

A Rare Case of Chondrosarcoma Affecting the Distal and Middle Phalanx of the Toe

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STATEMENT OF PURPOSE

1. **Primary purpose:** To present a case of a rare malignancy, affecting the tubular bones of the foot.
2. **Secondary purpose:** To highlight the importance of thorough work-up with respect to bone tumors.

BACKGROUND & LITERATURE REVIEW

Chondrosarcoma is part of a group of bone tumors that produce chondroid matrix. It is the third most common primary malignancy of bone, composing 20-27% of malignant osseous neoplasms¹. In a review of 11,087 bone tumors, Unni noted a total of 774 chondrosarcomas. Of this number, only 14 (1.8%) were found in the foot². Cases involving the tubular bones of the foot and hand are exceedingly rare. In a similar retrospective study, Toepfer et al. assessed 266 cases of bone tumors affecting the foot and ankle. The authors noted 4 cases of chondrosarcoma affecting the forefoot (1.5%)³.

Chondrosarcomas are classified based on a system that was developed by the World Health Organization (WHO).⁴

Grade I	Moderately cellular; hyaline cartilage matrix; absent mitoses; no metastatic potential
Grade II	Less chondroid matrix; present mitoses; chondrocytes with enlarged nuclei; intermediate metastatic potential
Grade III	Minimal-absent chondroid matrix; highly cellular with prominent mitoses; high metastatic potential. 10-year survival rate: 29-55%

Chondrosarcomas are often quite difficult to differentiate from their similar benign counterpart, enchondromas. In a retrospective review by Gajewski et al. where the two tumors were clinically and radiographically compared, a statistically significant difference was noted only in the mean size of the two tumors. Radiographic examiners only agreed on the diagnosis of chondrosarcoma vs. enchondroma 78% of the time, and when they agreed, they were only accurate 83% of the time.⁵

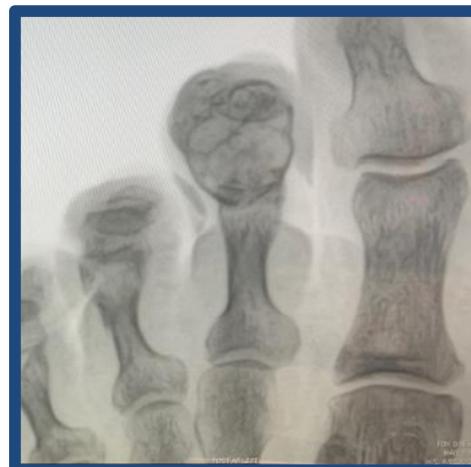
When this malignant tumor affects phalanges of the hand or foot, the treatment of choice is amputation. In a systematic review of 414 cases by Fayad et al., recurrence of chondrosarcoma was reported as 5.7% in those cases where only local resection or curettage was performed⁶. Sato et al. described a case report of chondrosarcoma affecting the 5th metatarsal, and recommended resection of a 2cm margin around the tumor.⁷

CASE STUDY

- 85 year-old male with a past medical history significant for hypothyroidism, benign prostatic hyperplasia, hypertension, and B12 deficiency presented to a podiatry office with complaints of localized pain associated with an enlarged left second toe.
- Pain was worsening over time, but size of toe had not changed in recent months.
- Palpable bony mass was noted, as well as appreciable rigid hammertoe deformity with contracture at the proximal interphalangeal joint. All other aspects of the physical exam were unremarkable.

Imaging:

- *Osseous expansion affecting the distal & middle phalanges of the second toe*
- *Mixed radiolucent and sclerotic appearance*
- *Rings and arcs pattern*
- *Cortical thickening with no evidence of periosteal reaction*
- *Underlying proximal phalanx unaffected*
- *Associated digital contracture at PIPJ*



- Given patient age and anatomic location allowing for ease of a definitive procedure, partial amputation of left second toe with resection of proximal margin at the proximal phalanx was performed.

CASE STUDY (CONTINUED)



- Specimens were sent for pathologic analysis.
- Results revealed Grade II (Intermediate Grade) Chondrosarcoma with negative proximal margins.
- Patient was sent for further oncologic evaluation, and there was no evidence of further metastases.

ANALYSIS & DISCUSSION

Chondrosarcoma is an osseous malignancy that rarely affects the forefoot. Given its rarity, its diagnosis can be often be overlooked. This can lead to a devastating outcome for the patient. Here, a case of chondrosarcoma affecting the phalanges of the second toe is presented. Recurrence rates for intermediate-grade chondrosarcomas vary based on whether wide resection vs. local curettage was performed.⁸ When recurrence occurs, it is usually a higher grade than the original presentation.⁸ In this case, a partial amputation was performed as a definitive procedure for wide resection of the tumor. The patient was then referred promptly to an oncologist for further assessment. This case highlights the importance of early management of osseous tumors as well as taking into account a malignant etiology despite a benign presentation.

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