DOI: 10.14260/jemds/2015/1335

ORIGINAL ARTICLE

EVALUATION OF RESULTS OF WIDE RESECTION AND RECONSTRUCTION USING NON-VASCULARISED IPSILATERAL PROXIMAL FIBULA FOR GIANT CELL TUMOR OF LOWER END OF RADIUS

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HOW TO CITE THIS ARTICLE:
Sujai S, Jayakrishnan S, Abhijeet Jayaswal, M. K. Siddalingaswamy, Venugopal N. "Evaluation of Results of Wide Resection and Reconstruction Using Non-Vascularised Ipsilateral Proximal Fibula for Giant Cell Tumor of Lower End of Radius". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 53, July 02; Page: 9186-9190, DOI: 10.14260/jemds/2015/1335

ABSTRACT: BACKGROUND: Giant cell tumour of bone can occur at lower end of Radius and it is the third common site. The tumour has to be treated properly to prevent recurrence. Various methods of treatment are available and resection and reconstruction using ipsilateral upper end of fibula is one of the methods available. **METHODS:** The patients who had GCT lower end of Radius and attended the hospital for treatment were taken in this retrospective study. The tumour was evaluated clinically and with X-ray and MRI. The tumour was confirmed by FNAC or biopsy. The tumour was resected and reconstruction of the Radius was done using non-vascularised ipsilateral fibula. **RESULTS:** There were ten patients in this study, six males and four females with age varying from 25 to 41 years and follow up period varied from 36 to 60 months. The results were assessed by musculoskeletal tumour society score. Average grip strength was 65% of normal and over all functional range combined movements was 155 degrees which is comparable to published reports. The result was good in eight patients and in two cases there was mild subluxation of wrist joint which was graded as fair.. There was no recurrence of tumour. **CONCLUSIONS:** GCT of lower end of Radius treated with resection and reconstruction using nonvacularised ipsilateral fibula gives good result cosmetically and functionally.
KEYWORDS: Giant cell tumour, Radius, Resection, Reconstruction, Fibula.

INTRODUCTION: Giant cell tumour of bone was first described by Cooper in 1818. It is an aggressive benign tumour with potential to become malignant.(1) Lower end of Radius is the third commonest site of occurrence.(1,2) If it is diagnosed very early extended curettage and bone grafting gives god result but recurrence can occur.(2,3,4,5,6,7)

If there is extension of tumour and there is break in the cortex resection of tumour and reconstruction is the treatment of choice to prevent recurrence. Reconstruction can be done vascularised or non-vascularised ipsilateral proximal fibula, custom made prosthesis, bone graft with arthrodesis of wrist.(8,6,9,10,11,12,7,13,14,15) Vascularised fibular graft needs expertise and fail sometimes but non-vascularised fibular graft is simple, less expensive and has good results.

MATERIALS AND METHODS: Ten patients underwent resection and reconstruction of distal end of Radius for Giant cell tumour of bone from 2003 to 2014. There were six males and four females. The age of the patients varied from 25 to 41 years with an average of 33 years. The tumour was assessed radiologically by X- rays and MRI. According to companacci grading(4) four were of grade two and six were grade three. MRI was done to know the extent of tumour and soft tissue involvement. The tumour was confirmed by FNAC in six cases and by biopsy in four cases.

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PROCEDURE: The tumour was approached by volar incision along the radial side. The incision was extended dorsally depending on the size of the tumour. After exposing the tumour taking care of vessels and tendons the tumour was resected enblock with a cuff of soft tissue saving the carpal ligaments. The Radius was resected 5cm above the tumour margin. Biopsy was taken from the distal cut end of Radius to make sure that there is no tumour tissue. The proximal end of fibula was exposed taking care of lateral popliteal nerve. The length of the excised Radius was measured and the length of the fibula taken out is equal to length of radius plus 2 cm. A step cut of 2 cm is cut in the Radius and the fibular graft.

The fibula was fixed to the radius with a narrow DCP. The carpal ligaments were attached to head of radius as much as possible. To stabilize the graft a K wire was passed from 3rd metacarpal to the head of fibula. The inferior fibular joint created is fixed with K wire passed from head of ulna to the head of fibula transversly. The anastomotic site of radius and fibula was grafted with the leftover bone graft.

Postoperatively above elbow slab was given for two weeks and after suture removal above elbow cast was applied. After three months X-ray was taken to see the union of the fibula with radius. If there is delay in union the cast was continued for another six weeks.

Once the fibula unites with radius, active and passive exercises of the wrist were started. The hand and wrist was assessed for pain, stability, functional status every three months for one year later half yearly. Grip strength, pinch strength and range of motion were measured. The results were assessed musculoskeletal tumour score.

RESULTS: The follow up period varied from 36 to 60 months with an average of 43 months. The union of bone occurred by 16 weeks in eight patients, one was delayed union which united by six months. There was one nonunion which united after autogenous iliac graft. The results were assessed by musculoskeletal tumor score.[16] The grip strength was 65% of normal side and overall functional range of combined movements was 155 degrees which is comparable to published results. The result was good in eight patients. In two there was mild pain at fibula carpal junction and disabling to carryout manual work. There was no recurrence in our series.

COMPLICATIONS: There was one delayed union and one nonunion which united after grafting. There was mild subluxation at wrist in two cases and did not need any further surgery like arthrodesis. The patients could manage their routine day to day activities.

DISCUSSION: Lower end of Radius is the third common site for giant cell tumour of bone.[1,2] Many a times the patient seeks medical advice after a prolonged time. By the time patient seeks advice the tumour has expanded and cortex broken extending in to the soft tissues. In these cases enblock resection is done including a cuff of soft tissue to prevent recurrence of the tumour.[9,11,13,15] The large defect in the Radius has to be filed and normal wrist joint has to be restored. Ipsilateral proximal end of fibula is an ideal graft for reconstruction as it resembles lower end of Radius. One can use vascularised fibula, non vascularised fibula, custom made prosthesis or osteoarticular allograft.[8,6,9,10,11,12,7,13,14,17,15,18]

The recurrence rate has been reported to be 0% or 5 to 25%.[5,13,19] In our study there was no recurrence. In some series subluxation of wrist has been reported.[9,13,20]

In our study there was mild subluxation in two cases. There was one nonunion at the site of fibula and radius which united after grafting.[20]

CONCLUSION: Non-vascularised fibular grafting after adequate resection of giant cell tumour of distal end radius achieved good cosmetic and functional outcome even though there is substantial loss of movement of the wrist. The results are acceptable to the patient. Therefore non-vascularised fibular graft for giant cell tumour of distal end of radius after resection of tumour may be considered as an effective and appropriate procedure.

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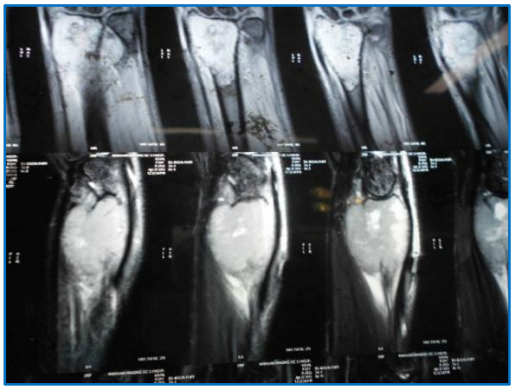
ILLUSTRATIONS:

Giat cell tumour of lower end of radius



MRI showing extent of the tumour

Fibular graft in situ after excision of the tumour

Post-operative X-ray showing fibular graft fixed with plate and K wires

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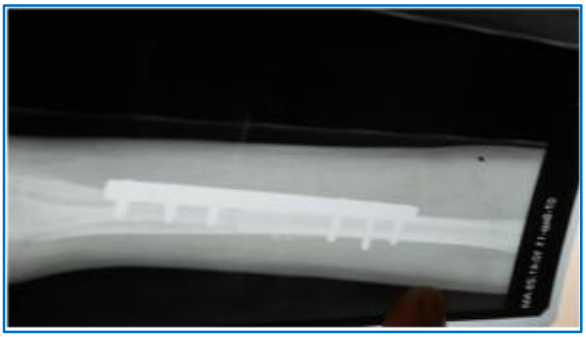
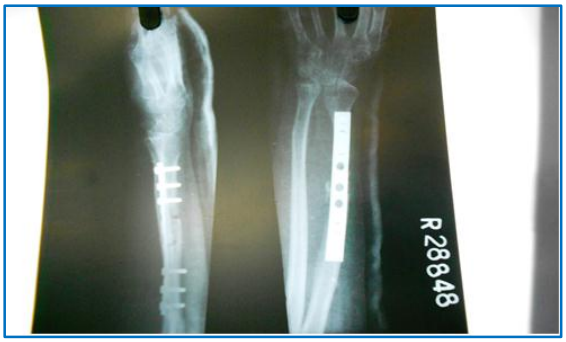


X-ray showing union of fibular graft with radius



X-ray showing delayed union of fibular graft

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FINANCIAL OR OTHER COMPETING INTERESTS: None

Date of Submission: 12/06/2015.
Date of Peer Review: 13/06/2015.
Date of Acceptance: 26/06/2015.
Date of Publishing: 30/06/2015.