International Journal of Research in Orthopaedics
Shanmugam S et al. Int J Res Orthop. 2022 Jan;8(1):60-63
http://www.ijoro.org

DOI: https://dx.doi.org/10.18203/issn.2455-4510.IntJResOrthop20214962

Original Research Article

Demographic, clinico-pathological features and management pattern of primary bone tumors in a tertiary care hospital of South India

Subbiah Shanmugam*, Sujay Susikar, Bharanidharan T., Arun Victor Jebasingh

Department of Surgical Oncology, Government Royapettah Hospital, Kilpauk Medical College, Chennai, Tamil Nadu, India

Received: 04 November 2021
Accepted: 06 December 2021

***Correspondence:**
Dr. Subbiah Shanmugam,
E-mail: subbiahshanmugam67@gmail.com

ABSTRACT

Background: Primary bone tumors are very rare tumors. The true incidence of bone tumors is not well established and is under reported due to rarity and lack of accurate registries. Hence it is essential to study about the demographic, clinico-pathological features and the pattern of surgical management of bone tumors. The aim of this study is to analyze the demographic and clinico-pathological features of primary bone tumors that were managed by surgery.
Methods: A retrospective analysis of all patients with primary bone tumor who were treated by surgery from 2012 to 2019 was done. The age, sex distribution, histopathology, location of the tumor and surgical procedure done were analyzed.
Results: Among 103 patients analyzed, 66 (64%) were men and 37 (36%) were women. Primary bone tumors most commonly presented in 11 to 20 years of age with 35 (33.9%) patients occurring in this age group. Osteosarcoma was the most common primary bone tumor and it occurred in 49 (47.6%) patients, out of which 34 (69.3%) patients were below 20 years of age. Giant cell tumor was the most common benign bone tumor and it occurred in 22 patients, out of which nine (40.9%) patients were of age 21 to 30 years. Distal femur was the most common site with 39 (37.9%) patients. The limb preservation rate for malignant appendicular bone tumors was 69.0%.
Conclusions: The diagnosis of bone tumor depends not only on histopathological features but also needs correlation with age, clinical features, tumor location and radiological features for confirmation of diagnosis.

Keywords: Bone tumors, Demography, Clinical features, Histopathological types, Limb sparing surgery, Amputation

INTRODUCTION

Though secondary bone tumors are common, primary non hematological tumors are very rare and they account for less than 0.2% of all cancers.[1] The true incidence of bone tumors especially low grade tumors is not well established and is under reported due to lack of accurate registries.[2] Even in high volume centers the number of bone tumor patients treated is very low and thereby the experience of the pathologists in diagnosing bone tumors is also very low. Hence the diagnosis of bone tumor depends not only on histopathological features alone but also needs correlation with information about age of the patient, clinical features, tumor location and radiological features for confirmation of diagnosis. The data available about demographic, clinical and histopathological features and the pattern of surgical management in South India are limited and hence we intend to analyze these features.

METHODS

A retrospective analysis of all patients with primary bone tumor who were treated by surgery from 2012 to 2019 in our institution was done. The age, sex distribution, histopathology and location of tumor were analyzed in

this study. The patterns of surgical management of bone tumors such as limb sparing surgery or amputation were also analyzed. Secondary bone tumors and hematological bone tumors were excluded as they are more commonly managed by non-surgical means. Recurrent bone tumors were excluded since the exact age of incidence and histopathological diagnosis of the initial primary bone tumor were not known in most cases.

RESULTS

Among 103 patients analyzed, 66 (64%) were men and 37 (36%) were women with a male to female ratio of 1.8 (Table 1).

Table 1: Sex distribution.

Tumor type	Male	Female	Total
Osteosarcoma	30	19	49
Giant cell tumor	13	9	22
Chondrosarcoma	9	2	11
Ewing sarcoma	5	3	8
Osteochondroma	3	0	3
Chordoma	1	2	3
Osteoma	1	1	2
Adamantinoma	1	1	2
Fibrous histiocytoma	1	0	1
Chondromyxoid fibroma	1	0	1
Benign ossifying fibroma	1	0	1
Total	66	37	103

Osteosarcoma, giant cell tumor, chondrosarcoma, Ewing sarcoma and osteochondroma occurred most commonly in men and chordoma occurred most commonly in women. Out of the 103 patients, osteosarcoma occurred in 49 patients and it was the most common primary bone tumor accounting for 47.6% of cases (Table 2).

Giant cell tumor occurred in 22 patients and was the second most common bone tumor. Also it was the most common benign bone tumor. Chondrosarcoma occurred in nine patients and Ewing sarcoma in eight patients. Overall 35 patients were of age 11 to 20 years and it was the most common age group for primary bone tumors accounting for 33.9% of all cases. Among 49 patients of osteosarcoma, 34 patients were of age less than 20 years with 69.3% of cases occurring in this age group. Among 22 patients of giant cell tumor, nine patients were of age 21 to 30 years constituting 40.9% of cases. Ewing sarcoma occurred most commonly in children of age less than 10 years with five (62.5%) cases occurring in this age group. Chondrosarcoma occurred more commonly in patients with more than 50 years of age with 36.4% of cases occurring in this age group.

Distal femur was the most common site for bone tumors occurring in 39 patients followed by proximal tibia in 21 patients (Table 3). Most common tumor of femur and tibia was osteosarcoma which occurred in 27 and 15 patients respectively. Out of the 82 patients with appendicular bone tumor, 64 patients were managed by limb sparing surgery and 18 underwent amputation (Table 4). The overall limb preservation rate for appendicular bone tumors was 78.0%. Out of the 58 patients with primary malignant appendicular bone tumors, limb preservation surgery was done in 40 patients with a limb preservation rate of 69.0% and it was least for Ewing sarcoma for which it was 57.1%. For benign bone tumors the limb preservation rate was 100%.

Table 2: Histopathological types versus age distribution.

Tumor type	<10yrs	11-15 yrs	16-20 yrs	21-30 yrs	31-40 yrs	41-50 yrs	>50 yrs	Total
Osteosarcoma	7	13	14	5	3	3	4	49
Giant cell tumor	0	0	2	9	4	6	1	22
Chondrosarcoma	0	0	1	1	3	2	4	11
Ewing sarcoma	5	2	1	0	0	0	0	8
Osteochondroma	0	1	0	1	1	0	0	3
Chordoma	0	0	0	0	1	0	2	3
Osteoma	0	0	1	0	0	1	0	2
Adamantinoma	0	0	0	0	0	0	2	2
Fibrous histiocytoma	0	0	0	0	1	0	0	1
Chondromyxoid fibroma	0	0	0	1	0	0	0	1
Benign ossifying fibroma	0	0	0	1	0	0	0	1
Total	12	16	19	18	13	12	13	103

DISCUSSION

Bone tumors are more common in men as per Western data. In the present study osteosarcoma, giant cell tumor, chondrosarcoma and Ewing sarcoma were common in men and chordoma was common in women.

The age specific incidence rates of bone tumors typically show a bimodal distribution, with first peak occurring in the second decade and second peak occurring in patients older than sixty years of age.[3] This is related to the different age distribution of the main histological subtypes, since Ewing sarcoma and osteosarcoma are the most frequent histologic subtypes in the first two

decades, while chondrosarcoma, malignant fibrous histiocytoma, chordoma and secondary osteosarcomas show an increased incidence after the fourth decade.[3]

Table 3: Histopathological types versus tumor location.

Tumor type	Fem-ur	Tibia	Hum-erus	Radius	Fibula	Sca-pula	Man-dible	Sacrum	Chest -wall	Others	Total
Osteosarcoma	27	15	2	0	2	0	3	0	0	0	49
Giant cell tumor	5	5	2	4	1	0	0	1	1	3	22
Chondrosarcoma	4	1	0	0	0	0	0	0	4	2	11
Ewing sarcoma	2	0	2	0	0	2	0	0	1	1	8
Osteochondroma	1	0	1	0	0	0	0	0	0	1	3
Chordoma	0	0	0	0	0	0	0	3	0	0	3
Osteoma	0	0	0	0	0	0	1	0	0	1	2
Adamantinoma	0	0	0	0	0	0	2	0	0	0	2
Fibrous histiocytoma	0	0	0	0	0	1	0	0	0	0	1
Chondromyxoid fibroma	0	0	0	0	0	0	0	0	0	1	1
Benign ossifying fibroma	0	0	0	1	0	0	0	0	0	0	1
Total	39	21	7	5	3	3	6	4	6	9	103

Table 4: Histopathological type versus pattern of surgical management.

Tumor type	Limb sparing surgery	Amputation	Total	Limb preservation rate (%)
Osteosarcoma	32	14	46	69.6
Giant cell tumor	19	0	19	100
Chondrosarcoma	4	1	5	80
Ewing sarcoma	4	3	7	57.1
Osteochondroma	2	0	2	100
Fibrous histiocytoma	1	0	1	100
Chondromyxoid fibroma	1	0	1	100
Benign ossifying fibroma	1	0	1	100
Total	64	18	82	78.0

But in the present study, we observed that bone tumors were more common in age group of 11 to 20 years of age and 33.9% of cases occurred in this age group. There was no bimodal age distribution in our study since the incidence of chondrosarcoma and secondary osteosarcoma was very low in the study population when compared to Western population.

Osteosarcoma is the most common malignant primary bone tumor and it occurs most commonly in distal femur.[2] Similar to Western data, in the present study, osteosarcoma was the most common malignant primary bone tumor and it occurred most commonly in distal femur. In studies by Mohammed et al, Senac et al and Jain et al osteochondroma was the most common benign lesion.[4-6] Unlike the results of these studies, in the present study, giant cell tumor was the most common benign tumor followed by osteochondroma. Di Caprio et al and Chauhan et al stated that 80% to 85% of patients with primary malignant bone tumors involving the extremities can be treated safely with wide resection and limb preservation with or without reconstruction.[7,8] But in the present study the limb preservation rate for malignant bone tumors of extremities was 69.0% and it was least for Ewing sarcoma for which it was 57.1%. This might be because of the reason that most patients presenting to our institution had advanced disease at diagnosis.

CONCLUSION

The diagnosis of bone tumor depends not only on histopathological features but also needs correlation with age, clinical features, tumor location and radiological features for confirmation of diagnosis. The demographic and clinico-pathological features of primary bone tumors that were treated in our institution differed from that of Western data and it may be useful for better understanding of the disease.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Bone tumor. Available at: https://www.nccn.org/professionals/physician_gls/pdf/bone.pdf accessed on 18/10/2021. Accessed on 20 August 2021.
2. DeVita VT, Lawrence TS, Rosenberg SA. Devita Hellman and Rosenberg's Cancer principles and practice of Oncology. 11th ed. United States of America: Walters Kluwer; 2019.
3. Alessandro F. Epidemiology and classification of bone tumors. Clin Cases Miner Bone Metab. 2012; 9(2):92-5.
4. Mohammed A, Isa HA. Patterns of primary tumours and tumour like lesions of bone in Zaria. Northern Nigeria: A review of 127 cases. West Afr J Med. 2007;26:37-41.
5. Senac MO, Isaacs H, Gwinn JL. Primary Lesions of bone in 1st decade of life: Retrospective survey of biopsy result. Radiology. 1986;160:491-5.
6. Jain K, Sunila, Ravishankar R. Bone tumors in a tertiary care hospital of south India: A review 117 cases. Indian J Med Paediatr Oncol. 2011;32(2):82-5.
7. DiCaprio MR, Friedlaender GE. Malignant bone tumors: limb sparing versus amputation. J Am Acad Orthop Surg. 2003;11(1):25-37.
8. Chauhan A, Joshi GR, Chopra BK, Ganguly M, Reddy GR. Limb salvage surgery in bone tumors: a retrospective study of 50 cases in a single center. Indian J Surg Oncol. 2013;4(3):248-54.

Cite this article as: Shanmugam S, Susikar S, Bharanidharan T, Jebasingh AV. Demographic, clinico-pathological features and management pattern of primary bone tumors in a tertiary care hospital of South India. Int J Res Orthop2022;8:60-3.