

Coralline Hydroxyapatite Reduces Local Recurrence of Benign Bone Lesions

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Background. Aneurysmal bone cysts (ABC), unicameral bone cysts (UBC), and fibrous dysplasia are benign bone lesions that are known to locally recur after intralesional treatment at published rates ranging from 20-60%, 20-40%, and 10-60%, respectively. Numerous studies have described intraoperative adjuvants for these three conditions, and reported on a variety of bone defect fillers including autologous bone, allograft cortical and cancellous bone, polymethylmethacrylate and demineralized bone matrix. Coralline hydroxyapatite, available as Pro-Osteon 500 (Biomet Interpore Cross International, Irvine, CA), is a non-resorbable, osteoconductive bone substitute derived from marine coral. It is FDA-approved for use as a filling material for bone defects and has a biologically inert profile and distinct radiographic appearance that aids in detecting lesional recurrence on surveillance radiographs. Most importantly, we contend that it reduces the local recurrence rate when used in patients with ABC, UBC and fibrous dysplasia.

Questions/Purposes. 1) To determine the local recurrence rate in our patients with ABC, UBC, and fibrous dysplasia treated with coralline hydroxyapatite. 2) To describe the characteristic radiographic findings and 3) any unique complications observed in our patient series.

Patients and Methods. An IRB-approved retrospective review of our institutional database identified 61 patients who underwent curettage and coral grafting from 1995-2014 for a pathologist-confirmed diagnosis of ABC (n=22), UBC (n=17), or fibrous dysplasia (n=22). There were 25 females and 36 males with a mean age of 21 years [range 0.5-70 years] at index surgery. Fifty surgeries were performed after primary presentation of the lesion and 11 surgeries (6 ABCs, 4 UBCs, 1 fibrous dysplasia) were performed on patients referred for local recurrence of their lesion after initial treatment with curettage and cancellous bone grafting. At the time of surgery, following curettage of the lesion, all bony cavities were treated with a high speed burr prior to grafting. The argon beam coagulator was used for ABC cases. After impaction of coral graft, a strip of demineralized bone matrix was placed as a cortical patch. All lesions in the proximal femur were treated with prophylactic fixation. Mean follow-up was 55 months [range 12-198 months]. All patients were monitored at 6 weeks, 3 months, 6 months, and then annually for clinical and radiographic evidence of local recurrence. MSTS functional assessment score was recorded for each patient.

Results. One of 22 ABC patients (5%) had a local recurrence of the proximal fibula 7 months after his index surgery, necessitating a repeat curettage and coral grafting, with no subsequent recurrence after 40 months. Two of 22 patients with fibrous dysplasia (9%) had a symptomatic local recurrence necessitating repeat curettage and coral grafting, without subsequent recurrence. No patients with a UBC treated with coral had a local recurrence. A distinct radiodense border is immediately present following curettage and grafting, with bony consolidation of the defect observed as early as 6 months. One patient suffered a mid-shaft humerus fracture through a prior area of curettage and coral grafting 7 years after his index surgery while engaging in sports. No histologic evidence of recurrent UBC was found at the time of operative fracture fixation. All patients had an MSTS functional score of 28-30 at their most recent postoperative visit.

Conclusion. In our patient series, the use of coralline hydroxyapatite to fill defects remaining after curettage of ABC, UBC, and Fibrous dysplasia resulted in a lower local recurrence rate than historically published rates following curettage and bone grafting. The radiodense appearance of consolidated coral allows for clear visualization of recurrent lesions and postoperative complications are minimal.