

UC Davis

Dermatology Online Journal

Title

Enchondroma of the toe presenting as clubbing and painless longitudinal erythronychia

Permalink

<https://escholarship.org/uc/item/1nr8d8vk>

Journal

Dermatology Online Journal, 31(2)

Authors

Levian, Brandon

Ravi, Vignesh

Mosallaei, Daniel

et al.

Publication Date

2025

DOI

10.5070/D331265297

Copyright Information

Copyright 2025 by the author(s). This work is made available under the terms of a Creative Commons Attribution-NonCommercial-NoDerivatives License, available at <https://creativecommons.org/licenses/by-nc-nd/4.0/>

Peer reviewed

Case Report

Enchondroma of the toe presenting as clubbing and painless longitudinal erythronychia

Brandon Levian, BA¹, Vignesh Ravi, MD², Daniel Mosallaei, MD², Sebastian Cruz, MD², Melvin Chiu, MD, MPH², Brittney DeClerck, MD², Jenny Hu, MD, MPH^{2a}

¹ Keck School of Medicine, University of Southern California, Los Angeles, California, USA, ² Department of Dermatology, Keck School of Medicine, University of Southern California, Los Angeles, California, USA

Keywords: cartilage, enchondroma, erythronychia, nail neoplasm, nail tumor

Dermatology Online Journal

Vol. 31, Issue 2, 2025

Abstract

Enchondromas are frequently occurring cartilaginous tumors, accounting for 10-25% of all benign bone neoplasms. We present a distinctive case involving distal clubbing of the right third toenail with a painless, 5mm-wide red longitudinal streak. Clinical examination, nail matrix biopsy, and imaging confirmed the presence of an enchondroma in the distal phalanx. Although solitary enchondromas often present with pain or pathological fractures, asymptomatic cases like this one are quite rare. Given the low risk of malignant transformation, the patient chose regular magnetic resonance imaging (MRI) monitoring. This case highlights the need to consider enchondromas in the differential diagnosis of painless longitudinal erythronychia, an infrequent manifestation. Proper diagnosis is essential to differentiate these lesions from malignant chondrosarcomas, which have a different management approach.



Figure 1. Distal clubbing of the right third toenail with a 5mm red longitudinal streak.

Introduction

Enchondromas are commonly occurring cartilaginous neoplasms, representing 10-25% of all benign bone tumors, with a peak incidence observed during the fourth decade of life.¹ Herein, we report a unique case of an enchondroma of the toe presenting as digital clubbing and painless longitudinal erythronychia.

Case Synopsis

A 34-year-old man with no significant past medical history presented with a one-year history of a painless expanding red streak on the right third toenail. The patient denied any known history of inciting factors or trauma

and a review of systems was unremarkable. Examination demonstrated distal clubbing of the right third toenail with a 5mm-wide red longitudinal streak (**Figure 1**). There was no tenderness to palpation and Hutchinson sign was negative. Biopsy of the right third toenail matrix and nail bed revealed nodular proliferation of cartilaginous tissue with peripheral hyaline bone formation, consistent with enchondroma of the soft tissue (**Figure 2**). Subsequent magnetic resonance imaging (MRI) imaging of the right foot showed an expansile osseous lesion involving the entirety of the distal phalanx of the third toe, measuring approximately 1.6×1.4×1.1cm, with imaging characteristics suggestive of an enchondroma (**Figure 3**).

The patient was referred to an orthopedic surgeon, who concurred with the diagnosis of an enchondroma following an X-ray examination of the right foot (**Figure 4**), which aligned with the MRI results. Additionally, surgical options were discussed, such as curettage or a partial

^a Corresponding Author: Jenny Hu MD MPH, Department of Dermatology, Keck School of Medicine, University of Southern California, 830 S Flower Street Suite 100, Los Angeles, CA 90017, Tel: 213-688-9808, Email: jennychong.hu@med.usc.edu

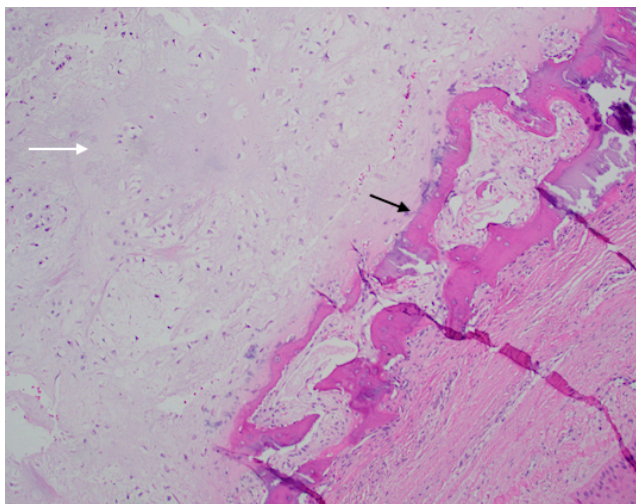


Figure 2. Histopathology of the nail matrix and nail bed showing a nodular aggregate consistent with cartilaginous tissue (white arrow), with peripheral bone formation (black arrow) and no notable atypia. H&E, true magnification 200x.

amputation of the third toe through the proximal interphalangeal (PIP) joint. The patient opted to defer further procedures for the time being and instead planned for regular surveillance MRIs every 6 months.

Case Discussion

Solitary enchondromas commonly appear on the distal phalanges of the hand, demonstrating a predilection for individuals aged 30 to 35 years.² Pain is frequently the primary symptom, with approximately 40-70% of patients presenting with a pathologic fracture.²⁻⁴ Less than 20% of patients are likely to remain asymptomatic. During a clinical examination, potential findings include pain, nail plate changes, paronychia, clubbing, longitudinal ridging with discoloration, or the presence of a subungual pearly white mass elevating the overlying nail plate.² Longitudinal erythronychia is characterized by a red linear band on the nail plate from the proximal nail fold to the free edge and may indicate the presence of a benign (onychopapilloma, glomus tumor and warty dyskeratoma) or malignant (malignant melanoma and squamous cell carcinoma) tumor in the nail matrix creating a groove in the ventral nail plate.⁵ However, there is a scarcity of reported cases highlighting longitudinal erythronychia as the primary clinical manifestation for an enchondroma. Therefore, the present case stands out as a distinctive occurrence—an enchondroma of the toe that presented as painless longitudinal erythronychia.

Diagnosing painless enchondromas of the toe poses a unique challenge, as the proximal phalangeal bones, typically the primary site for foot enchondromas, are concealed beneath the interdigital webs of the toes.³ Computed tomography (CT) scans reveal subtle calcification within the lesion, whereas MRI showcases signal intensities that are characteristic of a cartilaginous tumor. This



Figure 3. T1 turbo spin echo MRI (coronal) of the right foot with contrast. There is an expansile osseous lesion involving the entirety of the distal phalanx of the third toe measuring approximately 1.6x1.4x1.1cm, as shown by the white arrow. This demonstrates circumferential cortical thinning without evidence of pathologic fracture. Contour irregularity along the dorsal surface at the nail bed is consistent with reported history of excisional biopsy. The lesion demonstrates internal T1 signal isointense to muscle, STIR signal hyperintensity, and heterogeneous lobulated appearing enhancement. There is no visible periosteal reaction or extraosseous extension. Please note that the original image has been rotated 180 degrees.

includes low- to intermediate-signal intensity on T1-weighted images and an uneven high-signal intensity with septa exhibiting low-signal intensity on T2-weighted images. MRI scans are regarded as a superior imaging modality compared to CT scans for assessing the bone marrow and identifying soft tissue edema.⁶ This is particularly relevant in cases of foot enchondromas presenting with pathologic fractures, in which soft tissue edema is observed in 82% of patients.³ A biopsy is essential when there are persistent nail changes, ulceration, cutaneous lesions, discomfort, signs of infection, or suspicion of tumor. Histopathology reveals mature hyaline cartilage with a distinctive lobular pattern and small chondrocytes within lacunar spaces. Notably, lacunae containing chondroid matrix are often prominently featured, a histological characteristic shared with well-differentiated chondrosarcomas.⁷ Although well-differentiated chondrosarcomas and enchondromas share histopathological similarities, chondrosarcomas exhibit irregular and asymmetric lobulation patterns, increased vascularity, and presence of active blast cells within the chondrosarcoma capsule owing to their accelerated growth rate.⁷



Figure 4. X-ray of the right foot demonstrating an expansile lytic lesion in the distal phalanx of the right third toe measuring approximately 16.33×13.67mm, as shown by the white arrow. The lesion demonstrates a narrow zone of transition, amorphous calcifications, and mild endosteal scalloping. Please note that the original image has been rotated 180 degrees.

Although enchondromas typically have a positive prognosis as benign tumors, it is critical to differentiate these anomalies from chondrosarcomas, their malignant counterpart. Solitary enchondromas carry a slight, albeit highly unlikely (<1%), chance of malignant transformation into chondrosarcomas.⁸ On the other hand, patients with multiple enchondromas, as seen in conditions like Ollier disease and Maffucci syndrome, face a significantly

elevated risk of malignant transformation.⁴ Indicators of potential malignancy include nocturnal pain, larger lesion size (>6cm), pathological fractures, peritumoral edema, endosteal scalloping, and reactive bony changes on imaging.² With respect to imaging, findings such as periosteal reaction on X-ray, endosteal scalloping and cortical defects on CT scans, an abnormal signal in adjacent tissue on MRI scans, and increased uptake on bone and thallium scans, collectively suggest a diagnosis of chondrosarcoma rather than enchondroma.⁹

Regarding treatment, symptomatic enchondromatous lesions may necessitate simple curettage accompanied by bone grafting. However, there is no established standardized algorithm for surgical intervention.⁴ Prophylactic measures to prevent pathological fractures through internal fixation have been suggested, but this remains a topic of debate.⁴ The Mirels score is a tool designed to quantify the risk of a pathologic fracture resulting from neoplasms and thus the necessity for surgical intervention.⁴ Conversely, asymptomatic lesions can be monitored either with or without regular radiographic follow-up.¹⁰ Our patient chose to proceed with regular surveillance MRI scans because of the minimal risk of malignant transformation.

Conclusion

This case demonstrates an atypical presentation of an enchondroma as the causative agent for an asymptomatic longitudinal erythronychia. Although rare, clinicians should keep enchondromas in their broad differential for painless longitudinal erythronychia.

Potential conflicts of interest

The authors declare no conflicts of interest.

References

1. Park YK. Enchondroma. In: Santini-Araujo E, Kalil RK, Bertoni F, Park YK, eds. *Tumors and Tumor-Like Lesions of Bone: For Surgical Pathologists, Orthopedic Surgeons and Radiologists*. Springer London; 2015:243-251. doi:[10.1007/978-1-4471-6578-1_16](https://doi.org/10.1007/978-1-4471-6578-1_16)
2. Thomas L, Zook EG, Haneke E, et al. Tumors of the nail apparatus and adjacent tissues. In: Baran R, ARdB D, Holzberg M, Thomas L, eds. *Baran & Dawber's Diseases of the Nails and Their Management*. John Wiley & Sons; 2012:637-743. doi:[10.1002/9781118286715.ch13](https://doi.org/10.1002/9781118286715.ch13)
3. Chun KA, Stephanie S, Choi JY, Nam JH, Suh JS. Enchondroma of the Foot. *J Foot Ankle Surg*. 2015;54(5):836-839. doi:[10.1053/j.jfas.2015.01.002](https://doi.org/10.1053/j.jfas.2015.01.002). PMID:26024560
4. Biondi NL, Varacallo M. Enchondroma. In: *StatPearls [Internet]*. StatPearls Publishing; 2024.
5. Cohen PR. Longitudinal erythronychia: individual or multiple linear red bands of the nail plate: a review of clinical features and associated conditions. *Am J Clin Dermatol*. 2011;12(4):217-231. doi:[10.2165/11586910-000000000-00000](https://doi.org/10.2165/11586910-000000000-00000). PMID:21668031
6. Chou LB, Malawer MM. Analysis of surgical treatment of 33 foot and ankle tumors. *Foot Ankle Int*. 1994;15(4):175-181. doi:[10.1177/107110079401500404](https://doi.org/10.1177/107110079401500404). PMID:7951950
7. Shariat Torbaghan S, Ashouri M, Jalayer Naderi N, Baherini N. Histopathologic Differentiation between Enchondroma and Well-differentiated Chondrosarcoma: Evaluating the Efficacy of Diagnostic Histologic Structures. *J Dent Res Dent Clin Dent Prospects*. 2011;5(3):98-101. PMID:22991614
8. Altay M, Bayrakci K, Yildiz Y, Ereku S, Saglik Y. Secondary chondrosarcoma in cartilage bone tumors: report of 32 patients. *J Orthop Sci*. 2007;12(5):415-423. doi:[10.1007/s00776-007-1152-z](https://doi.org/10.1007/s00776-007-1152-z). PMID:17909925
9. Miwa S, Yamamoto N, Hayashi K, et al. A Radiological Scoring System for Differentiation between Enchondroma and Chondrosarcoma. *Cancers (Basel)*. 2021;13(14). doi:[10.3390/cancers13143558](https://doi.org/10.3390/cancers13143558). PMID:34298772
10. Lubahn JD, Bachoura A. Enchondroma of the Hand: Evaluation and Management. *J Am Acad Orthop Surg*. 2016;24(9):625-633. doi:[10.5435/JAAOS-D-15-00452](https://doi.org/10.5435/JAAOS-D-15-00452). PMID:27454024