

Giant cell tumor of proximal phalanx treated with en-bloc resection and silicone implant arthroplasty: A case report with six years follow-up

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Abstract

Primary giant-cell tumor of the phalanx is rare. The available literature consists of case reports or small series of cases. Therefore there are no consistent treatment guidelines for phalangeal giant cell tumors. We report this case as a unique one that has been treated with en bloc resection and silicone implant arthroplasty of the metacarpo-phalangeal joint for giant cell tumor of the proximal phalanx. There was no recurrence and the patient had reasonable function of the metacarpo-phalangeal joint at six years follow up.

Keywords: Phalanx, Giant cell tumor, silicone implant arthroplasty.

1. Introduction

Giant cell tumor of the proximal phalanx is a rare tumor with few cases reported in literature. Treatment options include curettage and bone grafting, en-bloc resection and reconstruction, Cryoablation, Use of Phenol, Denosumab therapy, amputation or ray resection. Curettage and bone grafting is reported to have a high recurrence rate as compared to en-bloc resection. We report a six year follow-up of a case of primary giant cell tumor of proximal phalanx in a 30-year-old homemaker treated with en-bloc resection and silicone implant arthroplasty for metacarpo-phalangeal joint reconstruction.

2. Case report

A 30-year-old left-handed woman presented with complaints of gradually increasing swelling and pain over the ring finger for three months. Clinical examination revealed the fusiform shape of the ring finger at the base of proximal phalanx that was tender on palpation. (Figure 1A, 1B).

Figure 1A: Preoperative clinical photograph showing fusiform swelling at the base of ring finger



Figure 1B: Preoperative clinical photograph showing an attempt to make a fist



There was no local rise in temperature, dilated veins, scar mark, or regional lymphadenopathy. The movements of the metacarpo-phalangeal joint were painful and the inter-phalangeal joints were stiff. The range of movement of metacarpo-phalangeal joint was from 0° to 30° and the total active motion (TAM) was 110°.

Postero-anterior and oblique radiographs (Figure 2) of hand revealed an osteolytic lesion involving the proximal one half of the proximal phalanx of the ring finger with breach of the cortex but without periosteal reaction.

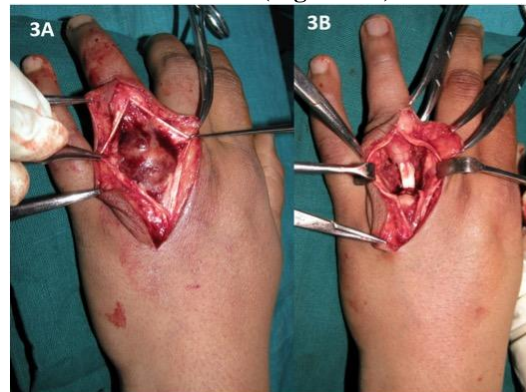
Figure 2: Posteroanterior and oblique radiographs of Left hand showing lytic lesion in the proximal half of left ring finger with cortical breach



MRI and FNAC suggested it to be a giant cell tumor. The tumor was graded as Enneking stage III, Campanacci Grade III. Other investigations suggested that there were no metastases.

The lesion in proximal phalanx was approached through a dorsal zigzag incision. After splitting the extensor tendon in the midline (Figure 3A), the tumor was resected with a five mm margin of the proximal phalanx (Figure 3B).

Figure 3: Intraoperative photographs showing the lesion (Figure 3A) after exposure. After en-bloc resection of the lesion (Figure 3B)



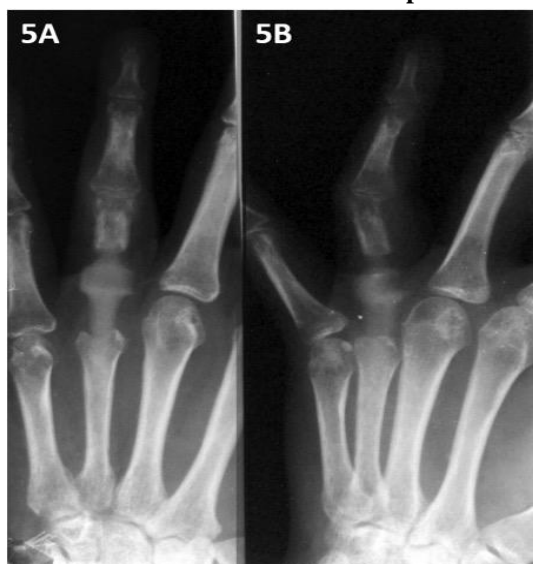
The articular surface at the distal end of the metacarpal head was also resected due to obvious intraoperative finding of its invasion by the tumor. Margins were assessed with frozen section and were found out to be negative for tumor cells. The defect created was four cm in length for which, standard silicon prosthesis for the metacarpo-phalangeal joint could not be used. Hence, a larger prosthesis that is normally taken for the great toe was taken. The distal stem of the silicone implant was trimmed and recontoured in order to fit to the remaining intramedullary canal in the distal half of the proximal phalanx. Care was taken that the joint level of the implanted prosthesis was more or less at the same level as the metacarpo-phalangeal joint of the ring finger (Figure 4).

Figure 4: Intraoperative photograph after reconstruction of the defect with silicone prosthesis.



Intraoperative range of motion was 0°-70° and the joint was stable. The split extensor tendon was repaired and the skin was sutured. The histopathological examination confirmed the diagnosis of giant cell tumor. Postoperative radiographs showed good position of implants (Figure 5A, 5B).

Figure 5: 4 weeks postoperative anteroposterior (Figure 5A) and oblique (Figure 5B) radiograph showing the defect reconstructed with silicone prosthesis



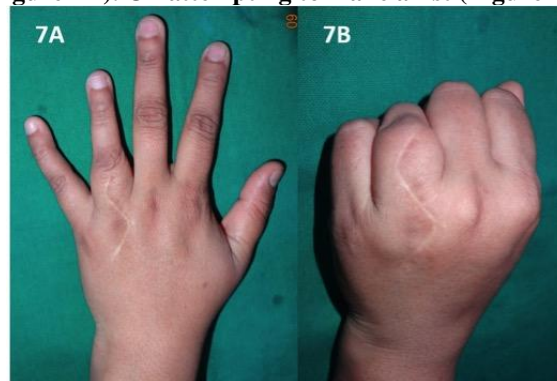
A dorsal plaster support extending to the proximal interphalangeal joint was applied and the ring finger strapped to the middle finger and gradual movements of the fingers were commenced. At four weeks, the metacarpophalangeal joint and the inter-phalangeal joints were allowed further movements and a dorsal splint support was given to apply at night. The patient was followed up every monthly for six months and thereafter every three monthly. At six years, there was no osteolysis or loosening of the implant (Figure 6A, 6B) and no local recurrence of the tumor or distant metastasis, but the implant had settled slightly in the proximal phalanx.

Figure 6: 6 years post-operative anteroposterior (Figure 6A) and oblique (Figure 6B) radiograph, showing slight sinking in of distal stem of silicone implant in the proximal phalanx



The metacarpophalangeal joint flexion was up to 70 degrees (Figure 7A, 7B). There was some loss of range at the proximal and distal interphalangeal joints but TAM improved from 110 degrees preoperatively to 220 degrees at six years postoperatively.

Figure 7: 6 years postoperative clinical photograph (Figure 7A). On attempting to make a fist (Figure 7B)



3. Discussion

The available literature for giant cell tumor of phalanges is in the form of case reports or small series of cases. Treatment options include curettage and bone grafting, en-bloc resection and reconstruction, Cryoablation, Use of Phenol, Denosumab therapy amputation or ray resection. There has been high recurrence rate with curettage and bone grafting alone. Few authors have reported the recurrence of the lesion even after ray resection [1].

The surgical options for the reconstruction of the metacarpophalangeal joint in cases of metacarpal tumors are well defined. They include tumor resection from metacarpal with arthrodesis involving the fibular or iliac crest graft, silicone replacement of entire metacarpal [2], vascularized joint transfer [3], tumor resection with reconstruction with fibula and silicone joint [4], or vascularized fibular transfer with silicone arthroplasty [5]. Because of rarity of the lesion of proximal phalanx, the surgical options are not well defined.

Allograft has also been used to replace the entire phalanx [6]. Arthrodesis of the MCP joint has been described for giant-cell tumor of the proximal phalanx as an alternative to ray resection [7] however it costs the range of motion. The metacarpophalangeal joint is the key joint for finger function, contributing 77 % to the total arc of finger flexion [8], and its loss causes a significant disability of the finger.

In our case, we performed en bloc resection of the tumor with reconstruction with silicone joint arthroplasty. Ansari et al [9] reported a similar case of proximal phalanx giant cell tumor treated with silicone prosthesis and fibula graft with 18 months follow-up. In their report, autologous fibula graft was used to replace the phalangeal bone loss and the standard silicone prosthesis was used. Also, the fibula graft had to be fixed to the phalangeal remnant with internal fixation. In our case, we did not use fibula but instead used larger silicone prosthesis due to large defect. By using this technique, we eliminated the need of fibular graft and therefore internal fixation.

This reduced the complications associated with harvesting autologous fibula graft and plating and thus additional morbidity.

In conclusion, en bloc resection and reconstruction of the metacarpo-phalangeal joint with a modified silicone implant should be considered as another option for management of giant cell tumor of the proximal phalanx involving the metacarpo-phalangeal joint.

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