

## Non-Vascularized Fibular Bone Graft for Giant Cell Tumor of the Distal Ulna: A Case Report

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**Abstract:** Cases of bone giant cell tumors (GCT) are rarely found, generally benign and locally aggressive tumors. Surgical resection is the universal standard for treatment of bone GCT. Non vascularized fibular graft (NVFG) is useful in the reconstruction of skeletal defects, especially in cases of scarred and avascular recipient sites and patient with tumor surrounded by poor tissue condition. We report a 53-year-old woman, with a lump in her left hand for three years. X-ray examination revealed a mass with firm border and regular edge that reached the epiphysis expansively with thinning of the cortex in the distal region of the left ulna. Tumor excision was performed with open reduction internal fixation (ORIF) and fibular bone graft. To date, GCT is one of the most obscure and intensively examined bone tumors, and its histological images do not predict the clinical outcome. Moreover, many unanswered questions regard to the treatment and prognosis without any consensus regarding the ideal treatment selection. NVFG osteosynthesis shows encouraging results, and adequate therapy, wound care and patient compliance affect the patient's outcome. In conclusion, NVFG and internal fixation are effective options for post tumor excision, and osteosynthesis has encouraging result.

**Keywords:** non vascularized fibular graft; giant cell tumor; bone graft; ulna

## INTRODUCTION

Cases of bone giant cell tumor (GCT) are quite rare or rarely found, generally benign and locally aggressive tumors. Bone GCT is more commonly found in adults, especially those over 65 years old.<sup>1</sup> Non-vascularized fibular bone graft (NVFG) transfer is a simpler, less expensive and a shorter procedure than the use of vascularized grafts and allows remodelling of the fibula at the donor site. It is a biological reconstruction with good long-term results, and a relatively low donor site complication rate of 16%.<sup>2</sup> Some studies showed that a peculiarity of non-vascularized fibular harvest is that the donor site regenerates new bone provided periosteum is preserved.<sup>3</sup> We report a case of a distal ulna GCT diagnosed in a 53-year-old-female treated with tumor excision, open reduction internal fixation (ORIF), and NVFG.

## CASE REPORT

53-year-old woman, came to the hospital with a complaint of a lump in her left hand. The lump was thought to have been as early as three years ago. Anamnesis revealed that at first the lump was marble-size and then enlarged slowly. The patient had never visited a doctor before. Vital signs were within normal limits. There was a lump in the left antebrachial region 8x9 cm in size (Fig. 1), firmly bordered with a hard consistency, damp, and absence of tenderness. No abnormalities were found in the examination of sensoric and motoric status. X-ray examination of the left forearm (anteroposterior and lateral positions) showed a mass, with firm border and regular edge that reached the epiphysis expansively with thinning of the cortex in the distal region of the left ulna. The effect obtained was a giant cell tumor in the distal region of the left ulna (Fig. 2).

In this patients, tumor excision, ORIF, and fibular bone graft were performed. Fixation was carried out using a plate of six holes, six screws, and one screw from the distal graft to the radius (Fig. 3, 4). Evacuation of the tumor revealed a dense mass with a size of 10x8x10 cm, soft edge border, with yellowish-white tissue (Fig. 5).

## DISCUSSION

Giant-cell tumors have a long history in orthopedic oncology. Jaffe et al defined the nature of the entity in 1940 and described its radiographic appearance, anatomic distribution of the lesions, histology, and variable and sometimes aggressive behavior.<sup>4</sup> The GCT is still one of the most obscure and intensively examined bone tumors. Its histogenesis is still uncertain, however, its histological feature does not predict the clinical outcome, and there are still many unanswered questions with regard to its treatment and prognosis.<sup>5</sup>



**Figure 1.** A 53-year-old female with a lump measuring 8x9 cm on the left antebrachial region



**Figure 2.** X-Ray photo of left forearm lateral aspect with the effect of giant cell tumors on the distal region of left ulna



**Figure 3.** Intraoperation images



**Figure 4.** Post operation image



**Figure 5.** Tumor mass sized 10x8x10 cm

There is no widely consensus regarding the selection of ideal treatment method. There are advocates of varying surgical techniques ranging from intra-lesional curettage to wide resection. The goals of treatment are eradication of the tumor, preservation of limb function, and prevention of local recurrence and distant metastasis. Several adjuvant methods beyond simple curettage have been reported in the orthopaedic literature during the last decade to facilitate better local control and prevent recurrences.<sup>6</sup>

Surgical resection is the universal standard of care for treatment of GCT of bone. As most giant cell tumors are benign and located near a joint in young adults, several authors favor an intralesional approach that preserves anatomy of bone in lieu of resection, just as what we performed to the patient.<sup>7</sup> There are numbers of recent reports of the successful use of vascularized fibular grafts, and non-vascularized grafts are now commonly used.<sup>8,9</sup> The clinical results of non-vascularized fibular grafts after tumor resection confirm these experimental findings.

Enneking et al<sup>4</sup> found primary union in 63% of the long bone reconstructions within the first 12 months and Yadav<sup>10</sup> reported a union after 8 to 10 months in 60%. On this patient we found the same clinical progression with union of bone. The NVFG are useful in the reconstruction of skeletal defects, especially in cases of scarred and avascular recipient sites and in patient with tumor surrounded by poor tissues condition.<sup>11</sup> NVFG osteosynthesis has encouraging results in such instances. It is technically less demanding, simple, and can be performed in almost all centers where image intensifier is available.<sup>10,12,13</sup> After all recent advances in the understanding of pathogenesis are essential to develop new treatments for this locally destructive primary bone tumor.

## CONCLUSION

Adequate therapy, wound care, and patient compliance affect patient outcome. In addition, NVFG and internal fixation are effective and important options for post tumor excision since osteosynthesis has encouraging results in such instances. It is technically less demanding, simple, and can be performed in almost all centers where image intensifier is available.

## Conflict of Interest

The authors affirm no conflict of interest in this study.

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