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GIANT CELL TUMOUR OF DISTAL END ULNA- A CASE REPORT AND REVIEW OF LITERATURE

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ABSTRACT

Introduction- Giant cell tumour is locally aggressive benign tumour occurring at epiphysis in mature skeleton. Knee joint and distal end radius are commonest sites affected. Distal end of ulna is unusual site of occurrence. Treatment depends upon the stage of disease.

Case history- We describe a case of 35 year female with giant cell tumour of ulna managed with excision of distal end of ulna without any stabilization of carpus with stabilization of proximal end with split transfer of flexor carpi ulnaris tendon.

Discussion- A literature review of GCT of distal ulna favors wide resection of ulna to minimize the recurrences. However there is no consensus as to whether stabilization or reconstruction is required or not and what is the optimal method of stabilization or reconstruction. However most of the authors would agree that stabilization of ulnar stump leads to improvement in functional outcome. We have got excellent oncological and functional outcome after wide resection of distal ulna and soft tissue stabilization using one half of the FCU tendon.

Keywords: GCT, Distal Ulna, Resection, Stabilization

INTRODUCTION

The distal end of the ulna is an uncommon site for primary bone tumour. Giant cell tumour of bone is a rare, benign but locally aggressive tumour accounting for 3 to 5 percent of all primary bone tumours (McDonald *et al.*, 1986; Sung *et al.*, 1982). GCT of the distal ulna is extremely rare accounting for approximately 0.45 to 3.2 percent of all cases of GCT (Blackley *et al.*, 1997; Goldenberg *et al.*, 1970; Malawer *et al.*, 1997). Wide resection of distal ulna with or without reconstruction or stabilization of ulnar stump is the recommended treatment for GCT in such cases (Blackley *et al.*, 1997; Cooney *et al.*, 1997; Ferracini *et al.*, 1988; Gainor, 1995). We present a patient with GCT of the distal part of ulna treated with wide resection followed by stabilization of ulnar stump using one half of ECU tendon.

Case History- 35 year old female presented with history of slowly increasing swelling at right wrist since last 9 months. No history of injury, pain and fever. On examination the swelling was present on distal aspect of ulna. Skin over the swelling was normal with no evidence of dilated veins, stretch mark or sinuses. On palpation it was not tender, with no local rise of temperature. The swelling was 8 cm in length, arising from distal end of ulna but not involving the wrist joint. It was soft to firm in consistency, not fixed to overlying skin. Flexion and extension at wrist joint were full and painless with restriction of ulnar deviation. Rotational movements were normal suggesting non involvement of distal radioulnar joint.

Radiograph of forearm with wrist showed a lytic lesion of distal ulna with ballooning of cortex without soft tissue extension (Figure 1). It was showing characteristic soap bobble appearance suggestive of giant cell tumour of distal ulna. CT scan showed cortical thinning without any soft tissue extension of tumour. Wrist and distal radioulnar joint was uninvolved. FNAC was done to establish the diagnosis of giant cell tumour. Considering size, extend and Enneking's grading we decided to perform en-block excision of distal ulna.

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Figure 1 (a, b): Radiographs showing Giant cell tumor of distal end ulna

The tumour was exposed through a dorsal lazy S shaped incision (Figure 2). The dorsal compartment of wrist was exposed. The tumour was exposed between extensor carpi ulnaris and flexor carpi ulnaris. The distal ulna along with 3 cm of normal bone was osteotomised. The tumour was excised along with triangular fibrocartilagenous complex to avoid incomplete tumour removal. The tendon of flexor carpi ulnaris was identified and split distal to ulnar osteotomy. One insertion was kept intact and other one was used to stabilize the end of ulna through a hole in the stump. No attempt was made to reconstruct DRUJ. Tourniquet was released and hemostasis was achieved. The wound was closed in layers over suction drain. The limb was splinted till suture removal on 14th day.

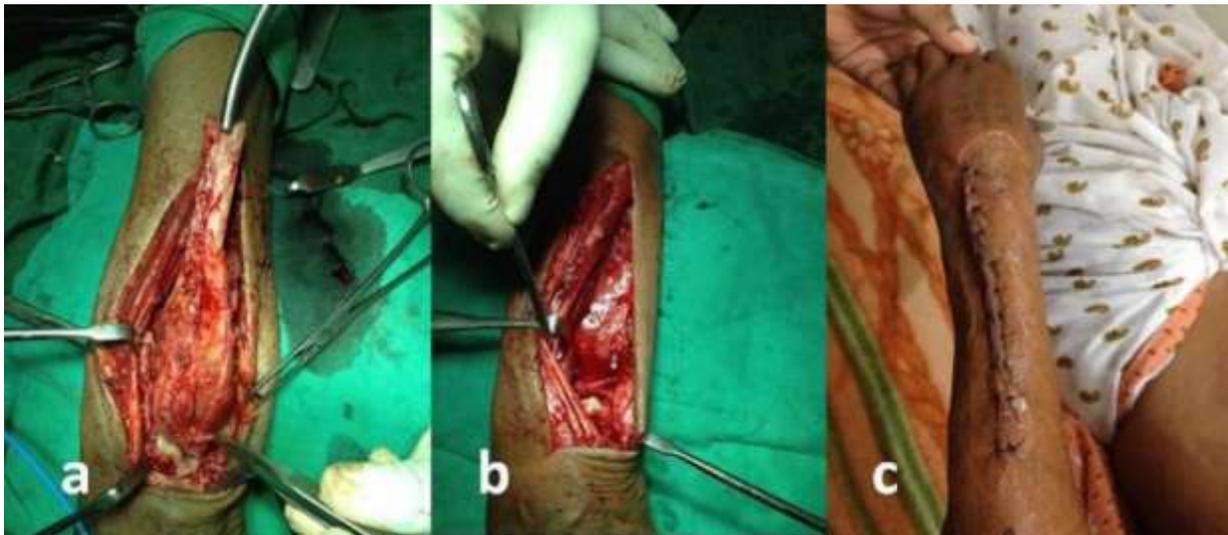


Figure 2: a) Excision of tumour, b) After tumour excision, c) Sutured operative wound

Post operative X ray showed complete removal of tumour. There was no recurrence of tumour till 2 years on clinical and radiological examinations. Ulnar subluxation of carpus and deformity of ulnar stump was not noted in recent x ray. Patient regained 80% percent of her preoperative range of motion with some loss in grip strength at 2 year fallow up (Figure 3)

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Figure 3: a) Post operative radiograph, b) Radiograph at 1 year, c) Radiograph at 2 year showing position of ulnar stump

RESULTS AND DISCUSSION

The distal end of ulna is a rare site for GCT. GCT is a benign but locally aggressive tumour with high potential for recurrence. Therefore the treatment of GCT should focus on minimizing the recurrences. The following treatment options are either intralesional curettage with adjuncts like cryotherapy, phenol, burring, bone grafting, PMMA cement or wide resection with or without stabilization or reconstruction of ulnar stump.

Simple curettage has high recurrence rate as compare to curettage with adjuvant therapy (Campanacci *et al.*, 1987; Sung *et al.*, 1982). Nevertheless, it seems more likely that adequate removal of tumour rather than specific adjuncts has more bearing on the recurrence rate (Wurapa and Whipple, 2003). Wide resection of the distal ulna is oncologically advantageous treatment. The primary goal of excision of tumour to decrease recurrence takes precedence over the restoration of function (McGrath, 1972). The distal ulna has been traditionally considered as dispensable and resection of distal ulna for degenerative condition was first described by Darrach and subsequently modified by Dingman (1952). Some studies have focused on wide resection of distal ulna for treatment of GCT. Cooney *et al.*, (1997) in a study of 8 patients with various neoplasms of distal ulna managed by en block resection alone, achieved excellent results in 75 percent of cases. They concluded that reconstruction of osseous defect is not routinely necessary. It adds unnecessary risk and morbidity without demonstrable functional gain.

Wolfe *et al.*, (1998) in a multicenter study reported on 12 cases who underwent wide excision of distal ulna without reconstruction for various conditions. They recommend wide excision of the distal ulna without reconstruction or stabilization as a procedure of choice for distal ulnar neoplasm. Harness and Mankin (2004) reported 3 patients with GCT of distal ulna (one primary and two cases with recurrence) treated by wide resection. All the patients had a few complaints aside from some minor instability. However, functionally distal end of the ulna aids in rotation of the forearm, in grip strength as well as maintaining the relationship between the carpus and the distal end of radius (Noble and Arafa, 1983).

Many authors have documented failures after wide resection of distal ulna. This may be attributable to the fact that the ulnar stump has a tendency to displace in a dorsal angulation and also tends to converge towards the radius. This instability can therefore be a cause of persistent pain, weakness of hand grip and limitations of forearm rotation (Bieber *et al.*, 1988). To overcome this problem, many authors have attempted stabilization or reconstruction of ulnar stump. Gainor (1995) reported excellent results in two patients of GCT treated by lasso tenodesis of ulnar stump using tendon graft from palmaris longus.

Ferracini *et al.*, (1988) reported on 8 patients with tumours of distal ulna including 5 patients with GCT. They performed stabilization of ulnar stump in seven cases using flexor carpi ulnaris (FCU), fascia lata or

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an autograft. All seven patients had an excellent functional outcome. They concluded that soft tissue stabilization of ulna should be performed whenever possible.

Goldner and Hayes in 1979, described extensor carpi ulnaris (ECU) tenodesis after distal ulna resection in 225 patients for various conditions. However the application of this technique for GCT of distal ulna was first described by Kayias *et al.*, (2006). The patient had an excellent oncological and functional outcome. We have used this technique in our case with similar outcome.

Wurapa and Whipple (2003) reported two stage allograft reconstruction of DRUJ in a patient with GCT treated with en block resection. At 40 months follow up patient had good wrist function. More recently prosthetic replacement of distal radioulnar joint has been described. Roidis *et al.*, (2007) have described distal radioulnar implant arthroplasty. Patient had a good oncological and functional outcome. Isidire *et al.*, (2011) have reported successful treatment with en block resection and reconstruction using distal radioulnar prosthetic joint. They concluded that distal radioulnar prosthetic joint can be a valid option for this difficult problem.

Conclusion

A literature review of GCT of distal ulna favors wide resection of ulna to minimize the recurrences. However there is no consensus as to whether stabilization or reconstruction is required or not and what is the optimal method of stabilization or reconstruction.

However most of the authors would agree that stabilization of ulnar stump leads to improvement in functional outcome. We have got excellent oncological and functional outcome after wide resection of distal ulna and soft tissue stabilization using one half of the ECU tendon as described by Goldner and Hayes.

REFERENCES

- Bieber EJ, Linscheid RL, Dobyns JH and Beckenbaugh RD (1988).** Failed distal ulna resections. *Journal of Hand Surgery American Volume* **13** 193-200.
- Blackley HR, Wunder JS, Davis AM, White LM, Kandel R and Bell RS (1997).** Treatment of giant-cell tumors of long bones with curettage and bone-grafting. *The Journal of Bone and Joint Surgery* **78-A** 811-820.
- Campanacci M, Baldini N, Boriani S and Sudanese A (1987).** Giant-cell tumor of bone. *The Journal of Bone and Joint Surgery American Volume* **69** 106-114.
- Cooney WP, Damson TA, Sim FH and Linscheid RL (1997).** En bloc resection of tumors of the distal ulna. *The Journal of Bone and Joint Surgery* **79-A** 406-412.
- Dingman PV (1952).** Resection of the distal end of the ulna (Darrach operation); an end result study of twenty four cases. *The Journal of Bone and Joint Surgery American Volume* **34A** 893-900.
- Ferracini R, Masterson EL, Bell RS and Wunder JS (1988).** Distal ulnar tumours. Results of management by en bloc resection in nine patients and review of the literature. *Journal of Hand Surgery* **23-B** 517-521.
- Gainor BJ (1995).** Lasso stabilization of the distal ulna after tumour resection: A report of two cases. *Journal of Hand Surgery* **20-A** 324-326.
- Goldenberg RR, Campbell CJ and Bonfiglio M (1970).** Giant-cell tumor of bone. An analysis of two hundred and eighteen cases. *The Journal of Bone and Joint Surgery* **52-A** 619-664.
- Goldner JL and Hayes MG (1979).** Stabilization of the remaining ulna using one-half of the extensor carpi ulnaris tendon after resection of the distal ulna. *Orthopaedic Transactions* **3** 330-331.
- Harness NG and Mankin HJ (2004).** Giant cell tumour of the distal forearm. *Journal of Hand Surgery* **20-A** 188-193.
- Isidre Gracia, Ignacio RP and Laura Trullols et al., (2011).** Distal radioulnar joint prosthesis for the treatment of giant cell tumour of the distal ulna: a case report and literature review. *Strategies in Trauma and Limb Reconstruction* **6(2)** 103-106.
- Kayias EH, Drosos GI and Anagnostopoulou GA (2006).** Resection of the distal ulna for tumours and stabilisation of the stump. A case report and literature review. *Acta Orthopaedica Belgica* **72** 484-491.

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- Malawer MM, Henshaw RM and Shmookler BM (1997).** Principles of Orthopaedic Oncology. In: *Principles of Orthopaedic Practice*, 2nd edition, edited by Dee R, Hurst LC, Gruber MA, Kottmeier SA (McGraw-Hill, New York) 225-316.
- McDonald DJ, Sim FH, McLeod RA and Dahlin DC (1986).** Giantcell tumor of bone. *The Journal of Bone and Joint Surgery* **68-A** 235- 242
- McGrath PJ (1972).** Giant-cell tumor of bone. An analysis of fifty-two cases. *The Journal of Bone and Joint Surgery* **54-B** 216-229.
- Noble J and Arafa M (1983).** Stabilization of distal ulna after excessive Darrachs' procedure. *Hand* **15** 70-72.
- Roidis NT, Gougoulas NE, Liakou PD and Malizos KN (2007).** Distal ulnar implant arthroplasty as a definitive treatment of a recurrent giant-cell tumor. *Journal of Hand Surgery American Volume* **32** 1262-6
- Sung HW, Kuo DP, Shu WP, Chai YB, Liu CC and Li SM (1982).** Giant-cell tumor of bone : analysis of two hundred and eight cases in Chinese patients. *The Journal of Bone and Joint Surgery* **57-A** 167-173.
- Sung HW, Kuo DP, Shu WP, Chai YB, Liu CC and Li SM (1982).** Giant-cell tumor of bone: analysis of two hundred and eight cases in Chinese patients. *The Journal of Bone and Joint Surgery American Volume* **64** 755-761.
- Wolfe SW, New Haven CT and Mih AD (1998).** Wide excision of the distal ulna : A multicenter case study. *Journal of Hand Surgery* **23-A** 222-228.
- Wurapa RK and Whipple R (2003).** Distal radioulnar allograft reconstruction after giant cell tumor resection. *The American Journal of Orthopedics* **32** 397-400.