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Research Article

Demographic Characteristics, Anatomical Distribution and Presentation of Sudanese Patients with Giant Cell Tumor

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Abstract

Introduction: Giant cell tumor of bone (GCTB) is a benign aggressive primary bone tumor. This study provides an overview of demographics, anatomical distribution, and clinical presentation of GCTB in Sudan.

Material and Methods: This retrospective study was conducted on patients with a diagnosis of giant cell tumor of the bone that attended our institution. Demographic information, tumor location and clinical presentation were obtained from medical records of patients. Data were collected using data sheet and analyzed using statistical package for social science (SPSS version 26).

Result: This study include 46 patients diagnosed with giant cell tumor of bone, 34 male (73.9%) and 12 female (26.1%), with their ages ranging from 17 - 57 years old, patients with age 30 or less are 31 (67.4%), age from 31 to 50 years are 12 (26.1%), and patients age more than 50 are 3 (6.5%), the mean age being 26.5 years old. The location of tumor was found to be commonly in proximal tibia 21 (45.7%) patients, followed by distal femur 18 (39.1%) patients, then distal tibia 3 (6.5%) patients, proximal fibula 1 (2.17%), patella 1 (2.17%) patient, calcaneum 1 (2.17%) patient and distal humerus 1 (2.17%) patient. All patients (100%) presented with pain that affect their life activity.

Conclusion: This study demonstrates an overview of GCTB in Sudan. Male was predominating over female in this study which is opposing the previous studies. Age distribution show slightly difference from those data in literature. In our patients, the tumor location and clinical presentation was in line with previous study. Further studies are recommended to expand information about GCT in Sudan.

Keywords: Giant Cell Tumor of Bone; Demographics; Clinical Presentation; Sudan

Introduction

Giant Cell Tumor of Bone (GCTB) is a benign, locally aggressive tumor with the ability of bone destruction and metastasis [1]. GCTB accounts for approximately 5-6% of all primary bone tumors and represents 15 -20% of benign bone tumors [2]. Except for chondroblastomas, it is the only benign bone tumor that can metastasize, with an incidence ranging from 1 to 9% [2]. It most commonly occurs between 20-45 years of age; with slightly more female predominance over male with a male-to-female ratio of 1:1.5 has been reported [1]. Less than 3% of cases occur in skeletally immature patients below the age of 14 years, and only 13% occur in patients over the age of 50 years [3,4].

About 90% of GCT is shown to be in the epiphyseal area of the bone [2]. However, the tumor may extend to the involved subchondral area or even disrupt the cartilaginous surface; hence, the joint and the capsule are rarely invaded [3]. GCT tends to occur in the metaphyseal region of the bone in skeletally immature patients, but it is exceedingly rare [2]. The most common sites for GCT are the distal femur, the proximal tibia, the distal radius, and the sacrum [1]. Other frequent areas include the fibular head, the proximal femur, and the proximal humerus [5]. Rare locations of GCT involvement are the bony pelvis, hands, feet, patella, and talus. The synchronous and multicentric GCT was reported, although it is infrequent [6].

Pain and local swelling are the most common presenting symptoms, as seen in 86% of the patients [1]. Pain may be activity-related or worsen at rest or at night, which may interfere with daily life activity [3]. These symptoms relate to structural and mechanical insufficiency resulting from the periosteal expansion of the tumor [2]. The duration of symptoms ranges from 3 to 6 months. Depending on tumor location and extension to adjacent structures, there may be additional symptoms such as limited range of movement of the affected joint and several neurological symptoms when the tumor involves the axial skeleton [1]. In rare instances, patients may remain asymptomatic until pathological fractures occur. Pathological fractures occur in 12% of patients with GCT at the time of the diagnosis [5]. However, it indicates highly aggressive behavior of the tumor with local recurrence and metastatic dissemination [3].

This retrospective study aims to establish the first demographic data for GCTs in Sudan. Moreover, tumor location and clinical presentation was also investigated in this study.

Material and Methods

Study design

This study was a retrospective cross-sectional in design that was conducted in orthopaedics department of future specialized hospital and Ibrahim malik teaching hospital at Khartoum, Sudan.

Participants

We include patients with Giant Cell tumors of Bone who were diagnosed and treated at Future and Ibrahim Malik Hospital.

Sampling

Total coverage for all consecutive patients was done in this study during the period of data collection.

Data collection method and tool

Data was collected using a questionnaire. The datasheet contains questions covering the patients' demographic data, clinical presentation, and tumor location.

Data analysis

Data were analyzed using statistical package for social science (SPSS). Version 26.0. Data were described and presented as mean ± standard deviation (SD) for quantitative variables and percent for qualitative variables.

Ethical approval

Ethical approval was obtained from the Sudan Medical Specialization Board (SMSB). Permission was taken from Future and Ibrahim Malik hospitals, and both written and verbal consent was obtained from the patients. Confidentiality of data and records has been preserved.

Result

Patient characteristics

A total of 46 patients were included in the study. The vast majority of patients were males (N = 34; 73.9%). Ages range from 17 - 57 years old, with the mean age being 26.5 years old. Most of them were less than 30 years of age (N = 31; 67.4%), and about 12 (26.1%) were from 31 to 50 years, and 3 (6.5%) patients were over 50 years. Most of the patients live in Khartoum state (N = 30; 65.2%), and 19 (41.3%) were students. Table 1 illustrates the main demographic characteristics of the study population.

	N	%
Gender		
Male	34	73.9
Female	12	26.1
Age (Years)		
<30	31	67.4
30-50	12	26.1
>50	3	6.5
Residence		
Khartoum	30	65.2
Central	9	19.6
East	4	8.7
North	1	2.2
South Sudan	2	4.3
Occupations		
Student	19	41.3
Worker	7	15.2
Employee	7	15.2
Housewife	3	6.5
None	10	21.7

Table 1: The demographic characteristics of bone giant cell tumor patients (N = 46).

Clinical presentation

At presentation, all the patients (n=46; 100%) were presented with severe pain that affected their daily activities (Table 2). The period from starting the symptoms until the presentation to the hospital was more than three months in 38 (83%) patients and from 1-3 months in 8 (17%) patients.

	N	%
Presenting symptoms		
Pain	46	100
Pain severity		
Severe	46	100
Complain affect daily activities (Yes)	46	100

Table 2: The presenting symptoms of patients with GCTB (N = 46).

Anatomical location

Regarding the anatomical location of the tumor, it was found to be common in proximal tibia in 21 (45.7%) patients, followed by distal femur in 18 (39.1%) patients, then distal tibia in 3 (6.5%) patients, proximal fibula in 1 (2.17%) patient, patella in 1 (2.17%) patient, calcaneum in 1 (2.17%) patient and distal humerus in 1 (2.17%) patient (Figure 1).

Figure 1: The anatomical locations of giant cell tumor of bone in patients (N = 46).

Discussion

The current study shows the demographic information, tumor location, and presenting symptoms of 46 patients diagnosed with Giant Cell Tumor of the Bone (GCTB) between 2015 and 2020 in the Orthopedic Oncology unit in Khartoum, Sudan. Many studies (1-5) report a slight female predominance over males, with a ratio ranging from 1.1:1 to 1.5:1. Our study reveals a male predominancy (3.7:1) over females, which conflicts with previous studies in the literature. This finding was also observed in a study in South Africa [7], which also shows a slight male predominance (1.2:1). There is no obvious cause for this variance. Possibilities may be certain geographic factors (more common in African men) or certain genetic factors.

GCTB tends to occur in patients ages ranging from 20 and 50 years in 80% of cases [2,3]. However, less than 5% of cases involved skeletally immature patients younger than 14 years of age, and 9%

of patients were over 50 years [5]. Our result shows that most of the patients were 17 - 57 years old, which is slightly different from those in the literature. No case with open physis was seen among our patients, indicating that giant cell tumors are rare in children with open physis. The knee is the most common site of GCTB, accounting for about 50 to 65 % of the cases [2,3,5]. In this study, 39 (84.8%) of our patients have tumors around the knee joint. The proximal tibia is the most common location as detected in 21 (45.7%) of our patients, followed by the distal femur in 18 (39.1%), then distal tibia in 3 (6.5%) patients, and one (2.17%) patient in the proximal fibula, patella, calcaneum, and distal humerus.

Pain and local swelling are leading symptoms of GCT, as seen in 86% of patients [2]. Almost all patients in our study suffer from pain at initial presentation to our unit. Patients describe pain as sever on pain scale that interfering with their normal life activates and this is in line with other studies in literature. However, no other symptoms were observed in these patients.

Conclusion

GCTB is benign rare primary bone tumor with aggressive and unpredictable biological behavior and abilities to distance metastasis. This study demonstrates the demographic characteristics, clinical presentation and the common anatomical location of CTG among Sudanese population. Male shows more predominance over female in this study which is conflict international studies that show equal or slight female predomince. Age group of our patients was slightly wider that other studies. The proximal tibia was the most common site of GCTB in our patient, followed by distal femur. Other frequent sites in our patients were distal tibia, proximal fibula, patella, calcaneum, distal humerus. This study may provide an initial overview of this disease characteristics among Sudanese patients. Further studies are recommended to expand the literature.

Conflict of Interest

The authors declare no conflict of interest.

Consent for Publication

All authors gave their verbal and written consents for publication.

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