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Case report

LIMB SALVAGE IN RECURRENT GIANT CELL TUMOUR PROXIMAL END RADIUS

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ABSTRACT

An 18years old male patient had undergone surgery for a giant cell tumour upper end of the right radius in Jan 2007. The tumour recurred within two months. Patient took alternative methods of treatment including indigenous medicines for the condition; all these failed and the patient was advised an above elbow amputation. By Sep 2008 the tumour had grown to a 14"x11"x11" swelling in the forearm extending to the distal arm with neurovascular involvement. A total resection of the tumour was done; vascular continuity of the brachial to the ulnar artery was done with a vein graft to salvage the limb. In 2012 tendon transfer was done to restore function to the wrist. Now there is no recurrence of the tumour and the patient has a fully functional limb.

Keywords: Giant cell tumour; proximal end radius; recurrent; salvage of limb; functional limb

INTRODUCTION

Giant cell tumours represent 5% of all bone neoplasm's.^{1,2} A benign but locally aggressive tumour it typically occurs in patients between 30 to 40 years, with a female predominance. 75% to 90% of all tumours are found in the long tubular bones especially the distal femur (30%), proximal tibia (25%), distal radius (10%) and the humerus (6%). The spine in 7% and the inominate bone in 4% cases are other common sites.³

The upper end of the radius is very rarely involved and in literature there are just about a dozen cases reported.^{4,5}

This case report is not only a giant cell tumour in the upper end of the radius, but one which has occurred in a young adolescent male. The tumour was surgically removed after a local recurrence;

vascular continuity of the brachial artery to the ulnar artery with a vein graft restored viability to the limb. Tendon transfers have given a good functional recovery. There is no recurrence after five years of follow up.

The case is unusual in the rarity of the lesion; a recurrence which occurred within months of the original resection; and the fact that the limb could not only be saved but also made fully functional; there is no evidence of recurrence five years post surgery.

CASE HISTORY

An 18y old male patient had reported to a surgeon with a painful swelling upper end of the right forearm in Jan 2007. He was diagnosed as a case of a Giant Cell Tumour and resection of the

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upper end of the radius was done in Feb 2007. The patient however noticed a recurrence of swelling at the same site in the forearm within two months of the surgery. For reasons unexplained he did not go in for a redo surgery, but took a series of treatment of indigenous medicine including Ayurveda, Homeopathy etc. After all these failed he was advised an above elbow amputation of the limb.

By Sep 2008 the tumour had grown to a 14"x11"x11" painful lobulated swelling at the site of the previous surgical scar. (Fig 1, 2).



Fig 1: Recurrent giant cell tumour upper end radius



Fig 2 : Lobulated swelling with the scar of previous surgery

The tumour had extended into the distal arm. The skin over the swelling was warm, adherent to the growth over the scar. There were dilated veins over the swelling. There was evidence of radial palsy and the distal radial pulsation was not palpable. An MRI scan revealed a soft tissue recurrence of the GCT encompassing the radio-ulnar neurovascular bundle, the brachial artery and the muscles in the proximal forearm.

In view of the young age of the patient and the limb being a dominant one, a calculated risk was

taken to salvage the limb by an enbloc resection and necessary reconstruction.

The patient and relatives were however explained about the real possibility of having to do an above elbow amputation and a pre-operative consent for the same was taken.

The patient was operated on 6 Sep 2008. During surgery an enbloc removal of the recurrence along with the tissues enveloped by the tumour along with the scar over the tumour was done.

The resection included the encompassed radial, ulnar and brachial arteries, the radial nerve, and involved muscles with a 2 inch segment of the radius and the previous scar. (Fig 3,4).

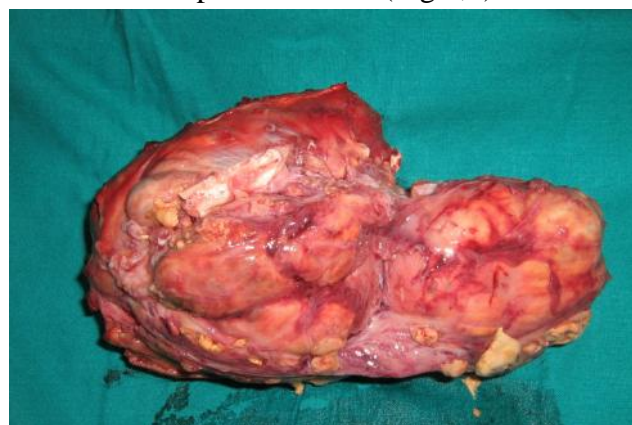


Fig 3: Resected tumour with 2 inches of radius



Fig 4: Bridging of brachial artery to ulnar artery with a vein graft

Further specimens were taken from deeper tissues including the joint capsule, forearm soft tissue, from over the ulna and bone marrow from the distal radius.

Vascular reconstruction was done by bridging the brachial and ulnar arteries with a vein graft. (Fig 4).



Fig 5: Well healed transposition flap over vessel repair

The repaired vessels and exposed joint capsule were covered with a local transposition flap. Other raw areas were split skin grafted. All these healed well. (Fig 5)

The histopathology report confirmed soft tissue recurrence of the giant cell tumour with all margins including the bone marrow, and deeper soft tissues free of tumour.

The patient did well and despite a wrist drop with the help of a radial palsy splint could carry out all his normal functions of life.

In August 2011 a tendon transfer to correct the wrist drop was done. As most of the major flexor and extensor tendons of the forearm had been removed at the time of the tumour resection, only the Flexor Carpi Ulnaris could be spared. (Fig 6).



Fig 6: FCU being tunneled for transfer

The tendon was split into two and used to power both the Extensor. Digitorum Communis and the Extensor Pollicis Longus.

The patient has good wrist and thumb extension following the tendon transfer and is able to carry out all functions with the hand. (Fig 7)



Fig 7: Return of function in the hand with a good grip and extension of the thumb, fingers and wrist

A follow up done five years after the recurrence and resection have shown no evidence of local recurrence. There are no pulmonary metastases.

DISCUSSION

Though giant cell tumours represent 5% of bone neoplasms (as reported in a study from the Mayo clinic)^{1,2}, the proximal end of the radius is an extremely uncommon site of the lesion, Lewis et al having reported only seven cases in their extensive study.⁴⁻⁷ The lesion mainly affects patients between the third and fourth decades of life (60% to 70% of cases) with the frequency being more in women than men.¹⁻⁶ The lesion in the order of predominance affects the distal femur (30%) the proximal tibia (25%) and the distal radius (10%). Other sites affected are the humerus (6%), the spine (7%) and the inominate bone (4%). The proximal radius is affected in only about 0.5% cases.³⁻⁶

Treatment ranges from simple curettage for Stage 1 lesions to resection and reconstruction for Stage 3 lesions. The recurrence rate after simple curettage however ranges from 10% to 50%.^{1-3,7,10,11} With adjuvant therapy like radiotherapy, cryosurgery, argon therapy the recurrence rate can be brought down. However nearly one third of the long term survivors of bone tumours require an amputation.⁶⁻¹¹

Limb saving surgery after an extensive soft tissue recurrence has not been reported in literature, the mainstay of treatment recommended being in these cases being an amputation, as the risk of

recurrence after resection and reconstruction is considered very high.^{1-3,5-11.}

CONCLUSION

The aim of publishing this case report is the rarity of the case itself, as a giant cell tumour of the proximal end of the radius has been reported in literature less than a dozen times with successful treatment of a recurrent lesion never so. In this case the lesion has affected an adolescent male; and despite the recurrence of the tumour within two months of the first surgery, and the advice of three surgeons to go in for an amputation, salvage and reconstruction of an apparently hopeless limb was possible as the resection was complete; requisite reconstruction restored vascularity to the limb. A suitable tendon transfer restored effective function.

The message is that with advances in imaging techniques, radiotherapy, and aggressive surgical techniques, salvage of a limb should be the first option.

Key Message: Even an extensive recurrence of a giant cell tumour can be effectively operated upon and with adequate reconstruction not only can the limb be saved, it can be made fully functional.

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