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Proximal Phalanx Enchondroma with Pathological Fracture Treated with Curettage and Bone Substitute Placement – A Case Report

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Learning Point of the Article:

The use of bone substitutes as a cheap and viable material in the treatment of benign tumors of a small tubular bone.

Abstract

Introduction: Enchondromas are predominantly seen in short tubular bones and are usually symptomless and the onset of pain may indicate a pathological fracture in most cases or malignant transformation in rare instances. Here, we report a case of proximal phalanx enchondroma with pathological fracture treated with synthetic bone substitute placement.

Case Report: A 19-year-old girl presented to the outpatient department with complaints of swelling over the right little finger. She was evaluated for the same and a roentgenogram revealed a well-defined lytic lesion in the right little finger proximal phalanx. She was planned for conservative management, but she presented 2 weeks later with an increase in pain following trivial trauma.

Conclusion: Synthetic bone substitutes are excellent materials for filling the void in benign conditions as they form resorbable scaffolds which have good osteoconductive properties and are associated with no donor site morbidity.

Keywords: Enchondroma, curettage, bone substitute, bone morphogenic protein.

Introduction

Enchondroma is a benign cartilaginous tumor of the bone seen predominantly in the bones of the hand and is the most common bony tumors of the skeleton of the hand. Approximately 90% of all bony tumors of the hand are enchondromas and 35% of all enchondromas occur in the hand [1,2].

Enchondromas can be solitary or multiple and are predominantly seen in the fourth decade of life. They commonly affect small tubular bones and have a rare chance of malignant transformation. There is a predilection for enchondroma to affect the ulnar sided proximal phalanges [3].

Enchondromas are predominantly symptomless and the onset of pain may indicate a pathological fracture in most cases or malignant transformation to chondrosarcoma in rare instances [4].

Case Report

A 19-year-old girl presented to the outpatient department with complaints of swelling over the right little finger. She was evaluated for the same and a roentgenogram revealed a well-defined lytic lesion in the right little finger proximal phalanx (Figs. 1 and 2). She was planned for conservative management, but she presented 2 weeks later with an increase in pain following trivial trauma. A repeat X-ray revealed a pathological fracture, and hence, she was planned for surgery.

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Author's Photo Gallery


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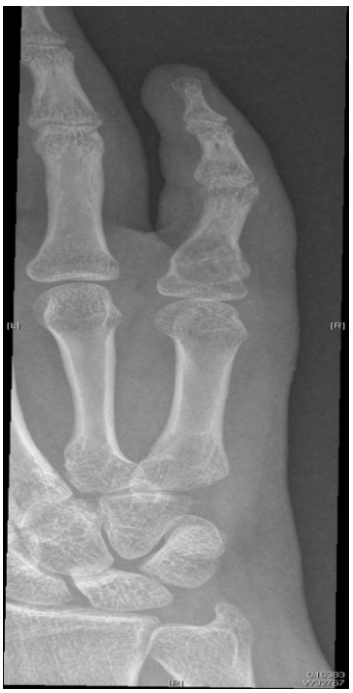

Figure 1: AP view Pre-operative.

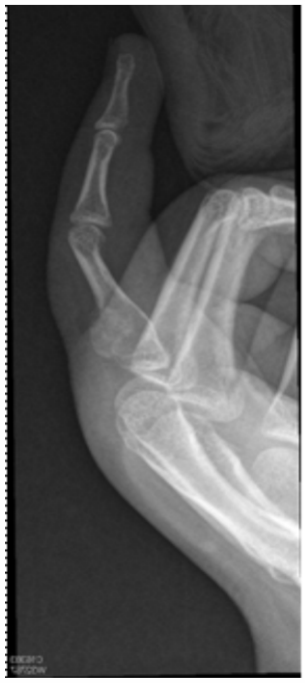

Figure 2: Lateral view Pre-operative.

She underwent curettage and bone substitute placement. The right little finger proximal phalanx was approached dorsally and a cortical window was made in the bone and the material was sent for biopsy. The void was filled with bone substitute and the window was closed. The wound was closed in layers and she was put on an ulnar gutter slab till suture removal and was put on a cast for 6 more weeks after suture removal (Figs. 3, 4, 5, 6).

The biopsy revealed lobules of hyaline cartilage some of which displayed mild hypercellularity with mild nuclear pleomorphism and occasional binucleation. Trabeculae of cancellous bone were present with intramedullary lobules of cartilage. There was focal calcification and enchondral ossification. An occasional focus of myxoid degeneration was seen. There was no evidence of malignancy in the multiple deeper sections studied. Findings were consistent with the enchondroma proximal phalanx of the right little finger (Figs. 7 and 8).

There was good osseointegration with the healing of the fracture at 3 months follow-up (Figs. 9 and 10).

Discussion

Enchondromas may present as a solitary and monostotic lesion with a peak incidence in the fourth decade of life and it has a predilection for short tubular bones (proximal and middle phalanges and metacarpal and metatarsal) of the hands and feet, distal femur, and proximal humerus. It can also present as multiple, polyostotic lesions in Ollier's disease which is non-heritable, and in Maffucci's syndrome which presents as multiple enchondromas and hemangiomas. Malignant transformation of a solitary enchondroma to chondrosarcoma is rare but has been documented [1].

Enchondromas typically are symptomless or may present as a painless swelling. This makes the identification of enchondromas tricky and could be sometimes picked up as an incidental finding during routine radiographs. They present as a well-defined lytic lesion, central or eccentric, and expansile or non-expansile, containing a calcified chondroid matrix and not invading surrounding tissue [1]. A plain radiograph is more than sufficient for diagnosis, but a computed tomography scan or magnetic resonance imaging could be used to define the lesion better.

Asymptomatic lesions could be managed conservatively, but surgical management has emerged as the treatment of choice, with curettage and bone grafting being the primary mode of treatment. An autograft from the iliac crest or distal radius could be used, but there is a risk of donor site morbidity. Bone substitutes could be used as an alternative to autologous bone grafts [5].

Bone grafting is an essential procedure used for filling defects in musculoskeletal tumors. Approximately 10% of all skeletal

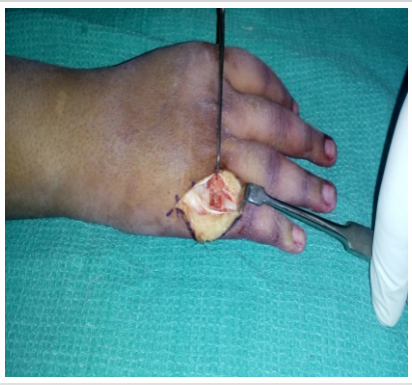

Figure 3: Approach to the proximal phalanx

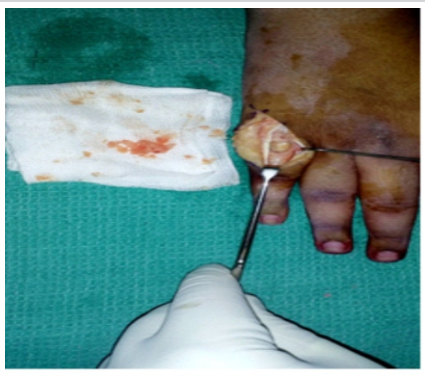

Figure 4: Post curettage

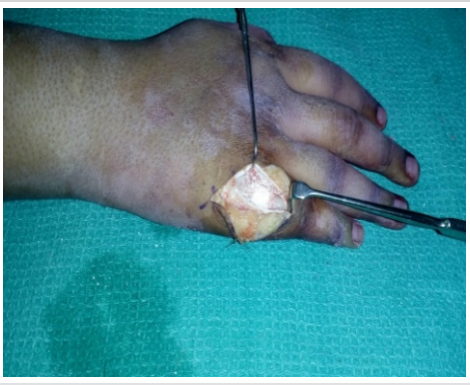

Figure 5: Void filled with bone substitute.

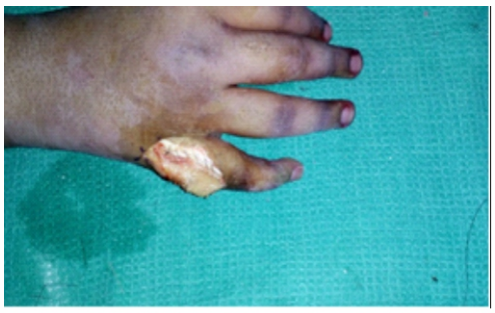

Figure 6: Tendon repaired.

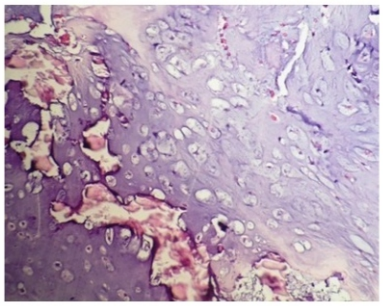

Figure 7: Histology of enchondroma.

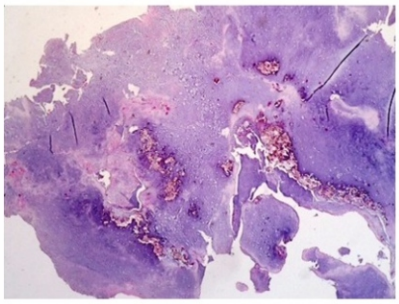

Figure 8: Histology of enchondroma.

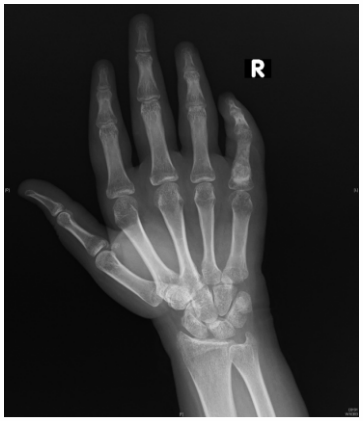

Figure 9: AP view 3 months follow-up.

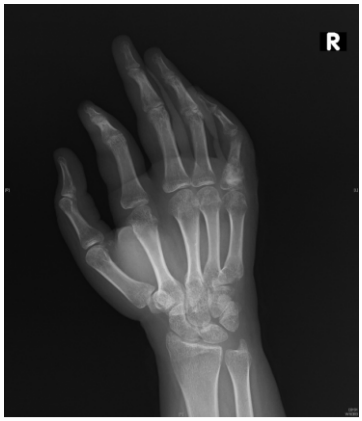

Figure 10: Lteral view 3 months follow-up.

reconstructive surgery requires bone grafting [6]. Autologous bone graft from the iliac crest is the most common donor site for both cortical and cancellous bone grafts. However, it is associated with 8–39% of complications like pain, infection, hematoma, urethral injury, and cosmetic deformity [5]. Bachoura et al., in a systematic review, reported that problems at the iliac crest donor site contributed to one-third of autograft related issues [7].

Allografts could be used as an alternative to autologous bone grafts and reducing operating time and preventing donor site morbidity. Nevertheless, there is a small risk of transferring infection from the deceased donor to the recipient [8].

Numerous substances such as hydroxyapatite, bicalcium or tricalcium phosphate, calcium sulfate, bone morphogenic protein (BMP) 2, and BMP7 are increasingly being used for manufacturing synthetic bone substitutes [9].

In 1892, Dreesmann proposed the use of calcium sulfate for filling voids in TB patients [9]. Calcium sulfate can be used as a paste, block, and granule. It forms a resorbable scaffold that disappears in 6–12 weeks. Hence, it is ideal for filling voids in small bones [5].

Pianta et al., in a biomechanical study using a cadaveric model, concluded that calcium phosphate cement placement in the void provides significantly increased strength comparable to intact bone [10].

Conclusion

The patient had a pathological fracture, and hence, she underwent curettage and bone substitute placement. The biopsy confirmed the diagnosis. She had an excellent functional and radiological outcome and no donor site morbidity.

Clinical Message

Bone substitutes can be used as a cheap and viable method of treatment in a patient with enchondroma of small bones.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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Consent: The authors confirm that informed consent was obtained from the patient for publication of this case report

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