Giant cell tumour of the distal humerus treated with elbow arthroplasty: A case report

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ABSTRACT

Introduction: Giant cell tumour (GCT) of the distal humerus is very rare and the treatment depends on the grade of the tumour. Case Report: We present a 32-year-old lady with Grade III GCT of the left distal humerus treated with en bloc excision and custom made total elbow replacement. Her preoperative Mayo Elbow Performance Score was 30. At 56 months follow up, she is pain free with a Mayo Elbow Performance Score of 90 and no evidence of recurrence. Conclusion: Enneking’s staging and Campanacci’s radiographic grading helps in planning the treatment. When the lesion has violated a joint, en bloc excision followed by reconstruction or joint sacrifice is the treatment of choice. The options of reconstruction are auto or allografts, custom made endoprosthesys or allograft endoprosthetic composite. Reconstruction using autograft is seldom feasible in elbow.

Allografts are met with high complication rates. Custom made total elbow arthroplasty is a good option especially for primary tumours of the elbow and can be done with good oncologic safety. Custom made total elbow arthroplasty is a good option for Campanacci Grade III GCT of the elbow. It provides excellent pain relief and good functional improvement with low complication rate.

Keywords: Giant cell tumour, Elbow tumour, Elbow arthroplasty.

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INTRODUCTION

Giant Cell Tumour (GCT) of bone is a distinct clinico-pathologic entity with distinguishing radiologic features. Although approximately 6% of the GCTs affect the humerus [1]. GCT of the distal humerus is rare. We present a case of distal humerus GCT which had breached the cortex and was successfully treated with custom made total elbow arthroplasty and was prospectively followed up.

CASE REPORT

Thirty one year old house wife presented to us in March 2005 with complaints of swelling on the inner
aspect of the left elbow for two years and pain for two months associated with decreased movements of the left elbow. There was no history of trauma or systemic symptoms. Her Activities of Daily Living were severely affected.

Her general physical examination was within normal limits. Left elbow examination revealed a 5x4 cm oval swelling on the medial and anteromedial aspect of distal humerus obscuring the joint line. Swelling was warm, tender, with well defined edges, smooth surface, firm consistency and immobile. She had a flexion deformity of 40 degrees with a further flexion up to 90 degrees limited by pain and spasm. Full supination and pronation were present. Her blood investigations and chest radiographs were normal. Radiograph of the left elbow showed an eccentric lytic lesion of medial condyle of distal humerus which had breached the cortex. Mayo Elbow Performance Score was 30 at presentation. Bone scan showed intense uptake in the medial condyle of the distal humerus while rest of the skeleton was normal. Biopsy from the lesion revealed uniform ovoid mononuclear cells with numerous osteoclast type multinucleate giant cells which was consistent with GCT.

She was treated with en bloc resection of the distal humerus and custom made total elbow arthroplasty using 316 L SS, constrained, hinged cemented prosthesis. Post-operative period was uneventful and she was started on physiotherapy. Histopathologic examination of the three excised specimen showed one cm tumor free margin proximally while distally the tumor had breached the cortex and involved the soft tissues. She was prospectively followed up and on final follow up at 56 months she was pain free with flexion of 20-110° and was able to carry out her personal and house hold works independently with a Mayo Elbow Performance Score of 90. There was no evidence of recurrence or metastasis.

DISCUSSION

GCT represents 4-8% of primary bone tumours. It is a locally aggressive benign bone tumour which occurs after the epiphyseal closure with a peak age of incidence in the 3rd and 4th decades [2]. GCT has a slight female preponderance and this is more in the paediatric and adolescent population [3].

GCT commonly affects the long tubular bones; the most common sites being distal femur and proximal tibia, distal radius, and proximal humerus, suggesting that in the lower extremity it tends to occur towards the knee; while in the upper extremity, away from the elbow [4]. Elbow per se is a rare site for primary bone

Figure 1: Preoperative radiograph showing eccentric, expansile, lytic lesion of the left medial condyle of humerus which has violated the joint.

Figure 2: Photomicrograph of the excised specimen showing uniform ovoid mononuclear cells with numerous osteoclasts type multinucleate giant cells consistent with giant cell tumor (H&E, x200).

Figure 3: Radiograph at final follow up showing the prosthesis in situ without any evidence of loosening.
plain radiographs including chest X-ray, MRI and biopsy. Enneking has classified benign bone tumours into latent, active and aggressive. Stage I (latent) and and II (active) are intracapsular while Stage III lesions (aggressive) are extracapsular extending into the soft tissues. On radiographs, GCT demonstrates a lytic lesion without mineralized tumour matrix, usually eccentric and shows a geographical pattern of destruction. Campanacci’s radiographic grading roughly corresponds to Enneking’s staging. Campanacci’s Grade 1 is a cystic lesion with sclerosed margins, Grade 2 where the cortex is thin but not perforated and Grade 3 where the cortex is perforated. MRI is the investigation of choice to determine the tumour inhomogeneity, intra-articular spread and soft tissue extensions. The transverse sections can differentiate GCT from other radiographically similar lesions [6]. Pre-operative histopathologic examination helps in differentiating primary malignant GCT which often mimics conventional GCT clinically and radiologically and carries a poor prognosis [7].

Grade I and II lesions can be treated by joint preservation with good functional outcome and low recurrence rates. When the lesion has violated a joint, en bloc excision followed by reconstruction or joint sacrifice is the treatment of choice. The options of reconstruction are auto or allografts, custom made endoprosthesis or allograft endoprosthetic composite. Unlike distal radius, reconstruction using autograft is seldom feasible in elbow. Hemiarthicular as well as total elbow allografts have been used in reconstructing the defects following tumour excision, but due to their high complication rates are mainly reserved as salvage procedure for failed elbow arthroplasty [8]. Custom made total elbow arthroplasty is a good option especially for primary tumours of the elbow and can be done with good oncologic safety [9]. It provides excellent pain relief and good functional improvement with low complication rates [10].

However, patients need to be followed up and evaluated periodically in terms of tumour recurrence, pulmonary metastasis or late malignant transformation of the residual tumour if any.

**CONCLUSION**

Giant cell tumor of the distal humerus is rare and a type III lesion at this site can be successfully treated with custom made total elbow arthroplasty, however, the patient needs to be followed up periodically.

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**Author Contributions**

Azad Sait S – Acquisition of data, Analysis and interpretation of data, Drafting the article, Final approval of the version to be published
Manasseh Nithyanath – Conception and design, Analysis and interpretation of data, Critical revision of the article, Final approval of the version to be published
Vinoo M. Cherian – Conception and design, Analysis and interpretation of data, Critical revision of the article, Final approval of the version to be published

Guarantor
The corresponding author is the guarantor of submission.

Conflict of Interest
The authors declare that they do not have any financial interest or any conflict of interest exists.

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REFERENCES