Capitate Chondroblastoma: A Case Report and Review of the Literature

HAND
2017, Vol. 12(2) NP14–NP18
© American Association for
Hand Surgery 2016
DOI: 10.1177/1558944716642762
hand.sagepub.com

Ali Izadpanah¹, Riyam T. Zreik¹, Thomas Shives¹, and Sanjeev Kakar¹

Abstract

Background: Chondroblastomas are benign tumors that typically occur in the epiphysis of long bones. Carpal bone chondroblastomas are very rare and are known to have less aggressive behavior with no evidence of recurrence reported. **Methods:** We present a case of a recurrent chondroblastoma in the capitate that was treated with repeat curettage, application of phenol, and bone grafting. **Results:** At 3 years post surgery, the patient is disease free with excellent functional return. **Conclusion:** Chondroblastomas are rare within the carpus. We present a review of the literature detailing their occurrence and treatment.

Keywords: capitate chondroblastoma, arthrodesis, recurrence

Introduction

Chondroblastomas are rare benign tumors that account for less than 1% of all primary, bone tumors.⁹ They typically arise in the epiphysis of the long bones and are readily treated with curettage and bone grafting. The recurrence rate of chondroblastomas has been described to be between 10% and 32%.⁹ Although controversial, there are rare reports of malignant chondroblastomas in the literature. Many authors believe that in cases of a malignant chondroblastoma, further pathological review is warranted to exclude other entities such as chondroblastoma-like osteosarcoma.⁶ Several reports of benign chondroblastomas with metastasis to the lungs have been described. These metastasizing lesions are microscopically indistinguishable from benign chondroblastomas, and to date there are no studies that definitively identifying the risk factors that would predict recurrence or more aggressive behavior of these tumors.¹¹ However, there are reports demonstrating some association between higher recurrence of these tumors and aneurysmal bone cystic changes, tumor location, or duration of symptoms.⁹

Chondroblastomas have been described to occur in a wide variety of locations, most commonly in the knee and proximal humerus. Tarsal involvement has been described to occur with an incidence of 3% to 16% of all chondroblastomas. These tumors typically present in the second decade of life.³ Chondroblastomas are extremely rare in the short bones of the hand. In the largest series of carpal neoplasms, only 6 cases of carpal chondroblastomas were reported with 3 occurring in the scaphoid (50%) and 1 in the capitate (17%). There have been 2 additional reports of chondroblastomas in the capitate, both without recurrence after

curettage and bone grafting. We present a case of a recurrent capitate chondroblastoma after initial curative curettage and bone grafting. Secondary curettage and allograft bone insertion with concomitant arthrodesis of adjacent hamate secondary to cortical expansion and articular involvement of the tumor with no recurrence at 3-year follow-up was performed.

Case Report

An 18-year-old woman presented to our institution with a history of dorsal wrist pain. She had previously been diagnosed with a capitate chondroblastoma, which was treated with curettage and allograft bone insertion at an outside institution (Figures 1a and 1b). With clear surgical margins, she was noted to have radiographic concerns of recurrent tumor within 6 months. Upon presentation to our clinic, she had a well-healed dorsal wrist scar with tenderness over the capitate and capitolunate joint. Radiographs and advanced imaging, including magnetic resonance imaging and computed tomography scans demonstrated an expansile/lytic/well-marginated lesion within the capitate that was involving the capitolunate joint (Figures 2a–2c). To address the recurrence with capitolunate articular surface expansion, she underwent excision and curettage, high-speed burr debridement, phenol application,

¹Mayo Clinic, Rochester, MN, USA

Corresponding Author:

Sanjeev Kakar, Department of Orthopedic Surgery, Mayo Clinic,
200 1st Street SW, Rochester, MN 55905, USA.
Email: kakar.sanjeev@mayo.edu

Figure 1. Imaging studies demonstrating initial presentation at outside institution. (a) AP and lateral radiographs of the wrist showing a lesion within the capitate. (b) Coronal and sagittal T1 MRI sequences showing cortical expansion of the capitate.

Figure 2. Imaging studies following (a) plain radiographs, (b) magnetic resonance images showing the recurrence, and (c) computed tomography images showing cortical expansion to the capitolunate articular surface.

and bone grafting with capitolunate arthrodesis (Figures 3a and 3b). The postoperative course was uneventful and without complications, and the pathology showed a recurrent chondroblastoma composed of uniform, well-defined

cells with ovoid-to-indented nuclei and occasional nuclear grooves, scattered osteoclast-type giant cells, and foci of pericellular “chicken wire” calcifications (Figures 4a and 4b). She was placed into a short-arm cast postoperatively

Figure 3. Images demonstrating (a) operative approach and capitolunate arthrodesis using bone graft and (b) Kirschner wires.

Figure 4. Chondroblastoma showing (a) sheets of uniform, well-defined, polygonal cells with ovoid indented or twisted nuclei and scattered osteoclast-like giant cells and (b) multiple foci of pericellular "chicken wire" calcifications.

Figure 5. Imaging studies demonstrating the capitolunate arthrodesis after curettage and phenol application 6 weeks postoperative prior to pin removal. (a) AP and (b) lateral radiographs demonstrating the capitolunate arthrodesis after curettage and phenol application 6 weeks postoperative prior to pin removal.

Figure 6. Imaging studies at 2-year follow-up demonstrating resolution of lesion after repeat curettage and phenol application with bone graft and capitolunate arthrodesis: (a) plain radiographs and (b) computed tomography images.

and 6 weeks later had demonstrated healed arthrodesis of the capitolunate articular surfaces (Figures 5a and 5b). At her most recent follow-up at 3 years, she was asymptomatic without any evidence of recurrence (Figures 6a and 6b). Her range of motion and grip strength was improved and almost identical to her contralateral side.

Discussion

Chondroblastomas are rare, benign bony tumors with an incidence of 0.02% in the carpal bones.⁹ Sato et al reported on a case of chondroblastoma in the capitate with secondary aneurysmal bone cyst changes and complete resolution following curettage and bone grafting.⁸ The case we present describes a recurrent capitate chondroblastoma treated successfully with repeat excision using curettage,

phenol application, and bone grafting with capitolunate arthrodesis secondary to expansion of the tumor to the articular surface of capitolunate joint. The arthrodesis did not result with any deficits in wrist range of motion or grip strength.

Despite reports in the literature suggesting a possible association between the presence of secondary aneurysmal bone cyst changes, tumor location, and duration of symptoms with increased risk of recurrence, there are no agreed upon histologic or clinical findings that predict an increased risk of recurrence other than an incomplete surgical excision with residual disease.⁴ Histologically, our case displayed the expected findings and did not show any evidence of cellular atypia, increased mitosis, necrosis, or secondary aneurysmal bone cyst changes. To date, there has been no evidence in the literature of any association between

chondroblastoma of the carpal bones and an increased risk of recurrence.

The principal treatment modality for the management of chondroblastomas is intralesional curettage and bone graft. In a series reported by Suneja et al, only 7 (13.2%) out of 52 patients had a local recurrence after treatment with only intralesional curettage.¹⁰ Dahlin and Ivins, in 1972, reported 38 cases of chondroblastomas with 3 recurrences after curettage, which were treated with repeat curettage and bone grafting with or without radiation.¹ The presented case demonstrates a successful treatment using repeat curettage and use of chemical (phenol) cauterization with bone grafting. High-speed burring, phenol, bone cement, and cryosurgery have been recommended to reduce local recurrence of these tumors.³ Rybak et al reported percutaneous radiofrequency ablation as an alternative method to surgery in some selected cases.⁷ Despite numerous advancements and alternatives in the treatment of these lesions, at times with multiple recurrences, amputation has also been recommended.⁶ Complete excision of the carpal bone has also been described as a treatment modality even in face of primary lesions; however, this can lead to significant functional sequelae.² In addition, considering the young age at presentation in many of these patients, the resultant possible delayed osteoarthritis of intercarpal and carpometacarpal joints could lead to persistent pain and symptoms. In the present patient, we elected to proceed with capitohamate arthrodesis after complete debridement as this has been demonstrated to cause no deficit in range of motion or grip strength with resolution of any symptoms secondary to changes at the capitohamate articulation.⁵

Chondroblastomas are rare benign tumors within the carpus. Despite initial successful treatment, patients need to be followed postoperatively for the chance of recurrence, which may cause additional carpal destruction. In the case presented, the patient developed recurrence with destruction of the capitohamate joint and underwent successful reconstruction.

Ethical Approval

This study was approved by our institutional review board.

Statement of Human and Animal Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation

(institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

Statement of Informed Consent

Informed consent for research purposes was obtained per institutional protocol.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

References

1. Dahlin DC, Ivins JC. Benign chondroblastoma. A study of 125 cases. *Cancer*. 1972;30:401-413.
2. Daly KE, Chow JW, Vickers RH. Excision of the hamate for an unusual hand tumour. *J Hand Surg Br*. 1993;18:606-608.
3. Davila JA, Amrami KK, Sundaram M, Adkins MC, Unni KK. Chondroblastoma of the hands and feet. *Skeletal Radiol*. 2004;33:582-587.
4. de Silva MV, Reid R. Chondroblastoma: varied histologic appearance, potential diagnostic pitfalls, and clinicopathologic features associated with local recurrence. *Ann Diagn Pathol*. 2003;7:205-213.
5. Oishi SN, Muzaffar AR, Carter PR. Treatment of Kienbock's disease with capitohamate arthrodesis: pain relief with minimal morbidity. *Plast Reconstr Surg*. 2002;109:1293-1300.
6. Rodgers WB, Mankin HJ. Metastatic malignant chondroblastoma. *Am J Orthop*. 1996;25:846-849.
7. Rybak LD, Rosenthal DI, Wittig JC. Chondroblastoma: radiofrequency ablation—alternative to surgical resection in selected cases. *Radiol*. 2009;251:599-604.
8. Sato E, Ichikawa J, Ando T, Sato N, Kawasaki T, Haro H. Chondroblastoma with secondary aneurysmal bone cyst of the capitate. *Orthopedics*. 2014;37:e500-503.
9. Springfield DS, Capanna R, Gherlinzoni F, Picci P, Campanacci M. Chondroblastoma. A review of seventy cases. *J Bone Joint Surg Am*. 1987;67:748-755.
10. Suneja R, Grimer RJ, Belthur M, et al. Chondroblastoma of bone: long-term results and functional outcome after intralesional curettage. *J Bone Joint Surg Br*. 2005;87:974-978.
11. Zambo I, Vesely K. [WHO classification of tumours of soft tissue and bone 2013: the main changes compared to the 3rd edition]. *Cesk Patol*. 2014;50:64-70.