

Outcomes of Treatment of Giant Cell Tumor by Curettage and Bone Cement

Kishore Hazarika, Swapnaneel Dutta

Department of Orthopaedics
Gauhati Medical College and Hospital

ABSTRACT

Giant cell tumour of bone are effectively treated by surgical means. This study evaluates the outcome of surgical treatment of giant cell tumour by curettage and bone cement. Methodology: This study conducted in Orthopaedics department GMCH consisted of six patients ranging from the age 27-70 years who underwent surgical treatment of Giant cell tumour using curettage and bone cementing. The patients were evaluated clinicoradiologically and staging done using Campannuci staging and they were followed up for a period of 12 months. Half of the study population were females and half were males. 83.3% of the study population had Campannuci grade 1 tumour, and 16.7% had Campannuci grade 2. Regarding MSTs among the studied group, 83.3% have no pain, all patients had enthused emotional acceptance and 66.7% had no restriction of nearby joints and can walk without support and 83.3% had normal gait. On a follow up of 12 months, there were zero recurrences and 16.7% study population had superficial skin infection. Conclusion: Giant cell tumours can be effectively treated using Curettage and adjuvant filling with bone cement as provided a good oncological outcome with zero recurrence and joint preservation.

Key words: Giant cell tumour, Curettage, Bone cement

Date of Submission: 06-03-2023

Date of Acceptance: 18-03-2023

I. INTRODUCTION

Treatment of GCT is largely done by surgical means. The tumour tissue can be removed either by resection or with curettage depending upon the involvement of the articular surfaces and soft tissue. Surgical outcomes are optimal when the tumor is removed with tumor-free margins, with minimal morbidity and an acceptable functional outcome (1). So while designing a treatment protocol for giant cell tumor of bone, the surgeon has to choose between an Intralesional excision or Enbloc resection, if he has to use adjuvant therapy to eradicate residual infection and what material is to be used to fill the consequent defect in the bone (2). Curettage presents with higher recurrence rates as compared with enbloc resection but also results in less morbidity (3). Curettage can be performed alone or combined with local adjuvants. Performing Curettage alone has the worst recurrence rates. Various physical and chemical agents have been used to control the microscopic disease remaining in the walls of the defect after a good curettage. Liquid nitrogen, phenol, hydrogen peroxide, alcohol, electro cautery, bone cement, and also argon plasma cautery have been used as adjuvants(4). The recommended physical adjuvant for curettage is liquid nitrogen. It extends the margin of a simple curettage and makes it equivalent to that of a wide resection. Cryosurgery significantly preserves joint function and also decreases the rate of local recurrence(6). Following resection, the specimen is measured in order to select the best-fitting prosthesis. Trial components are provided to enable a rapid comparison with the specimen, as well as to perform trial reductions prior to selection and assembly of the final prosthesis. The selection of the stem diameter is dependent upon the anatomy of the canal, which is reamed in order to accommodate the largest-diameter stem possible(7). Therefore, this study was to evaluate the outcomes of surgical treatment of giant cell tumor by curettage and bone cement

II. METHODOLOGY

Patient selection : This clinical study was carried out on 6 patients with 2 giant cell tumor of proximal end of tibia, 2 giant cell tumors of distal end tibia and 2 giant cell tumors of distal femur included in this study. The included study populations were adult patients with giant cell tumors who were admitted to Orthopedic Department, Guwahati Medical College hospitals from January 2022 to January 2023 treated by curettage and bone cement

Inclusion criteria : Patients were diagnosed with giant cell tumor using radiology and laboratory investigations, including X-ray, MRI and histopathology. Age of patients were ranged from 20 years to 50

years. Patients without pathological fractures. Lesions not reaching the articular surface of the knee joint were included in the study. Campanacci grade I and II were included in our study.

Exclusion criteria: Campanacci Grade III GCTs with severely damaged bony structure and soft tissue involvement. Pathological fractures. Intra-articular lesional extensions. Patients with other comorbidities who were not fit for any surgical procedure and recurrent cases were also excluded.

All the patients suspected of giant cell tumour of the lower limb were evaluated initially with a plain radiography after detailed history and clinical examination. They were staged based on radiological and pathological evaluation using MRI imaging and histopathological assessment using FNAC using the Campanacci staging. Campanacci's radiological grading method as follows: Grade I: tumors were intraosseous lesions. Grade II: tumors were intraosseous lesions without loss of cortical continuity and with a thin cortex. Grade III: tumors were extra osseous lesions that broke through the cortex and extended into soft tissue.

Operative procedure: The six (6) patients have giant cell tumour were opened by respective approaches and out of 6 patients with 2 giant cell tumor of proximal end of tibia, 2 giant cell tumors of distal end tibia and 2 giant cell tumors of distal femur. The tumour was thoroughly curetted and bone cement was used as adjuvant in the extensive curettage. Sub fascial drains were placed which exit in-line with the incision and the fascio-cutaneous flaps were pulled and closed. The limb was kept elevated and in full extension using a posterior splint.

Postoperative Care and follow up: Drain was removed after 24 hours and antiseptic dressing done. Patient were called for stitch removal after a period of 2 weeks and were regularly followed up for a period of 12 months. In the follow up functional outcome was assessed and complications were looked for. The collected data were coded, processed and analyzed using the SPSS version 22 for Windows® (IBM SPSS Inc, Chicago, IL, USA). Data were tested for normal distribution using the Shapiro Wilk test. Qualitative data were represented as frequencies and relative percentages. Quantitative data were expressed as mean ± SD (Standard deviation). Independent samples t-test was used to compare between two independent groups of normally distributed variables (parametric data). P value < 0.05 was considered significant.

III. RESULTS

The present study showed that, the age of the studied group ranged from 27 to 70 years, half of the group (50.0%) had age less than 35 years and the other half were equal or more than 35 years (**Figure 1**). Most of the studied group (83.3%) had Campanacci grade I and grade II (16.7%) (**Figure 2**). Regarding MSTs among the studied group, 83.3% have no pain, all patients had enthused emotional acceptance and 66.7% had no restriction of nearby joints and can walk without support and 83.3% had normal gait (**Figure 3**). The recurrence rate was zero (0.0%) after a follow up time 12 months. Regarding complications, there was only 16.7% of patients had superficial infection.

A case of male patient 70 years old, complaining from painful right ankle 4 months duration. Tender left distal tibia with painful limitation of ankle movements. Plain X-Rays done showing osteolytic lesion affecting the medial malleolus, reaching to the subchondral bone. FNAC was done and histopathological examination confirmed the diagnosis of giant cell tumor. Extended curettage was done after making a cortical window with Bone cement as an adjuvant was done. The patient's functional score was 96% after 12 months follow up (**Figure 4**).

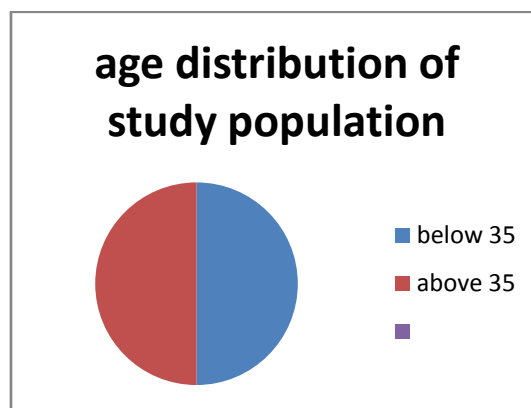


Figure 1

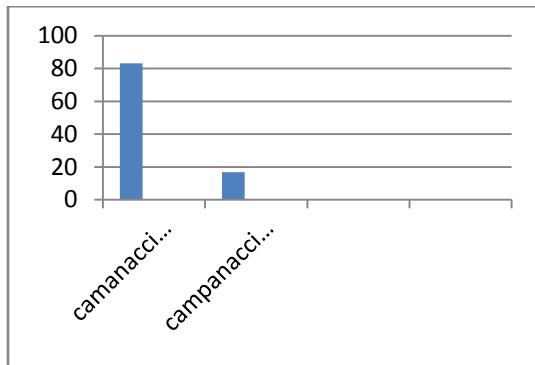


Figure 2

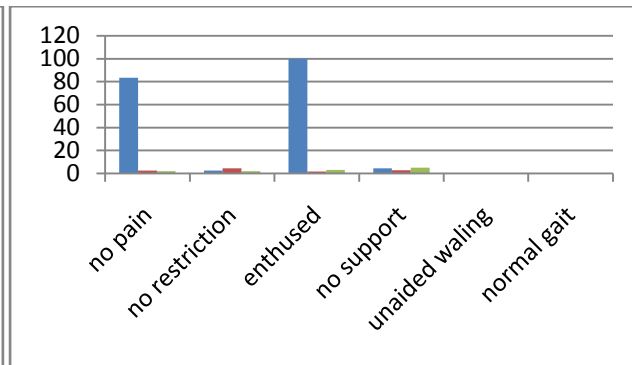


Figure 3



Figure 4: immediate post op to 3 months to 12 months followup

IV. DISCUSSION:

This clinical trial study was conducted on 6 patients underwent surgical treatment of giant cell tumor in lower limb long bones, by curettage and bone cement at orthopedic department, GMCH. Their age was ranged from 27 to 70 years. The aim of the present study was to evaluate the outcomes of surgical treatment of giant cell tumor by curettage and bone cement.

Our attainable results were in agree with a study by **Kafchitsas et al.,(3)** that included 24 female (63%) and 14 male patients (37%). The average patient age at the time of presentation of the first tumor was 28 years (range 13-56 years): 24 of the patients (63%) were younger than 30 years of age, 5 of the patients (13%) were in the third decade of life, 6 patients (16%) were in the fourth decade and only three patients (8%) were older than 40 years of age at the time of the initial presentation. The GCTs were graded using the grading system described by Campanacci. None of the patients had tumor with extraosseus extension (Grade III).

Another study conducted by **Gao et al., (2014)** advocated adjuvant using; Aggressive curettage and bone grafting was performed in 34 cases (52.3%), and aggressive curettage with bone cement was performed in 31 cases (47.7%). The overall recurrence rate after the aggressive intralesional procedures was 35.3% with bone grafting and 12.9% when bone cement was used as an adjuvant filling. The recurrence rate following aggressive curettage and bone grafting was higher than that following aggressive curettage with cement ($p = 0.038$). The Musculoskeletal Tumor Society (MSTS) score for bone graft patients was 91.1%, which was significantly lower than that for patients treated with bone cement (94.7%).

Our study is in agreement with **He, et al., (9)** included 93 patients, who were divided into the extended curettage (EC) group and segmental resection (SR) group. The EC group included 69 patients (37 men and 32 women), with the mean age of 36.3 years. The number of involved femur, tibia, and patella were 36, 32, and 1, respectively, and the average length of the lesion was 5.6 cm. The preoperative Campanacci grades were I, II, and III in 7, 33, and 29 cases, respectively. There were 57 primary cases and 12 recurrent cases. There were 18 preoperative pathological fractures. The SR group included 24 patients, with the mean age of 34.9 (range, 17–52) years. In this group, 11 femurs, 7 tibias, and 6 fibulas were examined. The average length of the lesion was 7.2 cm. All cases were of Campanacci grade III. There were 15 primary cases and 9 recurrent cases. There were 14 cases of preoperative pathological fracture and two cases of pulmonary metastasis.

Regarding MSTS score in our study was concur with **Araki et al.(10)** evaluated an average MSTS score of 29 points (range, 23 to 30 points). The lowest MSTS score (23 points) was observed in the patient who eventually underwent total knee arthroplasty for symptomatic progression of osteoarthritis to Kellgren-Lawrence (KL) grade 3, with MSTS scoring having occurred prior to the arthroplasty procedure.

Also, **He, et al.,(9)** reported VAS was used for pain evaluation; six cases (6.5%) of recurrence occurred within 18 months after surgery. There were five recurrence cases in the EC group, including three cases in the femur and two cases in the tibia, of which one was far from the articular surface and the four were around to the

articular surface. There was only one recurrence in the SR group, of which the patient had distal femoral recurrence.

Simillary, **Araki et al.(10)** was in consistent with the current study where they retrospectively evaluated 19 patients who underwent curettage and augmentation with calcium phosphate cement (CPC) for primary GCTB. The median age at the time of the index procedure was 39 years (range, 20 to 63 years). The Campanacci classification was grade I in 3 patients, grade II in 12 patients, and grade III in 4 patients. The study population included 12 women and 7 men. The median follow-up was 131 months (range, 66 to 205months). They close results regarding recurrence rate as their oncological assessment revealed that 17 patients were free of oncological disease.

Thus we recommend the use of extensive curettage with bone cement as adjuvant for patients with GCTB .

V. CONCLUSION:

Surgical treatment of a giant cell tumor of bone using Cement filling after extended curettage is provide a good oncological outcome and joint preservation. Curettage with adjuvants is a feasible first choice treatment option for GCTB with Cement filling does not increase the recurrence rate. Further trials with longer follow-ups and comparison of hydrogen peroxide with other adjuvant and comparing extended curettage with other methods. Further multicentric prospective studies are required to confirm our findings.

No Conflict of interest.

REFERENCES:

- [1]. **Montgomery C, Couch C, Emory CL, Nicholas R. (2019).**Giant cell tumor of bone: review of current literature, evaluation, and treatment options. *J Knee Surg.* 32(04):331–6.
- [2]. **Sobti A, Agrawal P, Agarwala S, Agarwal M.(2016).**Giant cell tumor of bone-an overview. *Arch Bone Jt Surg.*4(1):2.
- [3]. **Kafchitsas K, Habermann B, Proschek D, Kurth A, Eberhardt C. (2010).**Functional results after giant cell tumor operation near knee joint and the cement radiolucent zone as indicator of recurrence. *Anticancer Res.* 30(9):3795–9.
- [4]. **Gaston CL, Bhumbra R, Watanuki M, Abudu AT, Carter SR, Jeys LM, et al.(2011).**Does the addition of cement improve the rate of local recurrence after curettage of giant cell tumours in bone? *J Bone Joint Surg Br.* 93(12):166
- [5]. **Agarwal M. (2017).**Intralesional Curettage technique for Giant cell tumor of bone–current concepts and evidence. *J Bone Soft Tissue Tumors* May-Aug. 3(1):8–13.
- [6]. **Abdelrahman M, Bassiony AA, Shalaby H, Assal MK. (2009).** Cryosurgery and impaction subchondral bone graft for the treatment of giant cell tumor around the knee. *HSS J.* 5(2):123–8.
- [7]. **Henshaw R, Malawer M. (2004).** Review of endoprosthetic reconstruction in limb-sparing surgery. In: *Musculoskeletal cancer surgery.* Springer; p. 383–403.
- [8]. **Gao Z, Yin J, Xie X, Zou C, Huang G, Shen J. (2014).** Local control of giant cell tumors of the long bone after aggressive curettage with and without bone cement. *BMC Musculoskelet Disord.*15(1):330.
- [9]. **He Y, Zhang J, Ding X. (2017).** Prognosis of local recurrence in giant cell tumour of bone: what can we do? *Radiol Med.* 122(7):505–19.
- [10]. **Araki Y, Yamamoto N, Hayashi K et al. (2020);** Secondary Osteoarthritis After Curettage and Calcium Phosphate Cementing for Giant-Cell Tumor of Bone Around the Knee Joint. *JBJS Open Access.*, 5(3):1-8.

Kishore Hazarika, et. al. “Outcomes of Treatment of Giant Cell Tumor by Curettage and Bone Cement.” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 22(3), 2023, pp. 13-16.