, *et al.* (2002) stated that fragmentation was the most reliable *X*-ray finding in calceneal apophysitis(5,6). There have been studies including sonographic features of the OSD that involves tibial tuberosity. Showing pathologic findings like pretibial swelling, fragmentation of the ossification center, insertional thickening of the patellar tendon and excessive fluid collection in the infrapatellar bursa, they supported the sonographic examination of knee as a simple and reliable method to diagnose OSD(10-12). In Sever's disease, ultrasonographic examination provides to examine not only secondary nucleus of calcaneus but also, Achilles tendon and retrocalcaneal bursa. Achilles tendinitis and/or retrocalcaneal bursitis may accompany with Sever's disease or may be solely a cause of heel pain.

Our preliminary results showed that ultrasonography could demonstrate the fragmentation of secondary nucleus of ossification of the calcaneus and surrounding soft tissues. This finding might be valuable in the easy diagnosis of Sever's disease since children are prevented from excess radiation. This study is the first step, and further studies

Key Messages

- Ultrasonography is a safe diagnostic tool since there is no radiation.
- Ultrasonography could show the fragmentation of secondary nucleus of ossification of the calcaneus in sever's disease.

are needed to support the value of the sonographic examination in the diagnosis of Sever's disease.

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