ASPS February 2013 Case Study: Aneurysmal Bone Cyst

KSB Hospital – Dixon, IL

**Attendings:** David A. Yeager, DPM, FASPS
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**Students:** Veronica Kacmar-Fedorchak, PMS3
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*(Patient and Patient’s Parents Gave Permission to Print)*

**Chief Complaint:** Painful right heel

**Subjective:**
The patient is a 13 year old female presents to the clinic with her mother and father complaining of right heel pain. The pain began 2 days ago after playing in a basketball game. It was rated a 7/10 at this time and localized to the posterior and inferior aspect of the patient’s right heel. The patient stated that the pain was constant and also hurt at night with no relief from rest or any anti-inflammatories.

**Allergies:** NKDA
**Medications:** None
**Active Conditions:** None
**Social History:** Very active playing soccer, volleyball, and basketball
**Family History:** Mother 42, A&W; Father 43, A&W; Sister 15, A&W

**Objective:**
**Vitals:** Height: 4’2”; Weight: 84 lbs; BP: 117/77 mmHg; P: 60 beats/min; R: 16 breaths/min; Temperature: 97.8F; pain: 7/10
**General:** Pleasant female in no apparent distress
**Integument:** Skin warm, dry, and supple bilaterally. No open lesions, ecchymosis, or edema noted bilaterally.
**Vascular:** Pedal pulses palpable bilaterally. CFT <3 seconds in digits 1-5 bilaterally.
**Neurological:** Grossly intact
**Musculoskeletal:** Positive pain upon palpation directly inferior and posterior to the right heel area. Positive pain upon palpation lateral aspect of the right heel area just inferior to the sinus tarsi.
X-Ray: 2 views of the right foot (lateral and posterior views) show a well-circumscribed, non-invasive cyst in the heel. The cyst appears benign and shows no signs of pathologic fracture.

Assessment:
1. Calcaneal apophysitis, Right Calcaneus
2. Unicameral bone cyst versus Aneurysmal bone cyst, Right Calcaneus

Plan:
Placed the patient in a below-the-knee fiberglass cast and instructed her to maintain non-weight bearing on the right extremity. The patient is to return to the clinic in 2 weeks, and if there is still pain at that time a CT scan or MRI may be ordered.

Follow-up:
Upon a return visit, the patient was still in pain laterally but the pain posteriorly had resolved. She rated the pain slightly less 5/10. There are no other changes to the history. The CT scan revealed that it was a likely aneurysmal bone cyst measuring 21x29mm on the axial cut, 19x37mm on the sagittal cut, and 34x24-mm on the coronal cut. There are well-defined sclerotic margins to the lesion without evidence of expansion. After discussing the CT scan results with the patient and her parents, surgical intervention was discussed. This covered the pre-op, intra-op, and postop course as well as the risks, benefits, and possible complications with the procedure. The possibility of recurrence was also discussed during the visit. The patient opted for surgical excision of the bone cyst with curettage and packing.

Discussion

Aneurysmal bone cysts were first described in 1942 by Jaffe and Lichtenstein, and later again in 1950 by Lichtenstein. The term aneurysmal bone cyst is to this very day considered more of a descriptive term since there is no concrete evidence as to the direct origin, causation, or pathogenesis of the lesion itself. The lesion itself is usually described as a blood filled cavity within an expanded region of bone, and a nutrient artery may or may not be visualized as to the source of the fluid. McGlamry states that an aneurysmal bone cyst is an uncommon benign bone tumor that is rarely found in the bones of the foot. Aneurysmal bone cysts usually occur in long bones, and rarely occur in the feet. In fact only 5-10% of aneurysmal bone cysts diagnosed are diagnosed as occurring in the feet.

Aneurysmal bone cysts are found more often in the second decade of life; females are more likely than males to have them, and in the foot it is the metatarsals that are most commonly affected followed by the calcaneus, and then the cuboid. The signs and symptoms of aneurysmal bone cysts can be nonspecific; 55% of the time there is mild pain and 24% of the time there is swelling, and the pain may be brought on by activity. In order to properly diagnose the lesion it is imperative to use...
MRI or CT scans to augment the information gained from the radiographs. Once all other possible differentials are excluded, and aneurysmal bone cyst is found to be the diagnosis, then it is important to fully understand the extent of the lesion. In order to properly treat the lesion surgical intervention is usual advised, based on the size and amount of pain the patient is in. While some lesions will resolve on their own, some are very large and to leave them alone would put the patient at risk of fracture. Surgical treatment of aneurysmal bone cysts has evolved over the years; treatment now includes curettage, bone graft/chips, sclerotherapy, marginal excision, and a combination of the aforementioned methods. However, even with proper surgical treatment the reoccurrence rate of the lesion is 15-20%.

The discussion of aneurysmal bone cysts and their treatment leads to a particular patient case seen at the Katherine Shaw Bethea Foot and Ankle Clinic. On December 3rd, 2012 a 13 year old female presented to clinic with her mother complaining of right heel pain. The patient related that she had been playing soccer over the previous weekend and had felt the pain at the posterior aspect of her right heel after the game. A thorough exam was conducted and radiographs were taken. At the time a well circumscribed non-invasive lesion was noticed in two radiographic views; and at the time the differentials were unicameral bone cyst or calcaneal apophysitis. Due to the possibility of calcaneal apophysitis the patient was placed in a below-the-knee cast for 2 weeks non-weight bearing. It was discussed with the patient and her parents that if the pain was not better in two weeks that an MRI or CT scan would be warranted. The patient and her parents returned at two weeks, with no improvement of symptoms, and a CT scan was ordered. The CT scan resulted in the finding of a cystic lesion of the calcaneus; however, the lesion was found to be more expansive than previously thought, measuring at its greatest point 21 mm x 29 mm. At that point the possibility of the lesion being an aneurysmal bone cyst became more likely, and surgical intervention was discussed and consented to by the patient and her parents.

Surgery was performed on January 22nd, 2013. An incision was made on the lateral aspect of the right calcaneus, and using a C-arm the borders of the lesion were identified. A sagittal saw was then used to make a cortical window into the lateral aspect of the calcaneus, and once the window was removed an expansile sanguineous cyst was exposed within the body of the calcaneus. The lesion was noted to have substantial medial to lateral excursion. Curettage was performed, and all blood was sent to pathology. It was noted that once the cyst was irrigated that a nutrient artery was supplying blood to medial posterior aspect of the cyst; this area was cauterized, and finally the
lesion was filled with Bacterin bone graft and cancellous bone chips. The C-arm illustrated postoperatively that the lesion was adequately filled with graft. The patient recovered well from the surgery and was admitted overnight for pain management. The patient and her parents were made aware that reoccurrence was a distinct possibility; however, it was important to perform surgical intervention due to the increased risk of fracture with this specific lesion and to relieve her pain and to allow her to return to her previous active lifestyle.

This patient case and subsequent surgical intervention illustrated that aneurysmal bone cysts that are expansile and threaten fracture can be effectively treated with curettage and bone graft. An important note to take from this surgery is that one must look to see if a nutrient artery is feeding the lesion; if so that artery must be cauterized in order to prevent reoccurrence and ensure proper healing. It is important to remember that without knowing the causation or pathogenesis of aneurysmal bone cysts they can become difficult to treat and diagnose. While more study is needed in the area of aneurysmal bone cysts, this case study shows that simple curettage, cautery, and bone graft can be beneficial in treating a painful benign lower extremity bone tumor.

Lateral view of patient’s right ankle pre-surgery.
CT scan image pre-surgery of the largest section of the lesion; 21.42 mm x 23.90 mm.

First post-operative office visit radiograph of patient's right foot.

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