

Repair of a unicameral benign cyst of the clavicle using nanocrystalline hydroxyapatite (NanoBone® Bone Graft)

*Judd E. Cummings, MD, FACS Orthopedic Surgical Oncology of Arizona
Clinical Assistant Professor of Orthopedic Surgery, University of Arizona*

Preoperative

The patient was a 15-year-old female who presented with a bone lesion of the left clavicle. Her symptoms began two months prior and were associated with a palpable irregularity. Symptoms included intermittent sharp and throbbing pain due to the presence of a mass. The area was symptomatic with exertion and activity and was relieved by rest and position change. Symptoms moderately limited activities and were managed with anti-inflammatory medication (600mg ibuprofen oral). Patient had no prior surgeries.

Physical examination revealed minimal tenderness over the distal left clavicle with local swelling and acromioclavicular joint tenderness. Range of motion, joint stability, and strength were all within normal limits. Radiographs and MRI showed a radiolucent expansile bone lesion involving the left distal clavicle with cortical thinning and endosteal scalloping. There was no cortical disruption or associated soft tissue mass. There was no evidence of periosteal reaction. These findings favored a benign lesion, likely a unicameral bone cyst. Following a lengthy discussion of risks and benefits of surgery, particularly the notable risk of recurrence for unicameral bone cyst-type lesions, the patient and her mother agreed to proceed with surgical intervention.



Fig. 1. Preoperative radiograph demonstrating benign clavicular cyst

Surgical Procedure

Three days later, the patient was taken to surgery. Fluoroscopy was used to localize the lesion and a skin incision was made. Careful dissection through the subcutaneous tissue and deep fascia was completed. The clavicle was exposed in subperiosteal fashion and a burr was used to create a corticotomy at the site of the lesion. Straw-colored fluid was aspirated. Clinical findings were consistent with a simple bone cyst. Impending pathological fracture of the clavicle was noted. A burr was used to curette the cystic bone cavity and access the normal marrow space at either end of the lesion. A C-arm was used to ensure the adequacy of curettage.

The lesion was irrigated and 5ml of NanoBone SBX Putty was implanted. The wound was irrigated, followed by layered closure and placement of a sterile dressing. The arm was placed in a sling.

Postoperative Course

Two weeks postoperative, the patient was recovering well. Pain was managed with 600mg of ibuprofen administered orally. The incision was healing without erythema or drainage. The pathology findings were consistent with a unicameral bone cyst. As expected, minor stiffness in the shoulders was noted. The patient was instructed to begin range of motion exercises as tolerated.

Bone Graft Substitute Clinical Case Series

Overall, the patient felt well and had no complaints. Radiographs showed the expansile lesion of the left distal clavicle status post-curettage and bone grafting. There was no evidence of fracture or recurrence of the bony lesion.

Six-weeks postoperative, the patient continued to do very well with no significant pain. She had full range of motion and good strength in the shoulder. Patient was given permission to gradually increase her activities but was cautioned that full healing is likely to take an additional 6-8 weeks. She should avoid strenuous activities until then. She was cleared to undertake planned international travel. Radiographs showed progressive bone graft remodeling and no evidence of pathologic fracture or cyst recurrence.



Fig. 2. Two-weeks postoperative



Fig. 3. Six-weeks postoperative

At six months postoperative, patient had full strength and function of the left shoulder. Radiographs showed progressive bone graft incorporation and remodeling without evidence of cyst recurrence.

By one-year postoperative, the patient had no complaints and had returned to playing tennis. Radiographs showed complete bone graft incorporation and remodeling without recurrence of the bone cyst.



Fig. 4. Six-months postoperative



Fig. 5. One-year postoperative