



Characteristics Giant Cell Tumor of The Bone Cases at Dr. Mohammad Hoesin General Hospital Period 1 January 2017 - 31 Augsut 2020

Primadika Rubiansyah^{1*}, Randy Rakhmat Septiandani²

¹Teaching Staff, Department of Orthopaedic & Traumatology, Faculty of Medicine, Sriwijaya University/dr. Mohammad Hoesin General Hospital

²Resident at Department of Orthopaedic & Traumatology, Faculty of Medicine, Sriwijaya University/dr. Mohammad Hoesin General Hospital

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*Corresponding author:

Primadika Rubiansyah

E-mail address:

Shivanox@yahoo.com

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ABSTRACT

Background: Giant Cell Tumor (GCT) is a benign bone tumors with potentially aggressive and capacity to metastasize. This tumor could destroy the bone and joint component. As a primary bone tumor that appears at productive age, GCT can cause morbidity for patients. **Methods :** This research is a retrospective descriptive study with data obtained from the medical records of patients who went to Mohammad Hoesin general hospital for the period January 1, 2017-August 31, 2019. Data processing was carried out using SPSS 16.0. From the research results, 27 GCT patient data that met the inclusion criteria were obtained. **Results :** There were 23 (85.1%) patients in the 20-44 years age group, 2 (7.4%) people <20 years, 2 (7.4%) people > 44 years. There were 13 (48%) male patients and 14 (52%) female patients. The most common tumor locations were in the proximal tibia as many as 6 (22%) people, Distal Femur as many as 6 (22%) people, Distal Radius as many as 5 (18.5%) people, Distal Ulna as many as 3 (11.1%) people, Proximal Femur as many as 1 (3.7 %) people, Calcaneus as many as 1 (3.7%) people, Metacarpal as many as 1 (3.7%) people. Based on grading Campanacci, 16 (59.25%) people had GCT with Campanacci Grade III, Grade II with 8 (29.6%) people, and 1 (3.7%) grade I. Only 2 (7.4%) people had recurrences. No patients were found to have lung metastases (0%). There were 1 (3.7%) patients with pathological fracture on GCT. Management carried out was 24 people undergoing resection and reconstruction 24 (88.5%) and 3 (11.5%) people with curettage and bone cement. **Conclusion :** This study of GCTB at Mohammad Hoesin general hospital bring out that patient's characteristics are similar with other country and theory. Mostly patient got GCTB at age second until fourth decade of life, slightly more in female, mostly tumor detected around the knee. Mostly patient detected with Campanacci graded III and needed resection and reconstruction surgery. No reported lung metastases in GCTB patient but this record need further follow up due to short time between surgery and study

1. Introduction

Giant Cell Tumor (GCT) of the bone is a benign tumor that is aggressive and can metastasize, although it is almost not life threatening, this benign tumor can cause damage to the bone and joint components. This tumor is still unclear histogenetically. Pathological characteristics in the form of Mononucleated stromal cell proliferation and there are several multiple nucleated giant cells with a homogeneous distribution that resembles osteoclasts [1].

Giant Cell Tumors of the bone is 4-8% of the primary bone tumors that occur in the many countries. GCTs are observed predominantly at the ends of long bones, most commonly located in and around the knee. Clinically, GCT of the bone had complaint of pain and mechanical disturbances that caused by bone destruction. pain itself can obscure the presence. Radiographic grading system developed by Campanacci *et al.* grades lesions from 1 to 3, with

Grade 1 lesions having well-defined margins and an intact cortex, and Grade 3 having irregular margins and cortical destruction [1,2]. GCT has a fairly high recurrence rate and can metastasize. Approximately 1-9% of people with GCT can metastasize and recurrence [2].

Since most GCTs occur near bone joints, the best possible treatment is to maintain bone anatomy with an intralesional approach such as curettage. Besides that, there is a evidence of significant benefit in the management of GCT for bone resection and bone reconstruction, and replacement by prosthesis [2,3].

The morbidity that can caused from this tumor and high recurrence rate make GCT studies necessary. research on the characteristics of GCT of the bone cases at Mohammad Hoesin General Hospital Palembang for the period of 1 January 2017 - 31 August 2020.

2. Methods

This research is a retrospective study with a descriptive research design, research took place in August 2020 to September 2020 in the Medical Record Department of Mohammad Hoesin General Hospital Palembang. The study population was all patients with GCT whom got treated at Mohammad Hoesin general hospital Palembang from 1 January 2017 to 31 August 2020. The sample in this study was the entire population that met the inclusion criteria, namely Giant Cell Tumor of the bone patients with complete variables in patient data, while incomplete data were excluded from this study. The data used are secondary data, in the form of medical records of patients with Giant Cell Tumor of the bone at Mohammad Hoesin general hospital for 1 year, from 1 January 2017 to 31 August 2020. The data was then entered in a Microsoft Excel worksheet. The secondary data obtained are then grouped based on research variables with predetermined operational restrictions. The data is then presented in tables and diagrams. Variables are

analyzed descriptively.

3. Results

In the period from 1 January 2017 to 31 August 2020 there were 27 patients who had treated as GCT of the bone. The youngest age of the patients with GCT is 12 years, old while the oldest age is 57 years, with the average age is 29.8 years. The most age group is 20-44 years with 23 (85.1%) patients followed by 2 (7.4%) patients each for group age <20, and >44. as shown in Figure 1.

Distribution based on sex in patients with Giant Cell Tumor of the bone hemodialysis vascular access found that there were 13 male and 14 female as shown in Figure 2.

For distribution of GCT of bone, the most frequent to least was proximal tibia 6 (22%) patients, distal femur 6 (22%) patients, distal radius 5 (18.5%) patient, distal ulna 3 (11.1%) patients, 1 (3.7%) patients each for calcaneus, metacarpal, and proximal femur.

In study, there are 16 (59.25%) patients with GCT Campanacci Grade III, 8 (29.6%) patients with Campanacci Grade II, and 1 (3.7%) patient with Campanacci Grade I.

From 27 patients, there are only 2 (7.4%) patients which had recurrence of GCT. As shown in Figure 5.

There is no GCT of the bone patients (0%) with lung metastasize. As shown in Figure 6.

Among 27 GCT of the bone patients there is only one (3.7%) patient which had pathologic fracture.

For treatment of GCT of the bone, there is 3 (11.2%) patients conducted bone curettage and bone cement, and 24 (88.8%) patient got bone resection and reconstruction. As shown in Figure 8.

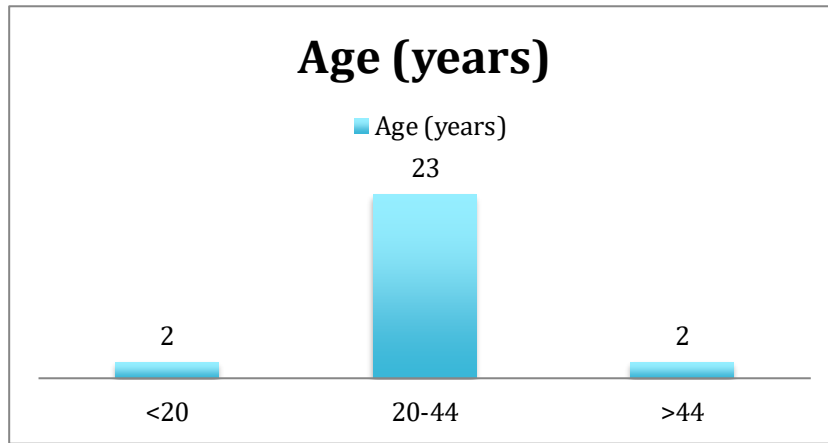


Figure 1. Distribution of patients with Giant Cell Tumor of the bone by age

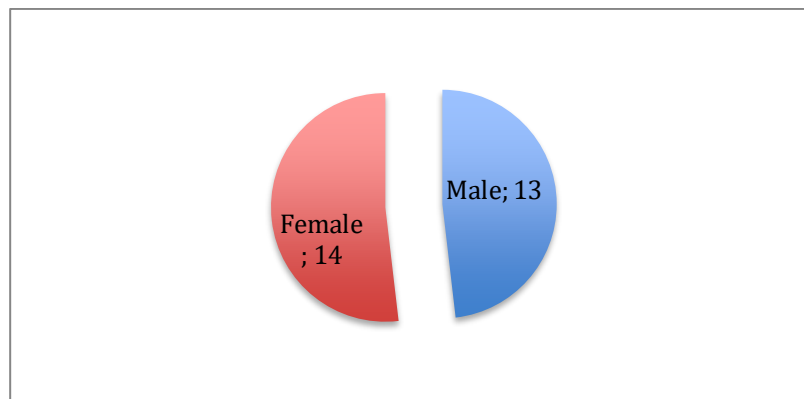


Figure 2. Distribution of patients with GCT of the bone by gender.



Figure 3. Distribution of GCT of the bone patients by Location

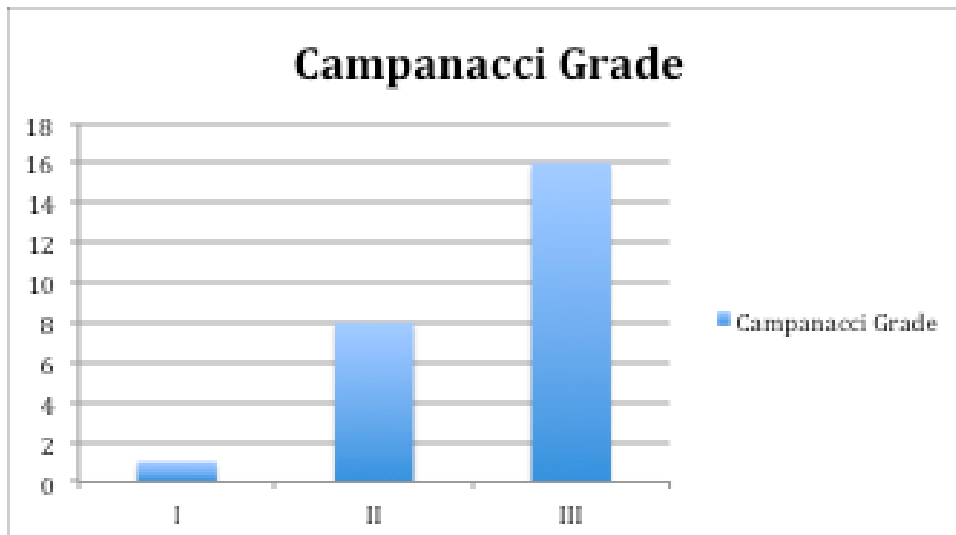


Figure 4. Distribution of GCT of the bone patients by Campanacci grading.

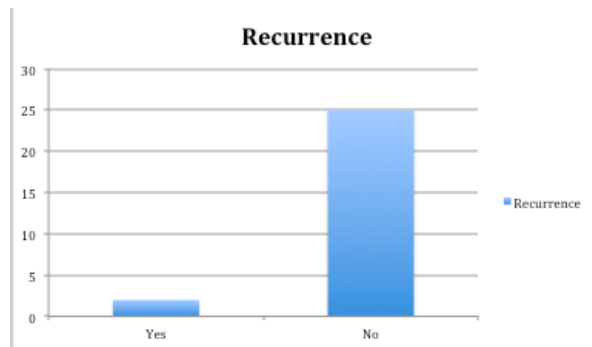


Figure 5 distribution of the patients with recurrence GCT

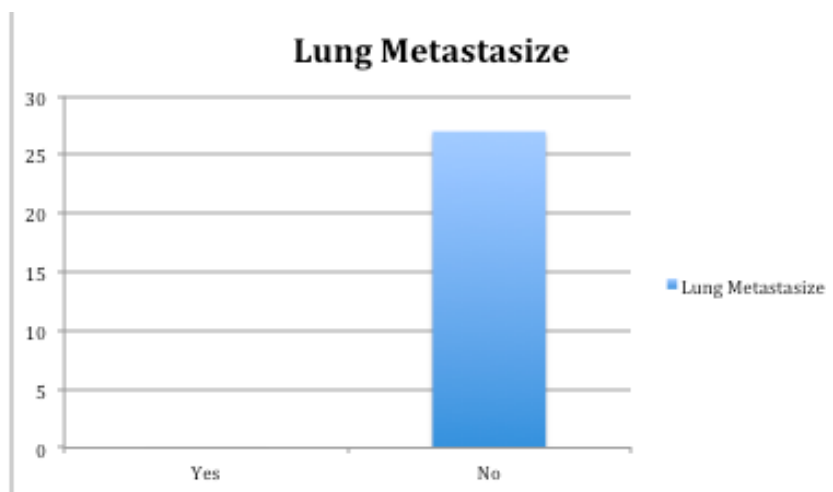


Figure 6 distribution GCT of the bone with lung metastasis

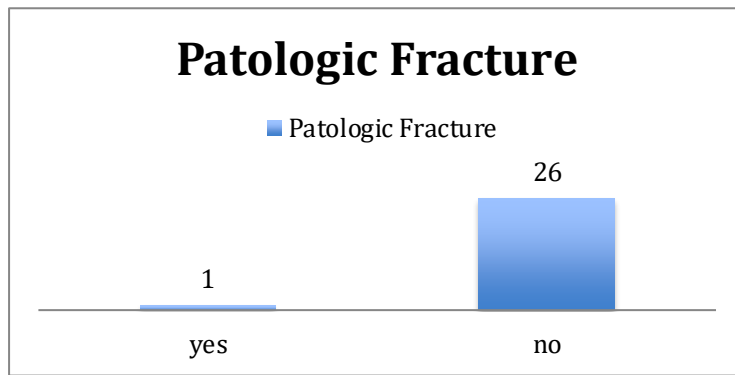


Figure.7 Figure that shows GCT patients with pathologic fracture

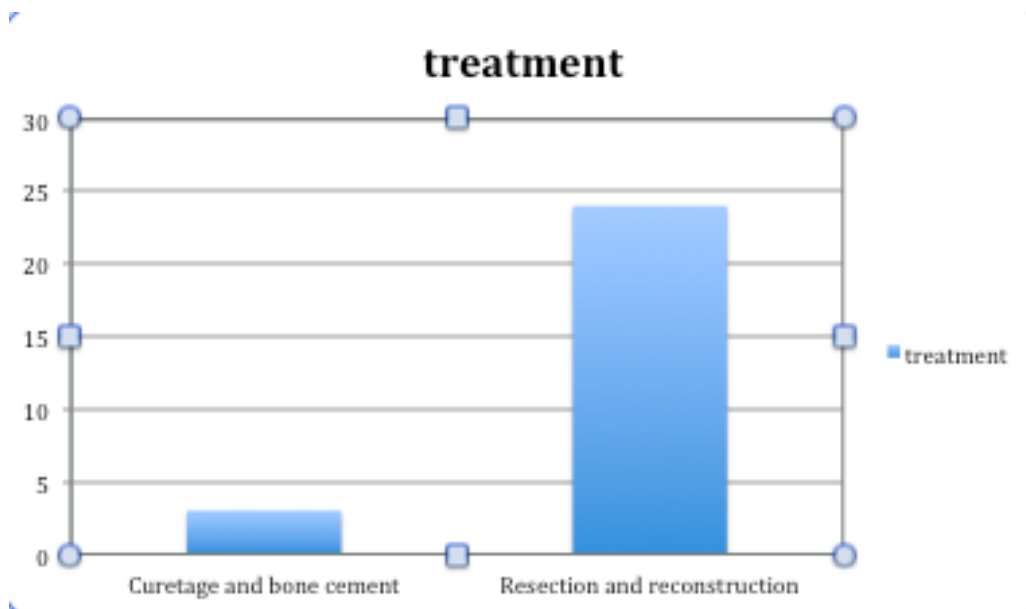


Figure 8 distribution of the treatment



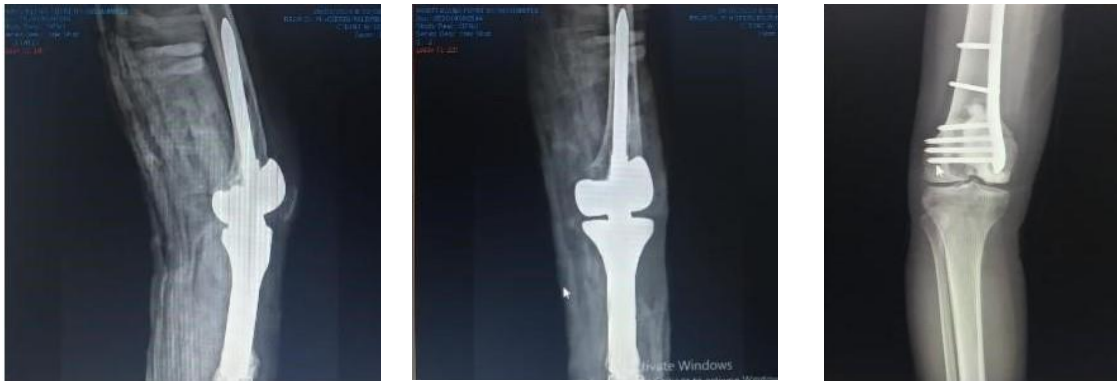


Figure 9. (top left) bone curettage and cementing of GCTB on calcaneus, (top mid) resection of GCTB at distal radius and reconstructed with wire and cement, (top right, bottom right) bone curettage on distal femur followed with cementing and plating with plate and screw, (bottom left and mid) resection and reconstruction of GCTB at distal femur with mega prosthesis.

4. Discussion

In this study, GCT of the bone patients who got treated in Mohammad Hoesin general hospital were collected from 1 January 2017 to 31 August 2020. The youngest age of the patients with GCT is 12 years, old while the oldest age is 57 years, with the average age is 29.8 years. The most group affected is in <20-44 years group with 23 (85.1%) patients. This is in line with research conducted by Jenifer et al, where there are 57.3% of study samples aged 20-44 years old. And there is a study conducted by Anshul et al which shown the most age group with GCT of the bone was in 20-45 years old [1,4]

There is a bit difference about distribution in gender for GCT of the bone patients. There is only slight difference with 14 (52%) female patients among 27 patients. As study conducted by Anshul et al, there was slightly female patients predilection in GCT of the bone. Jenifer et al also reported that their samples was 53.9% female patients in GCT of the bone patients. [1,4]

Consecutively, the most predilection part which had GCT of the bone is Proximal tibia (6 (22%) patients), Distal femur (6 (22%) patients), Distal radius, Distal Ulna (3 (11.1 %)), and one (3.7%) each for metacarpal, calcaneus, and proximal femur. This study match with Mavrogenis, Andreas F et al study. In their study, the most common predilection for GCT of the bone was around knee part (50-65%), distal femur (23-30%), and

proximal tibia (20-25%) [5].

For Campanacci grading, there are 16(59.25%) patient with grade III, 8 (29.6%) patients for grade II, and 1 (3.7%) patient for grade I. This is supported by research from Cao, H. et al., In China, as many as 79.2% of patients pf GCT who treated had the grading of Campanacci III [6].

In this study, recorded that there are 2 (7.4%) patients with recurrences, 25 (92.6%) people were not. Of these two patients, one patient had Grading Campanacci II and the other had Grading Campanacci III. Both had been resected and reconstructed. Based on the theory and research conducted by Klenke, Frank et al, bone GCT often recurs in curettage management and occurs in Grading Campanacci III. A total of 21 (17.9%) of the 118 patients had recurrences according to the study of Klenke, Frank et al [7]

In Mohammad Hoesin general hospital during the period January 1, 2017 to August 31, 2020, there was no recorded GCT of e bone patient who had lung metastases. In Cao's study, H et al stated that about 1-4% of transformed GCTs can cause pulmonary metastases. In Klenke, Frank et al., A total of 118 GCT patients collected from 1985-2005 found 4% of patients had pulmonary metastases. The incidence rate that reached 0 in this study at RSMH could be due to the lack of samples and the span of the sample period. (4)

There is 1(3.7%) patient with pathologic fracture on GCT while the remaining 26 (96.3%) people did not. Meanwhile as study conducted by Klenke, Frank et al, in which 17 out of 118 (6.9%) patients had pathological fractures on GCT. The nature of tumor cells, which are osteoclast-like multiple nucleated giant cells, caused osteolysis, thereby eliminating bone density and making bones prone to fractures [4]

It was recorded that 3 (11.5%) patients were subjected to curettage and bone cement and 24 (88.5%) people were subjected to resection and reconstruction as management of GCT of the bone in Mohammad Hoesin general hospital for period 1 January 2017 – 31 August 2020. Most patients present with a tumor that has long been enlarged and has soft tissue involvement. The reconstruction was managed by mega prosthesis or plating/nailing/wiring with cement. The curettage can also augmented by plate and locking screw.

5. Conclusion

During the period 1 January 2017 - 31 August 2020, 27 patients had been diagnosed with GCT and were treated. Most GCT patients diagnosed at the age of 20-44 years (85.2%), are female (52%). Of these patients, the predominant locations were proximal to the tibia (22.22%) and distal femur (22.22%), with grading Campanacci over half having grade III (59.25%). Total (85.2%) patients were managed by resection and reconstruction. Of these patients, 2 patients (7.4%) had recurrences and 1 patient (3.7%) had pathological fractures. There were no patients who had lung metastases (0%). Resection and reconstruction are the most treatment options (88.5%) at RSMH.

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