Anomalous Multifocal Ossification of the Os calcis

—Case Report—

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Summary: A three-month-old female baby was diagnosed by roentgenograms as having bilateral multifocal ossification of the os calcis. Five ossification centers in the bilateral calcaneus were recognized. However, at one year of age the roentgenograms showed only three ossification centers, with cleft separating on both sides the anterior third from the posterior two-thirds of the bone. At two years of age, the three ossification centers had coalesced into a single composite ossification center and the cleft at the calcaneus disappeared.

Key words: anomalous multifocal ossification—Os calcis—congenital—baby—multiple ossification centers

Introduction

Anomalous multifocal ossification of the os calcis is a rare disease first described by Sever in 1930. Most cases present with bifid os calcis, while in a few cases three or more ossification centers were shown to be present. This anomaly may be present in children with pes planovalgus, pes calcaneovalgus or mild equinovarus deformities, and most often the diagnosis is established via incidental findings obtained from roentgenograms. On a lateral view of the bifid os calcis, the anomaly is usually characterized by a radiolucent cleft separating the anterior third from the posterior two-thirds. The separation may or may not be complete, depending upon the child's age at the time of the evaluation. Fusion of the cleft usually occurs by 3 years of age. This anomaly does not cause clinical symptoms and does not itself require treatment. With respect to this case report, the anomaly was found accidentally on inspection of the roentgenogram of a patient presenting with pes calcaneovalgus, and the case exhibited multiple separated ossification centers in excess of those ever reported.

Case Report

The case in question, a female, was born at full term with a birth weight of 2,260 g, and a limitation of the plantar flexion of the right foot was noticed soon after birth. She was seen at an orthopedic department of a general hospital and

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diagnosed at one month of age as having pes calcaneovalgus affecting the right foot. She then underwent massage therapy for a few weeks until the deformity seemed to disappear and the function of the right foot became normal. However, she was subsequently referred to our department after the segmentation of the ossification of the bilateral os calcis was seen in the X-ray.

On examination the patient was found to be well developed, the extremities including the feet appearing overtly normal. X-ray revealed significant retardation in the development of the calcaneus. Three large ossification centers were found on the right calcaneus. They were coalescing into a composite ossification center, in addition two punctate ossification centers were found in the posterior region. There was a small anterior portion coalescing into a large posterior portion on the left side, and two punctate ossification centers, one of them coalescing into another posterior ossification center (Figs. 1A and B).

At one year of age, the roentgenograms showed two marked posterior developmental ossification centers coalescing into a large posterior composite portion bilaterally. There was a slight change only in both anterior portions, and a radiolucent cleft was found between the anterior and posterior ossification centers (Fig. 2A and B). At two years of age, the two ossification centers coalesced into a normal-shaped calcaneus and the cleft had almost disappeared on both sides (Fig. 3A and B).

Figs. 1A and B. Lateral views of the right foot (A) and left foot (B). Patient, age three months. Right foot showing three large portions coalescing into one composite ossification center and two punctate ossification centers (arrow). Left foot showing two large portions coalescing into one ossification center, and two punctate ossification centers, one of them coalescing into another ossification center (arrow).
Figs. 2 A and B. At one year of age, the bilateral side showed a radiolucent cleft between the anterior portion and posterior portion into which coalesced two ossification centers. But the posterior center remained as a punctate bilaterally (arrow).

Figs. 3 A and B. At two years of age, calcaneal ossification proceeded to almost a complete composite ossification center. However, the original punctate center was still present bilaterally (arrows).
Discussion

Anomalous multifocal ossification was first reported by Sever as "bifid os calcis" in 1930. According to his report, one of his three cases underwent an X-ray examination because of a fall and was found to have bilateral bifid os calcis at two years of age. When re-examination was carried out at three years of age, the cleft had completely disappeared.

Subsequently, Smola described another case that was 2 years of age. Roentgenograms of both feet were taken because of the shortness of the third toe, and they revealed bifid os calcis on the right side.

Szaboky et al. (1970) reported on a male child presenting bifid os calcis with severe planovalgus deformity at 42 months of age. At five and a half years of age, the bifid os calcis was no longer detectable. Ogden (1982) described a male infant presenting at four and half months of age a mild calcaneovalgus deformity of the right foot. At 8 months, the roentgenograms revealed two ossification centers on the right side and three tripartite ossification centers on the left side. As this infant was born two months prematurely, the record was taken at the real age of 6 to 7 months. At 5 years of age, the ossification centers had coalesced into a composite normal bone, though the original punctate ossification center was still present bilaterally.

Our case was initially observed at 3 months of age; at that time, the right calcaneovalgus showed five ossification centers, and the left normal foot showed five ossification centers, too. When the infant was 2 years of age, the cleft disappeared, with the original punctate ossification center being still present bilaterally. Schlüter (1954) described 4 cases of multifocal ossification of the calcaneus which exhibited two to four ossification centers. Hasselwander found one or two calcaneal ossification centers in fetuses. Porstmann and Arenz (1954) suggested that the coalescence might begin at six months of development. Ogden (1982) studied 63 feet fetuses ranging in crown-rump length from 150 mm to 360 mm (full-term). At approximately 190 mm crown-rump length (at about 5.5 months of gestation) a punctate, single ossification center was present. There appeared to be a solitary ossification center in all except two cases. In one case, two ossification centers were present, in the other fetus, tripartite ossification centers were present bilaterally. Gentili et al. (1984) examined 312 normal pregnancies between 20 and 40 weeks of gestation, and found that the calcaneal ossification center was detectable from 24 weeks on of gestation. Our case was of that a 3-month-old female infant showing five ossification centers bilaterally; this indicated significant retardation in the development of the calcaneal ossification. Usually multifocal ossification of the os calcis fuses by about 3 years of age. However, earlier than in other cases, the separation of the os calcis in our case had fused by 2 years of age, and the shape of the calcaneus became normal at that time.

References


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