Giant cell tumour of proximal radius – A rare case report

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Abstract

The giant-cell tumour was recognized more than a hundred years ago by Sir Astley Cooper (1818). The most frequently affected segments are sequentially the distal femur, proximal tibia and the distal radius. But involvement of proximal radius is rare. Not more than ten cases in the world literature have been reported so far. We are reporting a case of histologically proven giant cell tumour of proximal radius which was treated operatively by wide resection of tumour and reconstruction of radio-humeral and superior radio-ulnar joint using proximal fibula as autograft with preservation of annular ligament and elbow and superior radio-ulnar joint movements. This form of treatment has not been reported in the literature so far. The case is therefore being reported for its rare site and innovative method of treatment.

Keywords: Giant cell tumour, Proximal radius, Fibular grafting

Introduction and review of literature

Giant cell tumour (GCT) is a lesion of uncertain origin that appears in mature bone, most commonly in the distal femur, proximal tibia, proximal humerus and distal radius but other bones may be affected. Characteristically it extends upto the subarticular bone plate[1,2]. The distal radius epiphysis is affected in 10% of the cases [3]. But involvement of the proximal radius is rare.

In a series from memorial hospital and hospital for ruptured and crippled only one case of proximal radius out of total 124 cases while in Schinz and Uehlinger series only three proximal radius tumours were reported out of total 385 cases of giant cell tumour. Lewis et al (1985) in their extensive literature review, found only seven reported cases of GCT in proximal radius. They successfully treated a giant cell tumour in the proximal radius in a 35-year-old woman with curettage and bank bone graft [4].

Mir et al (2003) also reported a case, proximal radius GST in 35 year male which they treated with wide local excision sacrificing the proximal radio-ulnar joint[5]. Sakayama et al (2006) reconstructed a proximal radius GCT in a 73 year female with intralesional excision and floating radial head prosthesis [6]. Shrivastava et al (2008) reported a GCT occurring in a non-epiphyseal location (radial diaphysis) in a 35 yr female that was treated with wide excision of radius, ulnar centralization & wrist arthrodesis [7]. Singh A P et al (2009) reported one case of GCT of proximal radius Campanacci grade III giant cell tumour in 52 year lady which was managed with above elbow amputation [8]. In yet another report, Song et al (2010) performed en-bloc excision of the proximal radius followed by reconstruction with polyethylene, pins, a screw, and bone cement [9].

The benign nature of the tumour is said to have been pointed out first by Lebert in 1845. Later, Paget, in 1853, described the tumour in great detail emphasizing the fact that it is only locally malignant. Two years later, Virchow suggested that the giant-cell tumour might recur and might even prove malignant [10].

This tumour usually presents a characteristic roentgenographic appearance. It shows a destructive area in the epiphyseal region which involves adjacent metaphyseal bone, but which exhibits little extension to cortical bone of the shaft. Characteristically it extends up to the subarticular bone plate. The area of involvement is irregularly spherical, shows trabeculations due to destruction of the cancellous bone [10].

GCT’s are fleshy, friable reddish-brown lesions with occasional necrotic areas. Sometimes they may present as a cyst like lesion. Histologically, these tumours show a uniform distribution of multinucleated tumour type giant cells against a cellular background of ovoid spindle stromal cells. Osteoid foci may be seen within these lesions (usually with areas of haemorrhage or within a fracture callus), Xanthomatous changes may be seen. Giant cell tumours exhibit unpredictable biological behavior and 10 to 20% have potential for malignant transformation (usually after irradiation of the original tumour). Systemic spread may be seen, usually to the lungs, in approximately 1% to 3% of cases (usually passive vascular transports related to surgical curettage) [10].

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Case report

23 yrs. male patient was admitted with complaints of pain and diffuse swelling around right elbow with loss of supination & pronation movements of forearm for the last five months. There was no history of trauma or any constitutional symptoms. The overlying skin was normal and the neurovascular status of the right upper limb was intact. Flexion and extension of elbow were normal but supination & pronation were grossly restricted. X-Ray of elbow revealed a lytic lesion involving proximal six cms. of radius including shaft of radius from subchondral bone up to two cms below the radial tuberosity with breach in the cortex [Fig. 1(a) and 1(b)]. MRI showed soft tissue infiltration but the elbow joint and the adjacent neurovascular structures were not involved. Routine investigations were normal. Non-contrast tomographic scanning of the chest showed no sign of secondaries to lungs. Fine needle aspiration cytology was suggestive of giant cell tumour. The patient was managed with excision of tumour. Anular ligament was not involved and free therefore it was not sacrificed. Defect was reconstructed with free proximal fibular graft with reconstruction of superior radio-ulnar and radio-humeral joint. Histology of the lesion revealed aggressive giant cell tumour of Campanacci grade two [Fig. 2(a) and 2(b)]. Per-operatively the tumour was found adhered to adjacent soft tissue. After cutting the tendons of biceps brachii near its attachment, wide excision of tumour along with infiltrated soft tissue was done measuring nine cms in length. The annular ligament was seen to be uninvolved and was preserved. Proximal end of fibula was taken as graft and fibular head was shaped like radial head by nibbling and filing. It was passed through the intact annular ligament and was fixed with locked compression plate with the remaining part of radius [Fig. 3(a) and 3(b)]. Biceps brachii tendon was reattached to the fibular graft at the appropriate place. Thus, radio-humeral and superior radio-ulnar joints were reconstructed. Wound was closed in layers and plaster slab applied in mid prone position for three weeks.

Active and passive movements were started after three weeks. Initially only flexion and extension were possible, but after 12 months of follow up patient was having almost full range of flexion and extension and 50-60° of supination and pronation. There was no sign of recurrence till the last follow-up of 2 years 7 months [Fig. 4(a) and 4(b)].

Discussion

Giant cell tumour (GCT) constitutes an aggressive benign bone neoplasm. The radius distal epiphysis is affected in 10% of the cases but involvement of proximal radius is rare[3]. Giant cell tumour in the proximal radius has an incidence of approximately 0.5% of all giant cell tumours of bone[3, 4]. The patient’s age, the location of the lesion, its...
roentgenographic appearance, and the gross and microscopic appearances are crucial to unravel the mystery of an osseous lesion. However, the final diagnosis depends on the tumour’s histological appearance only\[7\]. The treatment of giant cell tumours of the distal radius has been frequently described but because of the rarity no such descriptions are available for the treatment of proximal radius tumours. Whatever is available in the literature is from the case reports.
A variety of treatments have been advocated for giant-cell tumour of bone, including curettage, curettage and bone grafting, cryotherapy of the cavity after curettage, application of phenol after curettage, insertion of methyl methacrylate cement in the cavity after curettage and wide resection followed by allograft, autograft or prosthetic reconstruction, radiotherapy and amputation. Reconstructive options for the lesions around the elbow include endoprosthesis, resection arthroplasty, interposition arthroplasty, allograft reconstruction, allograft-prosthesis composite arthroplasty and arthrodesis \[8\].

**Limb salvage surgery** aims to balance adequate tumorexcision margins and the preservation of all the important structures, to retain maximum post-operative function. However, the choice of surgery is based on the expectations and functional requirements of the individual patient. Peri-operative and long-term morbidity are higher in limb salvage surgery, including the higher likelihood of multiple future surgeries when compared with amputation. Nearly one-third of the long-term survivors of limb salvage surgery for bone tumours require an amputation.\[8\] Amputation in the primary treatment of giant cell tumours is only to be considered when the tumour is aggressive or has extensive local spread.

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