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Case Report

Enchondroma protuberans of the hand: A case report ☆

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ABSTRACT

Enchondroma protuberans (EP) is a rare form of enchondroma which demonstrates exophytic growth outside the margins of the bony cortex. A previously healthy 18-year-old male presented with chronic painless palpable mass of the left third finger. Radiograph showed a well-circumscribed expansile lucent lesion in the middle phalanx of the left third finger. The magnetic resonance imaging confirmed an expansile cortical-based lesion extending through the cortex into the soft tissues, which demonstrated high T2 signal with internal foci with low to intermediate signal suggestive of internal chondroid matrix. The patient underwent surgical excision, curettage and bone grafting, and surgical pathology study confirmed the diagnosis of EP. A rare case of EP involving a phalanx of the hand was described in this study. Imaging, particularly magnetic resonance imaging, plays a key role for accurate preprocedural diagnosis.

Introduction

Enchondromas are benign cartilaginous tumors occurring within the bony medulla that constitute approximately 90% of benign tumors in the hands [1]. Enchondroma protuberans (EP) is a rare form of enchondroma, with 20 cases described in the literature since 1982 [1–9]. In this study, we present a patient with EP of the finger with characteristic imaging and pathologic findings.

Case report

An 18-year-old male presented to the orthopedic clinic of our institute with a painless, very slowly growing mass of the left

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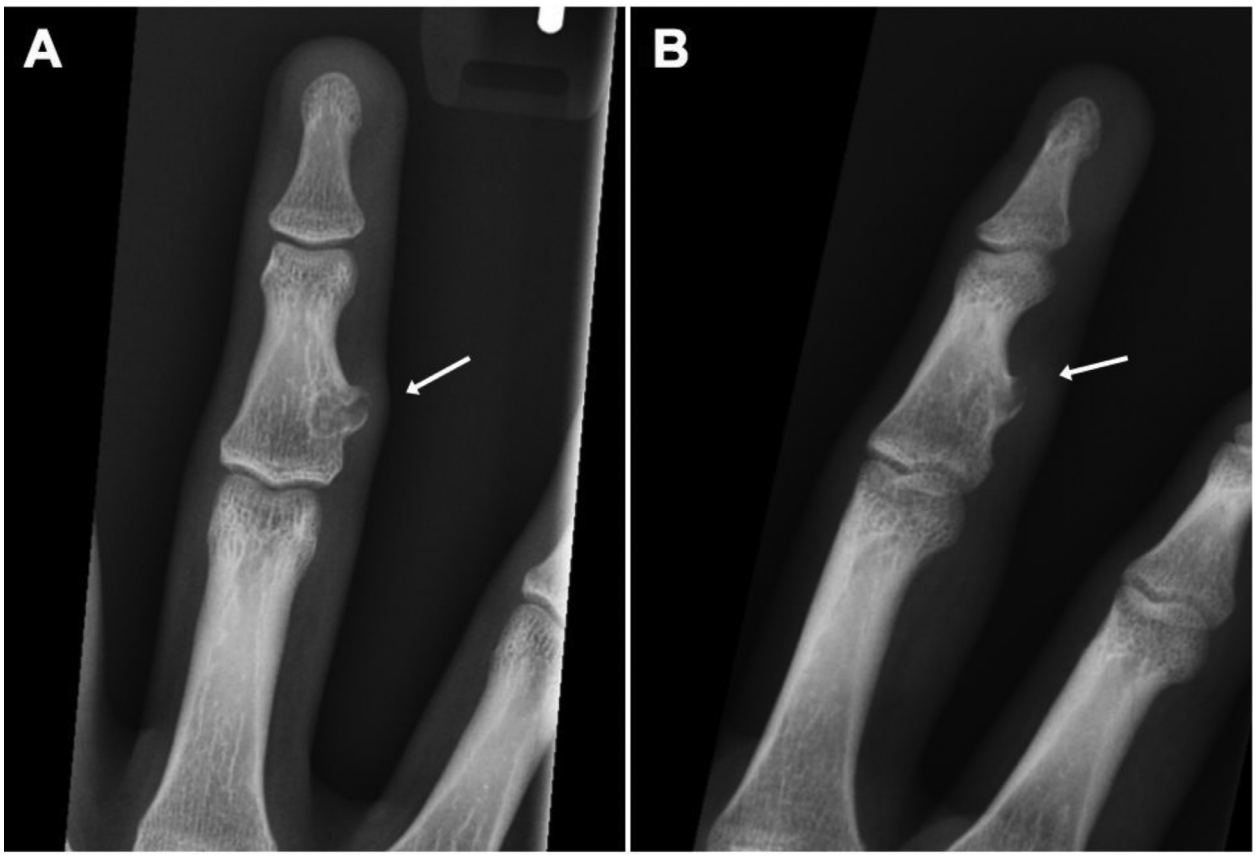

Fig. 1 – An 18-year-old male with a chronic mass of the left third finger. Frontal (A) and oblique (B) radiographs of the left third finger show a small well-circumscribed expansile lucent lesion in the proximal middle phalanx of the left third finger with mild overlying soft tissue swelling (arrows).

third finger. Patient denied any history of trauma and did not report any numbness or limited range of motion. On physical examination, there were no skin color or temperature changes. A firm mass was palpated over the proximal metadiaphysis of the left third middle phalanx which was minimally tender to palpation.

A radiograph of the left third finger was performed which demonstrated a subcentimeter, well-corticated cortical-based expansile lucent lesion within the proximal metadiaphysis of the middle phalanx (Fig. 1). Magnetic resonance imaging (MRI) of the left third finger (Fig. 2) demonstrated a 0.7 × 0.6 cm expansile cortical-based lesion within the proximal metadiaphysis of the medial third middle phalanx, extending through the cortex into the soft tissues. The lesion demonstrated high T2 signal with internal foci of low to intermediate signal suggestive of internal chondroid matrix. These findings were most suggestive of EP of the left third finger.

The patient underwent surgical excision, curettage and bone grafting, and surgical pathology study confirmed the diagnosis of EP (Fig. 3). On the follow-up visit 3 weeks after the procedure, patient reported no pain or limited range of motion.

Discussion

Enchondroma protuberans lesions usually center within the medullary space, and demonstrate exophytic growth outside the margins of the bony cortex, usually creating an expansile mass [2]. The masses grow at varying speeds and patients may be asymptomatic. Symptomatic presentations include a palpable mass, pain, or a pathologic fracture [2,3]. There is no predilection for either males or females, nor is there a particular age range that appears more at risk, with several previous cases in early childhood and late adulthood [1,4]. The most common site of EP is the hand, usually in the phalanges or metacarpal bones, followed by the ribs and the long bones of the arm [2,7,8]. The case in our study presented with chronic painless palpable mass on the left third middle phalanx.

Physical examination is nonspecific for diagnosis of EP and imaging plays a key role in preprocedural or pretreatment diagnosis. Radiographs usually show a well-defined lucent lesion within the medulla of the bone with a cortical defect and expansion into the soft tissues, with both the intramedullary and extraosseous portions possibly containing dense calcifications [8]. MRI is the modality of choice for

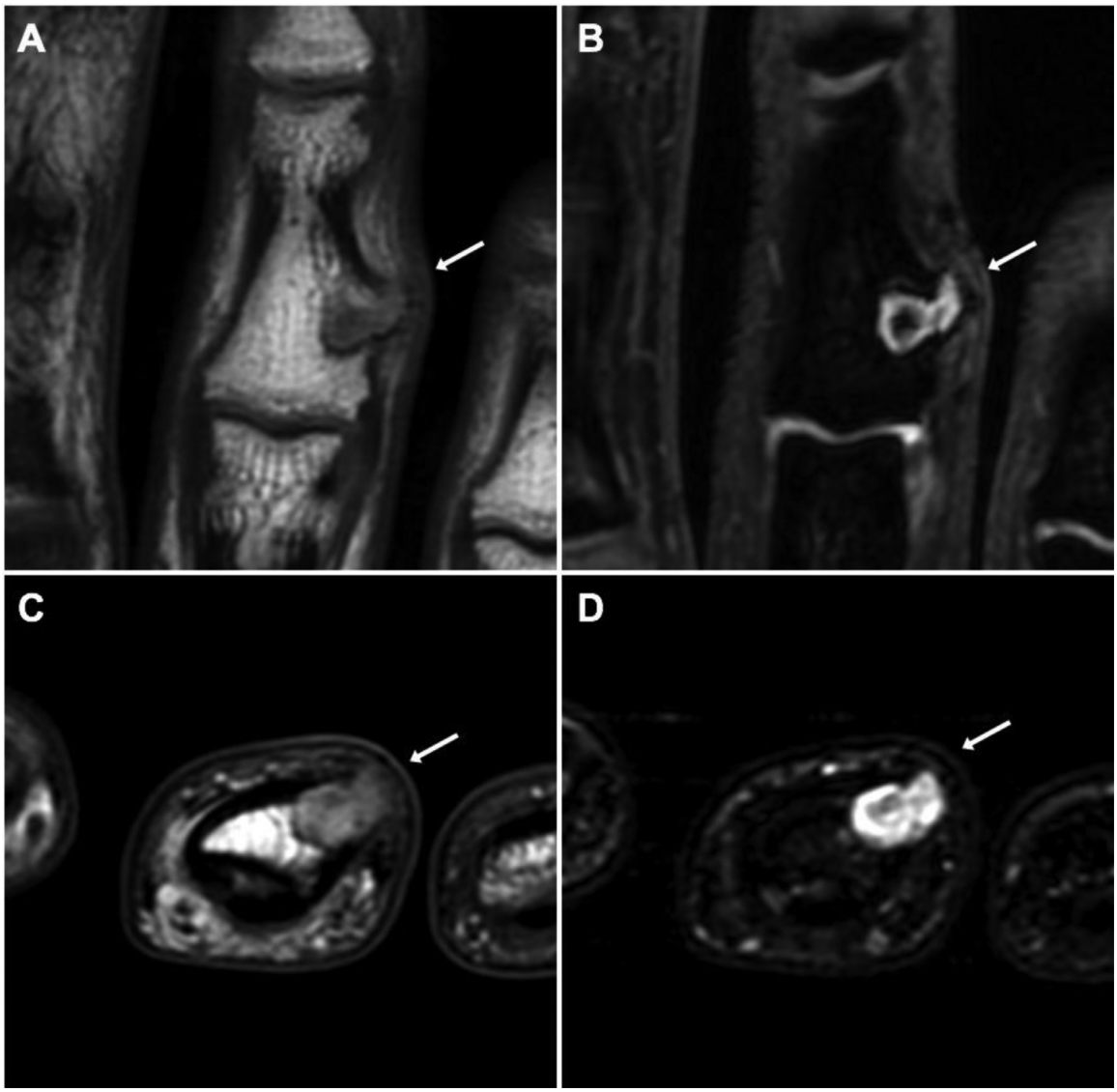

Fig. 2 – Coronal (A) and axial (C) T1-weighted and coronal (B) and axial (D) fluid sensitive MRI images of the left third finger reveal an expansile cortical-based lesion within the proximal metadiaphysis of the medial third middle phalanx (arrows), which demonstrate high T2 signal with internal foci with low to intermediate signal suggestive of internal chondroid matrix. The lesion extends through the cortex into the soft tissues.

diagnosis of EP. As with our case, on MRI, the lesion typically appears as a well-defined intramedullary lesion with low signal on T1-weighted images and high signal on T2 and STIR (short tau inversion recovery) sequences, with a cortical defect, cortical expansion, and invasion into the soft tissues [2]. Ultrasound may display a hypoechoic medullary lesion with a cortical defect, and may be helpful to find calcifications or blood supply, but is ultimately less informative than the more traditional radiographs and MRI [1]. Biopsy is usually performed to confirm the final diagnosis. On pathology as found in our case, findings are the same as the lobules of hyaline cartilage with calcification and endochondral ossification found in ordinary enchondromas, but without the disorganized lobulation structure and cartilaginous cap seen in chondrosarcoma [2].

Treatment options for EPs are primarily surgical and are being selected mainly based on patient symptoms and tumor growth rate. Small slow-growing tumors in asymptomatic patients without pain or movement restriction can be observed, although there is no definitive guideline on when to treat. Prompt treatment is encouraged as soon as there is pain or pathologic fracture to prevent damage to the bone [2]. Marginal excision is the only definitive treatment and has a high cure rate, with intramedullary curettage and bone grafting available as adjuncts when appropriate. A few of previously reported cases received bone grafting, and only one patient required a re-excision due to relapse [2,3,9]. Our patient underwent surgical excision, curettage, and bone grafting with acceptable outcome on early postoperative follow-up visit.

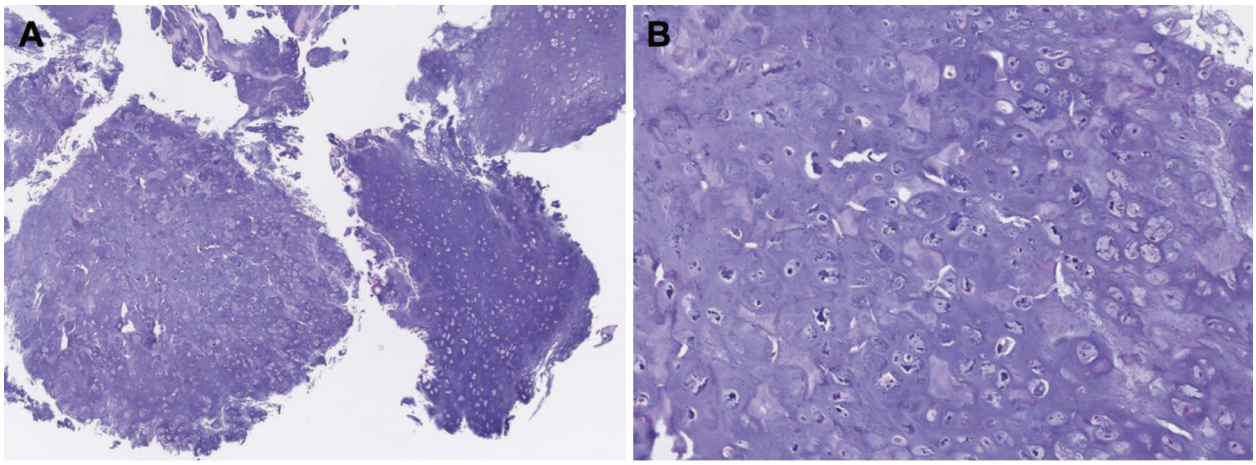

Fig. 3 – Photomicrograph of excised lesion by hematoxylin and eosin staining. (A) Low power (20x magnification) showing multiple scattered hyaline cartilage formed by multiple chondrocytes. (B) High power (50x magnification) showing moderately cellular monomorphic chondrocytes forming hyaline cartilage.

Conclusion

In summary, a rare case of EP involving a phalanx of the hand with characteristic imaging and pathologic findings was described in this study. Imaging, particularly MRI, plays a key role on preprocedural diagnosis.

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REFERENCES

[1] Xiang X, Cheng S, Yang YJ, Qiu L. Ultrasound manifestations of enchondroma protuberans: two case reports. Medicine (Baltimore) 2018;97:e11161.
[2] Beytemur O, Adanir O, Oncu M, Tetikkurt US. A rare cartilaginous tumor in the phalangeal bone: enchondroma protuberans. Acta Orthop Traumatol Turc 2014;48:379–81.
[3] Crim JR, Mirra JM. Enchondroma protuberans. Report of a case and its distinction from chondrosarcoma and osteochondroma adjacent to an enchondroma. Skelet Radiol 1990;19:431–4.
[4] Mohammadi A, Hedayati Asl A, Ghasemi-Rad M, Noroozinia F. Enchondroma protuberans of ulnar bone: a case report and review of literature. Case Rep Radiol 2012;2012:278920.
[5] Slesarenko YA, Sampson SP, Gould ES, Dagum AB. Recurrent enchondroma protuberans: a case report. J Hand Surg Am 2005;30:1318–21.
[6] An YY, Kim JY, Ahn MI, Kang YK, Choi HJ. Enchondroma protuberans of the hand. AJR Am J Roentgenol 2008;190:40–4.
[7] Caballes RL. Enchondroma protuberans masquerading as osteochondroma. Hum Pathol 1982;13:734–9.
[8] Keating RB, Wright PW, Staple TW. Enchondroma protuberans of the rib. Skelet Radiol 1985;13:55–8.
[9] Lasater P, Steensma MR, Patthanacharoenphon C, Davis MM. Enchondroma protuberans of the ulna in a pediatric patient: a case report. JBJS Case Connect 2016;6:e54.