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Case Report

Advanced enchondroma of the phalanx treated by en block excision and tricortical iliac crest autograft

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ABSTRACT

Curettage with or without augmentation forms the mainstay of treatment in most cases of enchondroma of the hand. Studies have shown that the chances of re-fracture increase with the increase in the bony involvement by the tumor and recommend augmentation for the larger lesions. Structural grafts are seldom used in enchondromas. There is only one reported case of the use of structural allograft in a case of recurrent enchondroma of the metacarpal. We present a case of advanced enchondroma involving the entire proximal phalanx which was managed by enblock excision with intercalary tricortical iliac crest strut grafting. Use of structural allograft in a case of enchondroma helps in augmenting the bony framework, providing stability and thus decreasing the chance of re-fracture at the site of lesion. The use of a tri-cortical graft provides better outcomes due to its osteoinductive and osteoconductive properties.

Keywords: Enchondroma, Tricortical graft, Proximal phalanx

INTRODUCTION

Enchondroma is the most common tumor of the hand.[1] The little finger and the proximal phalanx are the most commonly involved sites.[2,3] Patients usually present with pain, swelling, deformity or pathological fracture, however it can sometimes also be an incidental finding.[4] Removal of the tumor by curettage followed by augmentation using auto or allo-grafts or polymethylmethacrylate (PMMA) bone cement forms the mainstay of treatment. We present a case of advanced enchondroma of the proximal phalanx of ring finger, which involved the complete phalanx with thinned out cortices managed by complete excision of the diaphysis and bone grafting. The unique feature of this case report is that in this case we have used a tri cortical iliac crest strut graft to provide structural support along with its osteo-conductive and osteo-inductive properties.

CASE REPORT

A 34-year-old female presented to our hospital with a vague mass swelling of the proximal phalanx of left ring finger of one-year duration. It was initially painless but became painful later. Movements of the ring finger were restricted. She had once suffered a trivial injury to her ring finger which led to aggravation of pain and was immobilized for 2 months elsewhere. There was no other significant medical history.

On physical examination, the mass was non-tender and had a bony consistency. The skin overlying the mass was normal (Figure 1). A swan neck deformity was present in the finger with hyperextension of the proximal interphalangeal (PIP) joint and flexion at the distal interphalangeal (DIP) joint. PIP and DIP joint appeared stiff and any passive movement caused pain, however movements at the metacarpophalangeal (MCP) joint were preserved (Figure 2).

Radiographs showed a widened phalanx, with papery thin cortices and a lytic matrix with stippled calcification. There was an evidence of previous fracture which had healed (Figure 3). The articular surfaces appeared to be normal.

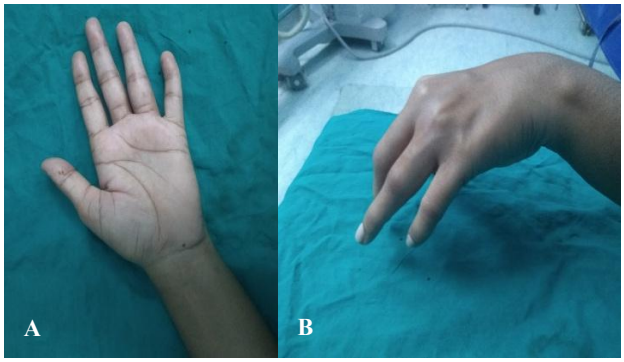

Figure 1 (A and B): Clinical photographs of the lesion; There was a swelling noted in the proximal phalynx of ring finger. Skin over the finger was normal.

Figure 2: The finger had developed swan neck deformity. There was a significant restriction of the PIP and DIP joint movements.

Figure 3 (A and B): Plain radiographs of hand (AP and oblique views) show a lytic lesion involving the proximal phalanx of ring finger. The entire phalanx was involved. Stippled calcification can also be seen. The articular surfaces were normal. There was also an evidence of previous fracture in the lesion.

Magnetic resonance imaging (MRI) showed a well-defined expansile lytic lesion with endosteal scalloping involving the entire proximal phalanx. The lesion appeared iso-intense on T2 sequences and hyper-intense on STIR images. There were few foci of T2 hypo-intense signals seen within the lesion representing tiny foci of calcification (Figure 4).

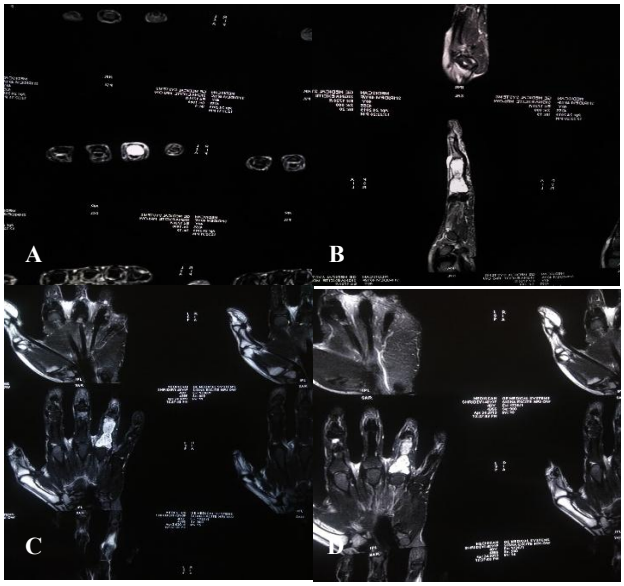

Figure 4 (A-D): MRI images of the lesion demonstrating an iso to hyper intense lesion on T2 and hyperintense lesion on STIR sequences. There were few T2 hypointense signals seen within the lesion suggestive of stippled calcification.

Complete blood count, ESR and CRP revealed no abnormalities. Serum alkaline phosphatase levels (480 IU/l), and calcium sand phosphorous levels were also normal. Based upon the radiographs and MRI a provisional diagnosis of enchondroma was made.

Figure 5 (A and B): Intra-operative fluoroscopic image showing the tri-cortical iliac crest graft place in the void and secured to the articular surface using 3 screws.

Surgery was planned under regional anaesthesia and a dorsal approach was used. Curettage was planned initially, but intra-operatively the cortices started to fracture even with meticulous attempts of curettage. This was causing excessive spillage of the tumor into the soft tissues. After clearing of all the tumor tissue there was a large void created between the articular surfaces of the phalanx, with fractured diaphyseal cortices providing no structural support. At this juncture a decision had to be made about the type of void filling material to be used. The material

used had to provide structural support along with bony integration. It was decided to use a tri-cortical iliac crest graft fashioned according to the length and diameter of the phalanx. The remaining cortices which were also involved by the tumor were removed, and the endosteal side of the articular surfaces was thoroughly curetted. The tri-cortical graft fashioned to resemble the phalanx was placed between the articular surfaces. It was fixed to the articular surface using three 2.0 mm screws (Figure 5). Wound was closed in layers and a splint applied. Wound healed without any complications and finger movements were started after 15 days.

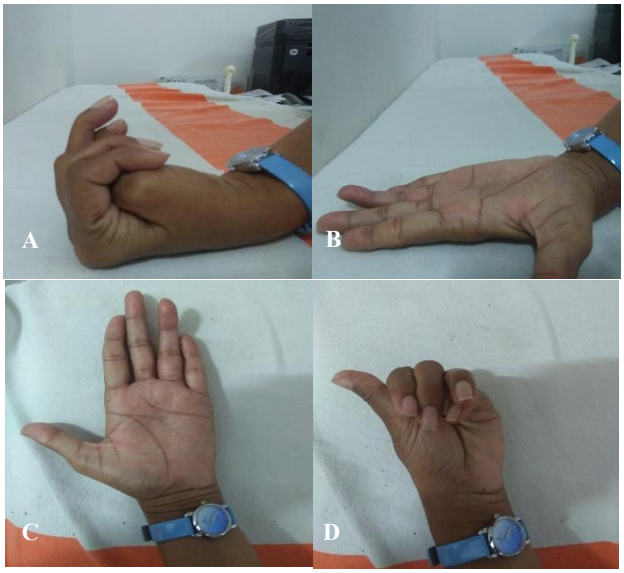

Figure 6 (A-D): Clinical photographs showing good functional outcome following surgery. The range of motion ROM in the PIP and DIP joint improved and the swan neck deformity also disappeared.

Figure 7 (A-C): Post-operative radiograph taken 6 months after the surgery showing good incorporation of the tri-cortical graft.

Histopathology confirmed the diagnosis of enchondroma. Patient was kept in regular follow-up for a period of one year. There was an improvement seen in the post-operative range of motion (Figure 6). Good incorporation of the graft was seen on the radiographs taken 6 months after the surgery (Figure 7). No evidence of recurrence was seen at the end of one-year follow-up.

DISCUSSION

Enchondroma is the most common benign cartilaginous tumor of the hand.[1] It frequently involves the proximal phalanges and ulnar sided fingers are more commonly affected.[2,3] It is usually detected as an incidental finding or sometimes present with pathological fractures.[5] Any trivial trauma can result in a fracture, as the pathological bone is weakened by the disease process. Curettage with or without augmentation is the standard treatment for symptomatic enchondromas. Various substances have been used for augmentation which include, cancellous autograft, allograft, PMMA, and hydroxyapatite.[6] However some authors consider that augmentation has no additional advantage over non augmentation techniques.[7] The chances of fracture are directly proportional to the percentage of bony involvement. One study predicts 1.59% increase in the chance of fracture with every 10% increase in the longitudinal bony involvement.[8] Accordingly some consider bone grafting necessary if the there is significant cortical thinning and if the lesion is located close to the articular surface.[3]

In our case there was a 100% involvement of the proximal phalynx of the ring finger. The cortices were completely thinned out and there was a significant enlargement of the bone. An attempt to curette was made but it led to cortical fractures at multiple sites, as the cortices were as friable as an egg-shell. Moreover, there was spillage of the tumor into the surrounding tissues with every sweep of the curette. The only option left out was to completely remove the diaphyseal part which contained the tumor tissue and place a structural graft in its place.

The patient had been explained regarding iliac crest grafting prior to the surgery and had fully consented for it. We used a tri-cortical iliac crest graft in our case to exactly bridge the intercalary gap. Studies have shown no additional advantage of autografts over allografts or bone substitutes, but in our case we had no provision of using allograft and the bone substitutes were not preferred due to financial constraints.[3,9,10]

CONCLUSION

Use of structural grafts is uncommon in enchondromas of the hand. To our knowledge there is only one reported case of structural allograft used in a case of recurrent enchondroma of the metacarpal. We consider that use of structural autografts have a better advantage in large lesions with significant cortical thinning as it can avoid chances of re-fracture and have a better bony integration.

Recommendations

Enchrondoma though is one of the most common tumor which occurs in the hand can be troublesome to manage. It

causes thinning of the cortices leading to chances of fracture. Tri-cortical iliac crest graft can be used to augment the structural skeleton. It is cost effective and is readily availability. Thus it can be considered as a method to treat this condition, given its good functional outcome.

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