Local Resection of Giant Cell tumor of Distal Radius and Reconstruction by Fibular Autograft

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Abstract

Background: Giant cell tumour of the bone (GCT) is a benign but locally aggressive neoplasm accounting for 4% to 9.5% of all bone tumours. In our setup patients present at a late stage, so treatment has to be tailored on an individual basis weighing risk of recurrence versus function.

Objective: To explore the union rate and restoration of range of movement after resection of giant cell tumour of distal radius and reconstruction by proximal fibular auto graft.

Subjects & Methods: After informed consent, using purposive non-probability sampling, eight patients of either sex with age ranging from 16 to 40 years with histologically proved giant cell tumour of distal radius were included. All the tumours were well contained within an intact cortex. All the patients underwent wide local excision of tumour and reconstruction with ipsilateral proximal fibular autograft.

Results: Eight patients were included in the study, mean age of the patient was 18.3 ± 7.5 years; seven patients (87.5%) achieved union during post-operative period of six months. Satisfactory range of movement was achieved however flexion and adduction was restricted as compared to extension and abduction.

Conclusion: It is concluded that wide resection and reconstruction by proximal fibular autograft for giant cell tumour of the distal radius is an acceptable procedure

Keywords: Bone graft, Giant cell tumour, Wide resection, Autograft

Introduction

Giant cell tumour of the bone (GCT) is a benign but locally aggressive neoplasm[1] accounting for 4% to 9.5% of all bone tumors.[2]Giant cell tumor occurs mainly in the proximal tibia, humerus, distal radius and the pelvis[2]. Giant cell tumors mainly occur in 20- to 40-year olds.[3] Three types of GCT can be distinguished radiographically according to the Cappanacci grading classification.

Grade I tumor is a well-defined with radio-opaque rim, Grade II is a tumor with well-defined margins with expanded but intact cortex and no radio-opaque rim and Grade III is a tumor with ill-defined margins with soft tissue extension. Standard treatment ranges from surgical curettage to wide local resection.[5] The mainstay of treatment is total removal in the form of curettage. The recurrence rate is high (12-50%) no matter what the treatment during the first 2-3 years, regardless of pre-operative tumor stage. 5-7% cases of giant cell tumor may produce malignant recurrences, usually after five years after surgery.[4] Neither age nor gender can predict the recurrence or metastases.[6]For giant cell tumour of the upper limb or for young patients, biological reconstruction should be considered. [5]

Current study aims to determine the union rate and restoration of range of movement after resection of giant cell tumour of distal radius and reconstruction by proximal fibular auto graft.

Subjects and Method

In a descriptive case series, carried out at Orthopaedics unit-1, Jinnah Hospital Lahore from 1st July 2013 to 5th January 2014, eight patients of either sex with age ranging from 16 to 40 years with histologically proved giant cell tumour of distal radius were included. All the tumours were well contained within an intact cortex (campanacci 1). Immuno-compromised patients and those with history of recurrence were excluded. All the patients underwent wide local excision of tumour and reconstruction with ipsilateral proximal fibular autograft**.** Host graft junction was fixed with dynamic compression plate (DCP) in all cases while fixation of the head of the fibula with carpal bones and distal end of the ulna was achieved through K-wires. Primary cancellous tibial grafting at graft host junction was done in all cases. Same consultant carried out all of the surgeries. Outcome variable was radiological union and range of motion as compared with healthy joint after six months. All patients underwent rehabilitation by physiotherapy. Data was analysed for descriptive statistics with frequencies and percentage for gender and union while mean and standard deviation for age and

difference in range of motion in operated and healthy wrist in all four directions i.e. flexion, extension, adduction and abduction.

Results

Eight patients were included in study; mean age was 18.3 ± 7.5 years ranging from 16 to 39 years. Three of the included persons (37.5%) were male while rest were female (62.5%). Seven patients (87.5%) achieved union while one patient got infection during post-operative period (within two weeks). Bone union was assessed in four cortices by anterioposterior and lateral view digital X-rays. Satisfactory range of movement was achieved in all patients, however flexion and adduction were restricted more as compared to extension and abduction (Table I).

Table 1: Difference in Range of Motion (in degrees) between operated and healthy wrist

	Minimum	Maximum	Mean	Std. Deviation
Adduction	11	25	17.43	4.791
Abduction	8	15	11.43	2.699
Extension	15	30	22.14	4.880
Flexion	20	45	33.57	8.997

Table 2: To see the union post operatively

Total number of patients	Union achieved	Non union
8	7	1

Discussion

Giant cell tumour varies in its presentation and aggressiveness. But recurrence is commonly reported. [8-12] Different procedures have so far been described for tumor excision but retention of function and range of motion is scarcely discussed in Pakistani context. Functionality is compromised because of risk of recurrence. The problem of selecting proper treatment is complicated by the failure of its histologic appearance to indicate its biologic behavior of the tumor. Despite controversies it is generally agreed that for a giant cell tumour of the distal end of radius, the extent of the surgical procedure and subsequent functional deficit must be weighed against the chance of recurrence. There are studies, which show that giant cell tumours in the lower end of the radius are thought to be more aggressive with its secondary's to lungs.[13]

Non-vascularised fibular auto graft was first used in 1945 for congenital absence of radius. Later on various authors used the auto graft for tumours of the distal end radius. This reconstruction technique has yielded good functional results for giant cell tumour of the distal end of the radius in various series. Non-vascularised proximal fibular graft is reasonably congruous with distal radius. Its incorporation as an auto graft is rapid and predictable. Moreover, it is easily harvestable without marked donor site morbidity. The postoperative wrist function is clinically acceptable.

Current study aimed to find out short-term benefits of wide excision of local tumor and reconstruction with ipsilateral proximal fibular auto graft. As reported previously in our series it is found to be more prevalent in females. It is also seen as a disease of younger age group as evidenced by the mean age of the patients.

Different side effects reported by Sheth et al[13] include carpal collapse, nerve injury and skin necrosis. Hardware failure and nonunion were also cited as possible complications of the wide resection and reconstruction group although not seen in our study.[13] These results further emphasise the importance of selecting the proper procedure on initial presentation. Patients undergoing intralesional curettage should be educated regarding the risk for local recurrence.[4-6] Clinicians must approach this tumor entity on an individual basis and recognize that it is reasonable to perform intralesional curettage only when the benefit in terms of functional outcomes outweighs the risk of recur-

rence and morbidity associated with a second surgical procedure.[7-9]

Wide excision in the form of extended curettage followed by good filling up of a cavity with cancellous bone grafts seems to be justified here as the results have shown. Limitation of this study includes shorter follow up period and small sample size. The insight provided by this case series may help build a better solution for giant cell tumor.

Conclusion

It is concluded that wide resection and reconstruction by proximal fibular autograft for giant cell tumour of the distal radius is an acceptable procedure, which may enhance the functionality at end of procedure.

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