



ORIGINAL RESEARCH PAPER

Orthopaedics

GIANT CELL TUMOR- PATHOLOGY & TREATMENT

KEY WORDS: Computerized tomography scan, curettage and bone grafting, wide resection.

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ABSTRACT

BACKGROUND: Curettage and wide resection are accepted methods of treatment of giant cell tumor (GCT) of bone. Present study is an analysis of outcome of 32 cases treated by curettage and bone grafting.

MATERIALS & METHODS: Thirty-two cases of GCT of bone treated by curettage and bone grafting. All cases of Campanucci grade 1, 2 and grade 3 which on computerized tomography scan showed break in the cortex confined to one surface and cortical break less than one third of circumference were treated by curettage and bone grafting.

CONCLUSION: Curettage and bone grafting is a reliable method in the treatment of GCT

INTRODUCTION

Giant cell tumor (GCT) of bone is a benign but locally aggressive tumor that usually involves the ends of long bones. It occurs most frequently in the third decade of life, i.e. after physal plate closure. The lesion consists of multinucleated giant cell mononuclear stromal cells. They represent 20% of all benign bone tumors and 5% of all bone tumors¹. The method of curettage with polymethylmethacrylate (PMMA) cementing, which was first described in 1969² has gained wide acceptance for the treatment of large juxta-articular GCTs. The polymerisation of PMMA produces a local chemical cytotoxic effect³. The best treatment should ensure local control of disease and maintain function. Curettage has been the preferred treatment for most cases of GCT. Many earlier studies had shown vry high (25-50%) local recurrence rates after curettage and bone grafting⁴⁻⁵. The use of modern imaging techniques and extended curettage through the use of power burrs and local adjuvants have improved outcome with reduced recurrence rates (10-20%). Phenol, liquid nitrogen, bone cement hydrogen peroxide, zinc chloride and more recently, argon beam cauterization have been employed as local adjuvants. Chemical or physical agents work by inducing an additional circumferential area of necrosis to "extend the curettage.

MATERIALS, METHODS AND OBSERVATION

Thirty-two patients treated by us constituted the clinical material. Twenty-eight of our cases were around the knee joint. Most of our patients (24 cases) were in the third decade. There were 14 males and 18 females. A part from routine investigations such as Hb%, TLC, DLC, ESR, S. Calcium, S. Alkaline phosphatase, X-ray of the lesion and X-ray chest, all patients were subjected to CT scan. Diagnosis was established by CT-guided core biopsy.

Cases were classified according to Campanacci's grading system Procedure to be selected was decided based on CT scan findings. All cases which on CT scan showed break in the cortex confined to one surface and cortical break less than one third of its circumference were treated by curettage and bone grafting. All cases belonging to Campanacci's Grade 1 and 2 as well as cases belonging to Grade 3 which fulfilled the above criteria were treated by curettage and bone grafting.

Bone graft was used to fill up the resultant cavity in all except four cases where bone cement was used. Present analysis is about these 32 cases underwent curettage and bone grafting.

The lesions in these 32 cases affected, upper tibia (n=16), lower femur (n=12), upper humerus (n=2), lower radius (n=2).

The primary modality of treatment was intralesional curettage and bone grafting. No other adjuvants were used. Inclusion criteria were: Patients with Grade II and III lesions that did not invade the joint who had undergone primary treatment at our institute and a minimum of two years follow up was available, less than 50% of

the cortex was destroyed with any extra osseous mass or destruction of cortex. Plain radiographs, chest X-ray, computed tomography (CT) and/or magnetic resonance imaging (MRI) in more than one plane. Fine needle aspiration cytology (FNAC) and/or Open biopsy, were done in all cases. Thickness of the subchondral bone at adjacent articular surface was measured radiologically¹⁰.

For curettage, the lesion was approached through a site of cortical break. In a lesion of lower femur and upper tibia, if the break in the cortex was in the posterior aspect

Posterior approach, isolating popliteal vessels and tibial nerve was preferred. In our series we went through posterior approach in four cases of lower femur and six cases of upper tibia. In the rest of the cases of lower femur and upper tibia, the approach was anteromedial or anterolateral depending upon the cortical break in the CT scan. After exposure, the site of the cortical break was identified by palpation and a circumferential area of 1 cm x 1 cm beyond the margin of the cortical break is marked using a cautery. With a small osteotome, the cortex is broken and with scissors, the area where there is soft tissue extension is removed as a lid, taking care not to spill the tumor. The cavity after thorough curettage, is washed several times with hydrogen peroxide and saline. The cavity was cauterized with phenol and then tightly filled with bone graft. The cases were followed up at six-week intervals until six months and then at three-month intervals till one year and then at six-month intervals



Figure 1: X-ray (anteroposterior and lateral views) showing GCT of upper end of tibia,

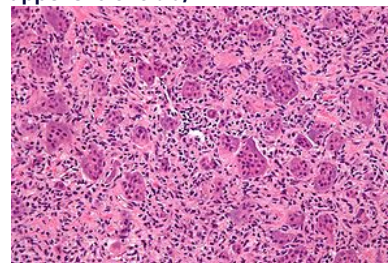


Figure 2: Photograph showing small Gaint cells (H&E stain)

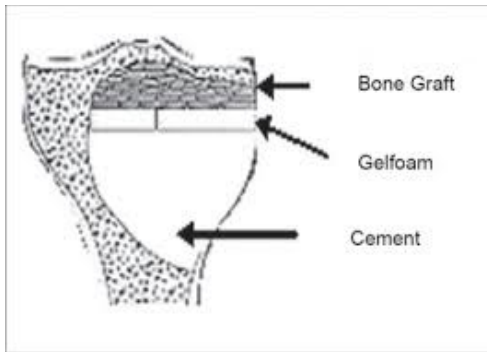


Figure 3: Diagrammatic representation of reconstruction of GCT with minimal subchondral bone

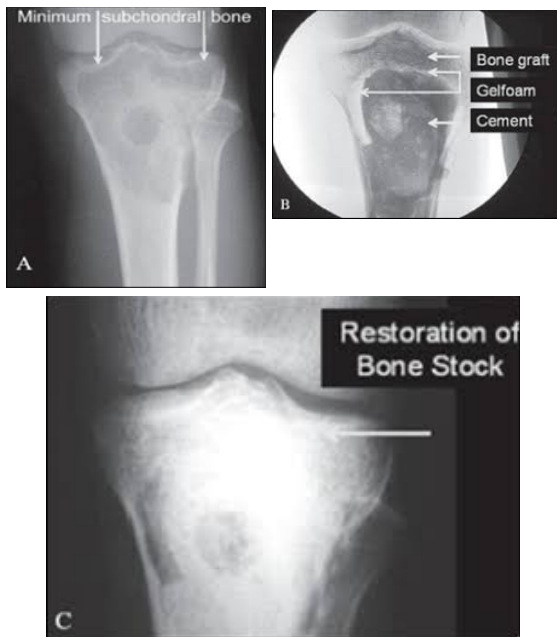


Figure 4: A,B,C: Reconstruction of GCT with minimal subchondral bone

RESULTS

Maximum follow-up was 05 years and minimum two years with a mean follow-up of Three years. In patients treated by curettage and grafting, functional evaluation was done after four months according to Enneking's method that takes into consideration range of movement of the joint, pain, stability, deformity, muscle strength, functional activity and subjective opinion. It was found that all cases showed good functions Of the 32 primary cases treated by curettage and bone grafting, four had recurrence. Of these none of them recurred before one and a half years. Two cases belong to Stage 2 of Campanacci's grading system and two cases belonged to Stage 3. One such recurrent case in the lower femur was treated by Re-Curettage Using Sandwich Technique (Bone Grafting + Gel Foam Layer+ Bone Cement Layer). No Case in the Curettage group had Lung metastasis¹².

DISCUSSION

Curettage and wide resection have been the accepted methods of treatment for GCT of bone.¹⁻⁶ Turcotte considers that many Stage 3 tumors, multiple local recurrences and pathologic fracture when joint anatomy cannot be restored are better treated with wide resections.¹ The definite criteria that guide the orthopedic surgeon to decide whether a particular case is to be treated by curettage have not been defined adequately. In this/study we are suggesting some guidelines based on the CT finding for helping the surgeon to decide treatment by curettage or does it require resection.

The CT Scan has significant role in the management of GCT as it helps in (a). CT-guided core biopsy (b). Knowing the site of cortical

break and the resultant soft tissue extension (c). Decide the surgical approach. We Performed curettage in cases where the break in cortex was confined to only one surface and the break did not exceed one-third circumference of bone. We approached the tumor through an area of cortical break so as to achieve complete tumor clearance. The higher incidence of recurrence after curettage and bone grafting reported earlier is partly also because of the defective approach. If a tumor around the knee joint even the break cortex is posteromedial, the lesion is approached from the lateral side. This inevitably leads to failure to clear the area of soft tissue extension on posteromedial side. Moreover, there is a contamination of the soft tissue during surgery on the lateral side. Recurrence rate in the 32 cases which had curettage as the primary procedure was 14% .almost similar to the recurrence rate which is reported in the literature.

CONCLUSION

In GCT of bone, curettage and bone grafting still remains the ideal treatment (Campanacci GrI, Gr II and selected cases of Gr III). Low rate of recurrence can be achieved if curettage and grafting is done in properly selected cases through a well-planned surgical approach after assessing the cross-sectional CT. Use of extended Curettage method helps in reducing recurrence rates in giant cell tumors.

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Conflict of Interest: None Declared

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