Aneurysmal Bone Cysts of the Hand, Wrist, and Forearm

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Purpose To determine the outcomes of surgical management of aneurysmal bone cysts (ABCs) in the hand, wrist, and forearm.

Methods The medical records of 11 patients undergoing surgical treatment of ABCs distal to the elbow from 1994 to 2011 with at least 12 months follow-up were reviewed retrospectively. Mean follow-up was 29 months (range, 13–56 months). There were 7 males and 4 females. Four lesions presented in the radius, 3 in the ulna, 2 in the metacarpals, and 2 in the phalanges.

Results Ten patients underwent wide unroofing and intralesional curettage with 9 undergoing associated high-speed burring. Multiple chemical and thermal adjuvants were used. One patient underwent *en bloc* resection with reconstruction. There was 1 recurrence in a periphyseal lesion in a 2-year-old boy treated with curettage, burring, and adjuvant chemotherapy. Ten patients incorporated the bone graft and healed without further surgery. One patient required revision bone grafting.

Conclusions The diagnosis of ABC should remain in the differential diagnosis for cystic lesions in the upper extremity in pediatric and adult patients. Low recurrence has been obtained predominantly with intralesional curettage and high-speed burring with and without chemical and thermal adjuvant therapy. Appropriate healing has been obtained with both allograft and autograft reconstructions. Periarticular and periphyseal lesions remain challenging and provide the highest chance for incomplete resection and recurrence. Follow-up with plain radiographs did not lead to any delay in diagnosis of recurrence in any case. *(J Hand Surg Am. 2015;40(10):2052–2057.*

Type of study/level of evidence Therapeutic IV.

Key words ABC, aneurysmal bone cyst, hand, wrist, upper extremity.

Jaffe and Lichtenstein described aneurysmal bone cysts (ABCs) in 1942. The cysts represent a cause of lytic, expansile, metaphyseal bone lesions throughout the appendicular and axial skeleton. Although benign, this locally aggressive lesion represents approximately 6% of all primary bone tumors.[1] Most commonly, ABCs are found in the long bones of the lower extremity or the posterior elements of the spine and may involve the hands in about 5% of cases.[2,3] Seventy percent of ABCs arise independently, and 30% can develop secondarily to other tumors including giant cell tumors, fibrous dysplasia, chondroblastoma, osteoblastoma, or osteosarcoma.[4] Initially believed to be non-neoplastic, evidence in the last decade suggests primary ABCs may have a neoplastic component not seen in secondary ABCs.[5] There is, however, no evidence of malignant transformation. Although they can affect patients of any age, these are most commonly

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Received for publication April 30, 2015; accepted in revised form June 4, 2015.

S.K. consults for Arthrex and Skeletal Dynamics. S.L.M. consults for Conventus and Integra.

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0363-5023/15/4010-0017$36.00/0
http://dx.doi.org/10.1016/j.jhsa.2015.06.108

TABLE 1. Aneurysmal Bone Cysts of the Forearm, Wrist, and Hand

Location	All Cases	Forearm	Wrist	Hand
Total number of cases	11	3	4	4
Males	7	2	2	3
Females	4	1	2	1
Average age, y (mean ± SD)	19 ± 14	25 ± 18	16 ± 21	18 ± 2
Pathological fracture	4	0	3	1
Treatment				
Curettage	10	3	3	4
Open reduction internal fixation	1	0	1	0
Treatment adjuvants				
Phenol	5	2	1	2
Argon beam	1	1	0	0
Hydrogen peroxide	2	1	1	0
High-speed bur	9	3	2	4

seen in the first 2 decades of life with a median age of 13. A large meta-analysis looking at 1096 patients found a slight predilection for females.[1]

The current English language literature describing ABCs in the hand and upper extremity includes multiple case reports and 2 limited case series.[3,6,7] The largest of these includes 10 patients treated for ABCs in the hand between 1954 and 1984.[3] This study found a high incidence of recurrence, with 4 out of 9 patients treated for primary disease developing recurrent tumor requiring further surgery. Seven of 9 patients underwent an intralesional curettage procedure. All 4 recurrences were found in this group, suggesting inadequate resection with intralesional procedures.[3]

The purpose of this paper was to review our experience with the management of this rare tumor of the upper extremity. We reviewed a retrospective series of patients with primary ABCs lesions distal to the elbow treated over the past 2 decades and examined factors associated with presentation, recurrence, and treatment options.

MATERIALS AND METHODS

After obtaining approval from the institutional review board, we conducted a retrospective chart review of all patients treated surgically for ABCs between 1994 and 2011 with a minimum of 1 year follow-up. We focused on patients with primary ABCs distal to the elbow, with an emphasis on presentation, surgical methodology, and recurrence. Recurrence was defined as a local lesion requiring further surgery with pathology consistent with the primary presentation.

In all, there were 17 patients treated with pathology-proven primary ABCs distal to the elbow during this time at our institution. Eleven of these had follow-up longer than 1 year. During the study period, 1 patient was found to have a secondary ABC. This was related to fibrous dysplasia and was excluded owing to the confounding nature of the underlying disease.

These 11 patients were followed after surgery for a mean of 29 months (range, 13−56 months). Within this cohort, there were 7 males and 4 females (Table 1). The mean age at initial surgery was 19 ± 14 years (range, 2−47 years). At initial surgery, 8 patients were children or adolescents (< 18 years) and 3 were adults. The 11 patients were treated by a team approach consisting of both an upper extremity surgeon and an orthopedic oncologist or a pediatric orthopedist.

Kaplan-Meier survival curves were used to estimate disease-free survival and rates of reoperation.

RESULTS

Ten of 11 patients received their initial treatment at our institution. One patient presented 2 months after initial resection at an outside institution. The referring surgeon felt that the resection was inadequate, and residual tumor was noted on initial postoperative imaging. Of the 8 for whom the initial chief complaint was available, 5 presented with pain without trauma or with pain that did not resolve after minimal trauma, 1 presented with a mass that subsequently became