Giant Cell Tumor of the Humeral Pallet Treated with Resection-Arthroplasty: A Case Report and Review of the Literature

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Abstract

Authors report rare location of a giant cell tumor in the humeral pallet of the elbow of an 80-year-old patient. Standard X-ray showed an osteolysis lesion whose geographical contours were invading the whole humeral pallet of the left elbow. Pathological examination established the diagnosis. The treatment consisted of a carcinological resection and a reconstruction by elbow replacement, which showed better results after 13 months of follow-up in terms of pain, function and no recurrence.

Keywords: Giant Cell Tumor; Humeral Pallet; Resection-Arthroplasty

Introduction

Giant cell tumors represent 5 to 10% of the primary bone tumors; they are generally benign; and located in the epiphysio-metaphysial area, their histogenesis is uncertain and their evolution is unpredictable; their behavior is confusing and characterized by recurrence; and their treatment is not unequivocally surgical. We report in this work an exceptional location of this tumor at the humeral pallet, which is worrying by its local aggressiveness; and treated by carcinological resection and reconstruction by arthroplasty of the elbow.

Observation

An 80-year-old patient; male, monitored for type 2 diabetes. Who consults for a painful swelling of the left elbow that appeared spontaneously 8 months ago and evolving by gradually increasing in volume in a context of general state conservation? The examination at the admission finds a tender swelling especially to palpation at the dorsoradial side of the left elbow; without local inflammatory signs or neurovascular complications. The function and mobility of the elbow were limited; X-rays showed a lytic lesion with a geographic pattern of bone destruction that invaded the entire distal end of the humerus (Figure 1); MRI showed a heterogeneous increased T2 signal involving the epiphysis with no extension to soft parts (Figure 2) additional tests to assess the disease extent were carried out and came back negative; especially scintigraphy that did not show other tumor locations; Histopathological examination of a biopsy of the said bone showed a grade 2 giant cell tumor according to Jaffe-Lichtenstein's classification. a wide resection of the tumor was made followed by acrylic cement filling (Figure 3), Later on, the patient benefited from a joint reconstruction by total prosthesis of the elbow (Figure 4) followed by post-operative rehabilitation.
Figure 1: X-rays showing a lytic lesion invading the whole humeral pallet.

Figure 2: MRI of the elbow showing a heterogeneous increased T2 signal involving the epiphysis with no extension to soft parts.

After 13 months, the patient showed no pain; the clinical examination found a 100° arc of mobility with a 110° flexion and a 15° deficit of extension. It also denoted a 70° pronation and an 80° supination (Figure 5); ligament testing finds a stable elbow; the objective assessment of muscular strength in the balance test compared to the healthy side showed a slightly diminished bending strength; moreover, the neurological examination did not find any sensory deficit and x-rays showed no signs of local recurrences.

**Discussion**

Giant cell tumors account for 5 to 10% of primary bone tumors; they are often benign and represent 13 to 15% of benign bone tumors [1]. However, they can sometimes be malignant and represent 2 to 5% of primary malignant bone tumors [2]. They are often seen in the

young adults aged between 20 and 40 years with a slight female predominance. Subject involvement after the age of 50 remains unusual [3], these tumors are usually localized at the distal femur or proximal tibia level; the distal end of the humerus is exceptionally affected and only a few cases have been reported in the literature so far [4]. The most common clinical expression at the upper limb is in the form of painful swelling impacting on joint function and mobility, and the standard radiology aspect of GCTs is quite typical; It is an alytic lesion with a geographic pattern of bone destruction, it has clear, off-centered limits and lies at the epiphyseal bone alone or both the epiphyseal and metaphyseal bone simultaneously. Other non-typical aspects can also be observed. Therefore, in less than 10% of cases, the limits of the tumor will be less clear, of permeative type [5]. CT scan and MRI can be requested despite the highly evocative aspect of standard radiographs. In fact CT scan shows better cortical rupture as well as the extension to the subchondral bone; MRI is interesting to show the extent of damage towards the joint and its related structures; and also to unveil "Skip" metastasis [6], scintigraphy when performed can be used to detect recurrences, and multifocal forms [7], histologically, the diagnosis of a GCT is based on the association and close entanglement of giant cells and mononucleated elements, which represent the «stroma» as reported by Anglo-Saxon authors. The relative proportion of both cellular categories is highly variable, but any territory with only mononucleated elements requires very accurate cytological analysis [8]. The approved histological classification is that of Jaffé-Lichtenstein [9], which was proposed in cooperation with Portis in 1940. Lichtenstein modified this classification by introducing a grade II +, which reflects very marked but yet insufficient focal cytological abnormalities to confirm a sarcoma. Finally, this classification holds a prognosis and therapeutic interest.

The treatment is typically surgical regardless of the stage of discovery of the tumor, the therapeutic methods proposed in giant cell tumors are numerous and varied; conservative treatment (curettage - filling) is often the method of choice for limited tumors without locoregional invasion, but the recurrence rate is high and ranges from 25 to 40% [10], this high recurrence rate therefore implies a particular treatment for GCTs localised to the upper limb, In our case the choice of resection - arthroplasty of the elbow was indicated because of the invasive nature of the tumor and the strong concern for the preservation of the joint. Actually, the joint replacement of the elbow seems an interesting alternative after resection of the tumor allowing early mobilization and a rapid recovery of the autonomy and helps mainly avoid local recurrences since it resolves the carcinological problem for good; as to the functional results after joint replacement of the elbow reported by the few series in the literature, they are reproducible and reliable [11-14]. The use of the total elbow prosthesis as a treatment for complex humerus fractures in the elderly has shown very good results since its introduction. In 2004, Kamineni., et al. [15] published an update to the Mayo Clinic series of 49 patients, averaging 69 years of age. The average hindsight was 7 years, the average elbow mobility was 24° - 131° and the MEPS (Mayo elbow performance Score) of 93 points, representing an excellent result.

Prosthetic loosening is a frequent complication but it can remain asymptomatic and non-evolutionary for a long time. In general, 15% of patients show radiological signs of loosening affecting mainly the ulnar component, 70% of which are not progressing and do not require any revision [16].

So, it seems that the total elbow prosthesis gives better results in terms of pain, mobility, and overall satisfaction in patients over 75 with limited functional demand.

**Conclusion**

Treatment of giant cell tumors is usually surgical but not unequivocal; resection-arthroplasty of the elbow seems to be a good alternative in the treatment of GCT of the distal end of the humerus since it preserves joint mobility better than any other technique especially in the elderly with low functional demand and it also gives good carcinological results.

**Disclosure of Interest**

The authors declare that they have no competing interest.

**Consent**

Patient gives informed consent for publication.

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**Bibliography**

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