



INCIDENCE OF HISTOPATHOLOGICAL STUDY OF BONE TUMOUR IN TERTIARY CARE CENTRE

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ABSTRACT

BACKGROUND- The correct diagnostic evaluation of the bone tumors is important of planning appropriate treatment of any bone tumor. The collaboration between radiology and pathology helps in providing a common database for the correct approach to the surgeon. Bone tumors are relatively uncommon among the wide array of lesions and they pose a diagnostic problem among pathologist because of the less diagnostic experience and availability.

AIMS & OBJECTIVES- To evaluate the histology of bone lesions and correlate them with respect to age sex & site of involvement.

MATERIALS & METHODS- Data corresponding to 84 patients with bone swellings presented to GSVM hospital were analyzed in the period between 2018 to October 2020. All clinical data was collected such as age, sex, site of involvement and histopathological patterns of bone lesions.

RESULTS- Total benign bone lesions were 59.5% while that of malignant bone lesions were 40.5%. Giant cell tumor was the most common lesion among males and females. Most common site of tumor was around knee joint and most common region involved is metaphysis.

CONCLUSION- We conclude that if clinical radiological and histopathological correlation is made then we can easily reach correct diagnosis even considering the fact that bone tumors are less common and its difficult to diagnosis them.

KEYWORDS : Bone tumors, giant cell tumor, metastasis, and osteosarcoma.

INTRODUCTION

Bone is made of cartilage, osteoid, fibrous tissue, and bone marrow elements, with each tissue having a potential to develop a lesion either benign or malignant¹. Bone tumors are relatively uncommon, constituting only 0.5% of all types of cancer². Bone tumors are classified on the basis of cell type, recognized products of proliferating cells³. The bone lesions range from inflammation, degenerative changes, and metabolic diseases to neoplasm and each of the components can give rise to benign or malignant tumors^{4,5}.

Diagnosed of Cancer disease during adolescence and elder adulthood, patients require added care and follow-up, because it can have long-term consequences, such as the development of secondary tumors even after clinical cure.⁶ Pathological bone lesions can show in a variety of ways, ranging from inflammatory to neoplastic disease. It's crucial to note that some benign processes, like osteomyelitis, can seem like malignant tumors, and that other malignant lesions, such as metastases or myeloma, can look like benign. It is difficult to determine radiologically with plain film imaging whether a bone lesion is benign or malignant.⁷ Together, the orthopedic surgeon and the radiologist will be unable to make a clear conclusion and further treatment. Histopathology is the gold standard for determining the correct diagnosis of a wide range of bone lesions.⁸ The interpretation of biopsy material is essential for determining the precise diagnosis of bone lesions, mapping out a treatment strategy, and evaluating prognosis.⁹ As a result, this study was conducted with the goal of determining the patterns of various bone lesions and correlating them with age, gender, and the location of the lesions.¹⁰ The good integrated approach is used involving radiographic, histological and clinical data; an accurate diagnosis will be formed to determine the degree of activity and malignancy of lesion. In The present study 84 biopsy specimen of bone lesion were taken which was received in the Department of Pathology at GSVM Medical College during period of 2 years from (2018 to Oct 2020).

Materials And Methods

The study on Bone Tumors and tumor like lesions was conducted in the department of Pathology, G.S.V.M. Medical College, Kanpur. Specimens were collected from L.L.R. Hospital & associated hospitals J.K. Cancer Institute Kanpur.

The biopsy specimens were systematically examined after noting down the clinical history and radiological findings. Soft tissues were processed routinely by paraffin section for light microscopy after fixation in 10% neutral buffered formalin. The large bony pieces were cut into smaller fragments (2 – 6 mm), fixed in 10% neutral buffered formalin and washed before subjecting to decalcification.

Decalcification solution (10% hydrochloric acid/ 5% nitric acid/ 10% EDTA disodium salt) was used until the tissue softened and later they were taken for processing. Sections were cut at 4-5 microns using rotary microtome and stained with Haematoxylin and Eosin and special stains whenever needed.

Statistics

Out of 84 cases, 68 cases showed positive correlation between histopathological and clinic-radiological diagnosis.

Sensitivity came out to be 80.09%.

Positive predictive value came out to be 80.09%.

Using chi square test we found this correlation to be significant.

$\chi^2 = 89.76$
P value < 0.05

RESULTS

In this study, the various parameters were taken according to Age, Gender wise distribution, behaviour of bone lesion,

based on symptomatically, Radiological findings of bone, bone lesions based on region involved, based on WHO Classification and Histological changes. Out of 84 cases, the most common age group affected was 11-20 years (33.3%) and other 21-30 years (26.1%), the other age groups were shown in Table 1].

Males were affected more than females [64.2% & 35.8 %] [Table-2]. Out of the 84 cases presented 59.5 % were benign [Table 3]. 47 % cases presented with the complain of pain and swelling [Table 4]. 35.7% cases presented with lytic with less sharp lesion radiologically [Table 5]. Overall the most common region involved is metaphysic [Table 6]. Out of 84 cases, maximum number of cases were of Giant Cell Tumour (35.7%) followed by miscellanies lesion (23.8%) and cases of cartilaginous tumours (16.6%)[Table 7].

Table 1:- Distribution of cases according to age

AGE (in years)	FREQUENCY	PERCENTAGE (%)
0-10	2	2.3
11-20	34	33.3
21-30	22	26.1
31-40	6	7.1
41-50	2	2.3
51-60	16	19.0
61-70	2	2.3
TOTAL	84	100

Table 2:- Gender wise distribution of cases

Gender	Frequency	Percentage (%)
Male	54	64.2
Female	30	35.8
Total	84	100

Table 3- Distribution of cases based on behavior of bone lesion

Bone lesion	Frequency	Percentage
Benign	50	59.5
Malignant primary	14	16.6
Metastasis	6	7.1
Tumour like lesions	14	16.6
Total	84	100

Table 4:- Distribution of cases based on symptomatically

Symptoms	Frequency	Percentage
Pain	15	17.8
Swelling	14	16.6
Pain and swelling	40	47.6
Inability to walk	1	1.1
Pain, swelling and restriction of movement	14	16.6
Total	84	100

Table5:- Distribution of Radiological findings of bone

Radiological Finding	Frequency	Percentage
Lytic with rim of sclerosis	6	7.1
Lytic with very well limited lesion	20	23.8
Lytic with less sharp lesion	30	35.7
Sclerotic	8	9.5
Permeative lytic lesion	3	3.5
Lytic and sclerotic	2	2.3
Lytic with specks of calcification	15	17.8
Total	84	100

Table 6:- Distribution of bone lesions based on region involved

Region involved	Frequency	Percentage (%)
Epiphysis	26	30.95
Metaphysis	40	47.6
Diaphysis	12	14.2
Diffuse involvement	6	7.1
Total	84	100

Table 7:- Distribution of cases based on WHO Classification

WHO Classification	Frequency	Percentage (%)
Cartilaginous Tumours	14	16.6
Osteogenic Tumours	10	11.9
Ewing's sarcoma/ PNET	2	2.3
Giant cell Tumour	30	35.7
Notochordal Tumour	2	2.3
Miscellaneous Tumour	6	7.1
Miscellaneous Lesions	20	23.8
Total	84	100

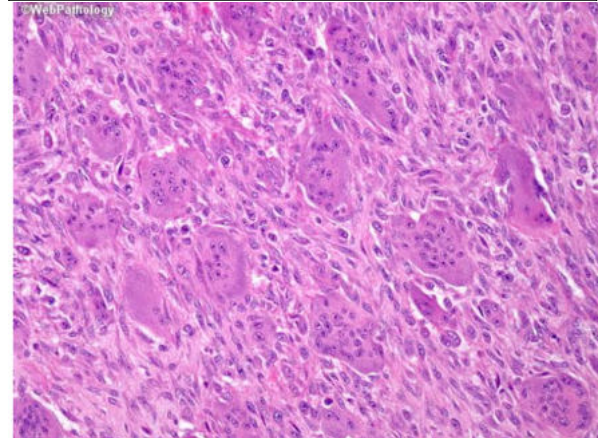


Fig-1: Giant cell tumor (GCT): Evenly distributed multinucleate giant cells separated by neoplastic spindle cells(H & E x100)

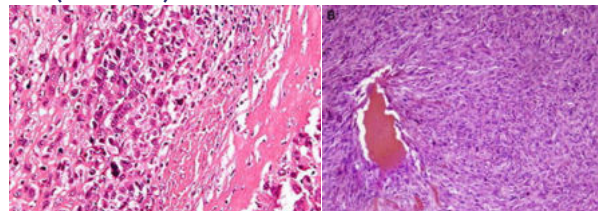


Fig 2© Osteosarcoma: Primitive osteoid and pleomorphic spindle cells. (H & E x100)

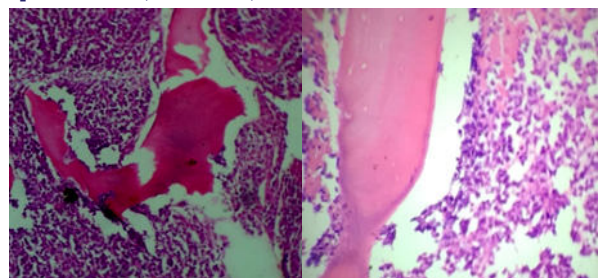


Fig. 8(a): H & E x100 Fig. 8(b): H & E x400 Ewing's Sarcom

DISCUSSION

In the present study, a significant proportion of neoplastic bone lesions were seen to occur in out of 84 cases, the most common age group affected was 11-20 years (33.3%) and other 21-30 years (26.1%), the other age groups were shown in Table 1]. This finding is similar to reports by Omololu et al.,¹¹ and Mohammed et al.¹² in their studies of bone tumors in all age groups.

In present study, bone lesions were most commonly seen in younger age group (<20 years). Males were more commonly affected more than females [64.2% & 35.8 %] [Table-2]. Most tumors of the bone showed male preponderance with male to female higher ratio these findings are similar to our institutional study according to previous reported similar findings were in other studies.¹³ Benign cases were more common as compared to malignant cases similar to other studies¹⁵⁻¹⁷ Giant cell tumour was the

most common neoplastic benign condition (59.9%). *Giant cell tumor (GCT)* evenly distributed multinucleate giant cells separated by neoplastic spindle cells shown on figure 1. In our study, Giant cell tumor was the most common benign tumor followed by Osteochondroma similar to studies like in Modi D, Rathod GB, Delwadia KN, et al 2016¹⁸, in some other studies Osteochondroma was the most common followed by giant cell tumor.^{19,20}

In our study, we found the majority of benign cases (59.9%), which was comparable with the findings of previous investigations.²¹⁻²³ The prevalence of benign tumors was found to be relatively high (84%) in certain research¹⁶, which might be related to discrepancies in sample size and selection methods. Among 50 benign tumors, we diagnose the majority (59.9%) of benign tumors as osteosarcoma, followed by cases of Benign Giant Cell Tumor. The majority of instances of benign giant cell tumor were detected in age group 11 to 20, whereas the majority of cases of malignant giant cell tumor were identified in age group 21 to 30. These findings in our study corroborate the findings of other study.²³⁻²⁴ The most prevalent malignant primary bone tumors are osteosarcomas, which account for 14 (16.6%) of all cases, and metastasis, which accounts for 6 (7.1%). In our investigation, 16.6% of malignant tumors were diagnosed, followed by 16.6% of chondrosarcoma cases; both of these tumors were found in people aged 11 to 20 years. Other researchers found comparable results, as well as tumor-like lesion instances 14 (16.6%).^{21,23-25}

Solid tumors are more likely to metastasize to the bone, according to the research.²⁶⁻³⁰ Three metastatic lesions were found in the current investigation, all of which were in the older age range (61-70 years). The literature also shows that metastatic tumors are common in this age range.^{23,31-32}

CONCLUSION

In conclusion, this study showed that clinical radiological and histopathological correlation is made then we can easily reach correct diagnosis primary bone tumors were malignant & benign define with grading of growth, occurred the fact that bone tumors are less common and its difficult to diagnosis them.

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