Unicameral bone cysts are benign, fluid-filled lesions that typically occur in the metaphyseal-diaphyseal regions of long bones within the first 10 years of life.1 They represent approximately 3% of all bone tumors that are analyzed by biopsy, and their prevalence in males is twice that in females.2,3 Unicameral bone cysts are typically asymptomatic until a stress fracture occurs, which accounts for more than 80% of diagnosed cases.4 These cysts are relatively common in the humerus, femur, and tibia, but they rarely form in the calcaneus. Only two reports have appeared in the literature that involved adults. One report included a few adults (40 patients, mean age 13.2 years, ranging from 4–27 years), which described bone cysts in the humerus, femur, tibia, and fibula.5 The other report documented 36 cases (33 patients, mean age 37.9 years, ranging from 13–74 years), which stated that 14% of the cysts were localized to the calcaneus.6

Case Report

A 36-year-old female runner (168 cm, 54 kg, 36–40 miles per week) presented right lateral midfoot and rear foot pain that was exacerbated by running. She had a history of recurring stress fractures of the midfoot over a period of 7 years. Prior to her most recent episode of pain, the patient had been diagnosed by bone scans as having had stress fractures to the navicular on three occasions. An orthopedist diagnosed the most recent injury as a cuboid stress fracture on the basis of plain radiographs, and she was immobilized in a walker-boot for 6 weeks. The patient reported only moderate aching for the first 4 weeks. During the 6-week period of immobilization, the patient swam four times a week. At the beginning of the 3rd week, she began biking without wearing the walker-boot. She was still using the walker-boot during the 5th and 6th weeks, but she complained of pain. Following the 6 weeks of immobilization, an attempt to run caused the patient to experience the same level of pain in the same location that she had experienced prior to immobilization. The patient then sought the assistance of an athletic trainer (AT). After performing a thorough evaluation that included postural assessment and gait analysis, the AT referred her to a podiatrist. Evaluation at 8 weeks after the diagnosis of a cuboid stress fracture, the patient exhibited an antalgic gait and pain was localized around the lateral calcaneus and cuboid. No obvious soft tissue deformity was apparent and talocrural joint range of motion was within normal limits. Palpation along the middle portion of the lateral aspect of the calcaneus revealed point tenderness, which rated by the patient as 10 on a 1-10 scale. On the basis of the previous radiographic evidence, the earlier diagnosis of a cuboid stress fracture was reaffirmed.
but symptoms in the calcaneus were apparent. MRI revealed a pathological signal intensity in the marrow of the mid-portion of the calcaneus that extended laterally to an area near the site of localized pain. The elevated signal intensity suggested the possibility of a calcaneal stress fracture.

A CT scan was subsequently ordered for comparison with the MRI results (Figures 1-2). The CT scan revealed a 1.8-cm smooth-margined area of radiodensity and several coarsened trabeculae extending through the site of marrow edema in the mid-portion of the calcaneus, which suggested the existence of an intraosseous cyst or hemangioma. Subsequent acquisition of plain radiographs confirmed the presence of some type of cyst or hemangioma.

The differential diagnosis included a unicameral bone cyst with a stress reaction or a pseudo-fracture in the mid-body of the calcaneus. Surgical intervention was recommended to evacuate the cyst, which the patient elected to have performed. An 8-cm lazy-S incision was created along the course of the peroneal tendons in the area proximal to the calcaneo-cuboid joint. Great care was exercised to avoid the sural nerve, which was visualized and retracted. After the cystic structure was identified, a window was created on the lateral aspect of the calcaneus to facilitate curettage and evacuation of the contents of the cyst. The cystic structure was measured to be approximately 3 cm in depth and 1.5 cm in diameter, which had several small branches protruding into other areas of the calcaneus. An osteocele allographic graft (2 cc) was packed into the cystic structure to fill the defect created by curettage, and the bone segment that had been removed to create the window was repositioned on the lateral aspect of the calcaneus.

The patient was immobilized and weight-bearing was avoided for 2 weeks following surgery. Treatment consisted of intermittent ice, compression, and elevation for 30 minutes every 2 hours for the first week. Daily cryotherapy treatments (47°F for 50 minutes) were continued throughout the postsurgical rehabilitation period (VascuTherm, ThermoTek, Inc Flower Mound, TX). For the first week following surgery, the patient received 30-minute cryotherapy treatments at approximately 2-hour intervals throughout the day (approximately five treatments per day). At 3 weeks postsurgery, the patient was placed in a walker-boot and was instructed to begin limited weight-bearing with crutches, and resistive four-way ankle exercises (plantar flexion, dorsiflexion, inversion, and eversion) were initiated. Ankle exercises were performed twice per day, which consisted of three sets of 10 repetitions.

Figure 1  CT of lateral calcaneal marrow intensity. The arrow indicates the area of increased bone marrow intensity.

Figure 2  CT axial section of calcaneus. The arrow points to the cyst.