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EVALUATION OF NEOPLASTIC BONE LESIONS: A MORPHOLOGICAL STUDY AT A TERTIARY CARE CENTRE.

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ABSTRACT… Objectives: To determine the pattern and frequency of various bone tumors at a tertiary care centre in rural area. **Study Design:** Retrospective study. **Setting:** Orthopaedic Peoples University of Medical and Health Sciences (PUMHS), Nawabshah. **Period:** June to December 2018. **Material and Methods:** The 5 years record from July 2015 to June 2018, of all the patients who were admitted and operated for any bone tumor was retrieved. A total of 68 cases were included in the study having complete file record, regardless of their age and sex, the histopathological report of their bone biopsy was mandatory for inclusion in the study. The patients of incomplete file record, without histopathological report and the cases of other bone non-neoplastic conditions were not included in the study. All the collected data was recorded on a proforma, analysed statistically and results were tabulated. **Results:** In present study 68 cases of bone tumors were evaluated. The patients were aged between 7.5 to 73 years with a mean of 26.4 + 12.7 years. Among these 68 cases 41 (60.3%) were male. The malignant tumors were diagnosed in 25 (36.8%) cases among these 14 (20.6%) cases in male patients and 11 (16.2%) cases in female. The overall benign tumors were observed in 43 (63.2%) cases, and among these 27 (39.7%) cases were male and 16 (23.5%) cases were female. Osteosarcoma was the most common malignant tumor diagnosed in 14/25 (56%) cases followed by chondrosarcoa in 4/25 (16%) cases. In benign tumors the osteochondroma was the commonest tumor detected in 11/43 (25.6%) cases followed by benign giant cell tumor which was diagnosed in 9/43 (21%) cases. Most of the malignant tumors (24%) were diagnosed in 11 - 20 years age group, and most of benign tumors were detected in 21-30 and 31- 40 age groups each comprising of 23.3% cases. Three cases of metastatic tumors were also diagnosed and all were present in older 61 – 70 years age group. **Conclusion:** The bone tumors are more common in males, occurred predominantly in the second decade of life. osteochondroma and osteosarcoma was the most common benign and malignant bone tumors. Metastatic lesions were observed in older age group.

Key words: Bone Tumors, Histopathology, Osteochondroma, Osteosarcoma.

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INTRODUCTION

The bone tumors are comparatively rare.[1] The exact frequency of bony neoplasm is still controversial, as many benign lesions are not biopsied and recorded. In general when we exclude the myeloma and lymphoma, the tumors of bone having malignant biological behaviour make up only 0.2% of all malignancies in adults and approximately 5% of all malignancies in childhood.[2] Mostly the bone tumors develop during the early decades of life and having predilection towards the long bones of the extremities. The tendency of particular tumor in certain age group and instance at specific sites, gave significant diagnostic information about that tumor[3], their diagnosis is routinely made by radiological support using plain X-ray, CT (computed tomography) scan, MRI (magnetic resonance imaging), or bone scintigraphy.[4] Beside these all the histopathology provides accuracy in diagnosing these bone tumors or tumor like lesions.[5] Bone lesions may create diagnostic challenges to orthopaedic surgeons and surgical pathologists[6], as the normal is composed of four types of elements including osteoid, cartilage, fibrous tissue and bone marrow, among which

any element may be responsible for various benign and malignant neoplastic lesions.[7]

Due to large variety of bone disorders, the exact diagnosis is very difficult clinically, and only exception to melanoma, the biochemical analysis is not much significant.[8,9] The microscopic examination is necessary in the diagnosis of bony lesions as some disorders have lack of clarity in the clinical diagnosis of benign and malignancy, like Osteomyelitis and Ewing's sarcoma, traumatic or pathological fractures, osteoblastoma or osteosarcoma, myeloma or metastasis, tuberculosis or malignancy.[9] Therefore, coordination between radiographic, histologic and clinical data including age, gender, and site of lesion is necessary for an even better management of these bony lesions.[10]

The present study was conducted to determine the pattern of various neoplastic conditions of bone and their relative frequency in our setup at a tertiary care centre in rural area.

METHODS

This retrospective study was conducted in the department of Orthopaedic PUMHS, Nawabshah, during June to December 2018. The 05 years record was retrieved, from July 2015 to June 2018. We collect the data of patients who were admitted and operated for any bone tumor. A total of 68 cases were included in the study, who were having the complete file record, regardless of their age and sex, and histopathological report of their bone biopsy which was mandatory for inclusion in the study. The relevant demographic and clinical details were recorded on a proforma designed for the study. The patients with incomplete file record, without histopathological report and the cases of other bone non-neoplastic conditions were not included in the study. As the separate paediatric orthopaedic department is not established in our institute, so paediatric population was also included in our study. All the data collected was statistically analysed and the results were tabulated.

RESULTS

In present study 68 cases of bone tumors were evaluated. The patients were aged between 7.5 to 73 years with a mean of 26.4 + 12.7 years. Among these 68 cases 41 (60.3%) were male and 27 (39.7%) were female. The peak age incidence was observed in 20 - 40 years of age (Table-I). Out of 68 cases the malignant tumors were diagnosed in 25 (36.8%) cases among these 14 (20.6%) cases in male patients and 11 (16.2%) cases in female. The overall benign tumors were observed in 43 (63.2%) cases, and among these 27 (39.7%) cases were male and 16 (23.5%) cases were female (Table-I & II). Osteosarcoma was the most common malignant tumor diagnosed in 14/25 (56%) cases followed by chondrosarcoa in 4/25 (16%) cases. In benign tumors the osteochondroma was the commonest tumor detected in 11/43 (25.6%) cases followed by benign giant cell tumor which was diagnosed in 9/43 (21%) cases (Table - III). Most 6/25 (24%) of the malignant tumors were diagnosed in 11 - 20 years age group, and most of benign tumors were detected in 21-30 and 31- 40 age groups each comprising of 10/43 (23.3%) cases (Table-III). Three cases of metastatic tumors were also diagnosed and all were present in older 61 – 70 years age group (Table-III).

Age (years)	Male		Female		Total
	Benign	Malignant	Benign	Malignant	
0-10	03	01	02	--	06
11-20	04	04	02	02	12
21-30	06	02	04	02	14
31-40	07	02	03	02	14
41-50	04	02	02	02	10
51-60	02	01	03	--	06
61-70	01	02	--	02	05
>70	--	--	--	01	01
Total	27 (39.7)	14 (20.6)	16 (23.5)	11 (16.2)	68

Table-I. Gender and age wise distribution of bone tumors (n=68)

Histological type	Male	Female	Total (%)
Malignant Tumours			
Osteosarcoma	09	05	14
PCM	00	01	01
Chondrosarcoma	03	01	04
NHL	01	01	02
MGCT	00	01	01
Metastatic	01	02	03
SUBTOTAL	14	11	25 (36.8)
Benign Tumours			
Osteochondroma	07	04	11
Chondroma	05	03	08
Chondroblastoma	01	00	01
Osteoma	04	02	06
Osteoid Osteoma	00	01	01
Osteoblastoma	00	01	01
BGCT	06	03	09
Myxoma	02	01	03
Fibromyxoma	00	01	01
Chondromyxoid Fibroma	01	00	01
Desmoplastic Fibroma	01	00	01
SUBTOTAL	27	16	43 (63.2)
OVERALL TOTAL (%)	41 (60.3)	27 (39.7)	68

Table-II. Frequency of histological types of bone tumors by sex (n-68)

Histological Type	0-10	11-20	21-30	31-40	41-50	51-60	61-70	> 70	Total (%)
Malignant Tumours									
Osteosarcoma	01	04	03	03	02	01	-	-	14 (56)
PCM	-	-	-	-	-	-	-	01	01 (4)
Chondrosarcoma	-	02	-	01	01	-	-	-	04 (16)
NHL	-	-	-	-	01	-	01	-	02 (8)
MGCT	-	-	01	-	-	-	-	-	01 (4)
Metastatic	-	-	-	-	-	-	03	-	03 (12)
Sub Total	01	06	04	04	04	01	04	01	25
Benign Tumours									
Osteochondroma	03	02	02	02	01	01	-	-	11 (25.6)
Chondroma	02	01	03	01	01	-	-	-	08 (18.6)
Chondroblastoma	-	-	-	01	-	-	-	-	01 (2.3)
Osteoma	-	02	01	01	01	01	-	-	06 (14)
Osteoid Osteoma	-	-	-	01	-	-	-	-	01 (2.3)
Osteoblastoma	-	-	-	-	01	-	-	-	01(2.3)
BGCT	-	01	03	02	01	01	01		09 (21)
Myxoma	-	-	01	01	01	-	-	-	03 (7)
Fibromyxoma	-	-	-	-	-	01	-	-	01(2.3)
Chondromyxoid Fibroma	-	-	-	01	-	-	-	-	01(2.3)
Desmoplastic Fibroma	-	-	-	-	-	01	-	-	01(2.3)
Sub Total	05	06	10	10	06	05	01	-	43
Overall Total (%)	06 (8.8)	12 (17.6)	14 (20.6)	14 (20.6)	10 (14.7)	06 (8.8)	05 (7.4)	01 (1.5)	68

Table-III. Age wise distribution of histological types of bone tumours.
PCM – Plasma Cell Myeloma NHL – Non-Hodgkin's Lymphoma
MGCT – Malignant Giant Cell Tumour BGCT – Benign Giant Cell Tumour

DISCUSSION

The bone tumors are relatively less common neoplasms having diversity in biological behaviour and pathological features, so accuracy is essential in the diagnosis, staging and appropriate treatment of these neoplasms. The clinically aggressive tumors often need extensive local and/or systemic treatment, the surgery often disfigure the parts that makes the management of these neoplasms challenging.[3] Clinical features of bone tumours are mainly non-specific or not recognised, and usually not detected in the initial stages[11], so experience in diagnostic orthopaedic pathology is also needed in maintaining the high standard of histological reporting.[12] In present study we evaluate 68 cases of neoplastic lesions of bone, we observed that these lesions are more common in younger persons between 20 - 40 years of age, as observed by other studies[13] and the male (60.3%) were found affected more than the females, this was also the observation of other researchers mentioned in the literature.[1,7,10,14] We detect majority of benign (63.2%) cases in our study, which was in consistent with the findings of other studies[10,13,15] some studies showed a very high (84%) frequency of benign tumors[16], these differences may be due to differences in sample size and selection criteria. Among 43 benign tumors, we diagnose majority (25.6%) of cases as osteochondroma followed by 21 % cases of Benign Giant Cell Tumor. The majority of cases of osteochondroma were fall in the 0 - 10 years age group, while the most of the cases of benign giant cell tumor were diagnosed in 21 - 30 years age group, these findings in our study confirms the observations of other studies.[7,15] Osteosarcomas are the most frequent malignant primary bone tumours mentioned in the literature, and detected as the most common (56%) diagnosis among malignant tumors in our study followed by 16 % cases of chondrosarcoma, both of these tumors were present in 11 - 20 years age group, similar results were observed by other workers.[7,10,15,17]

Bone metastasis are almost always multiple that involve the axial skeleton.[18] Metastasis is the process involving loss of intercellular cohesion, cell migration, angiogenesis, access to systemic circulation, survival in circulation, evasion of local immune responses, and growth at distant organs. Bone is the third commonest site of metastatic tumors after lung and liver, some studies shows that the bone metastasis is more prevalent than primary bony neoplasm. As the bony metastasis are frequent, they typically represent a short-term prognosis in cancer cases, and the tumor is rarely cured after spreading in to the bones, but often it can still be treated to slow its growth. The majority of skeletal metastases are due to breast and prostate cancer. The literature reveals that the solid tumors more frequently metastasize to the bone.[19-23] In current study 3 metastatic lesions were found, all of these were in older age group (61-70 years), the literature also show the incidence of metastatic tumors in similar age group.[7,24,25]

CONCLUSION

The bone neoplasms are predominantly occur in younger (2nd and 3rd decade) age group with proclivity for male gender. The frequency of benign tumors are more common than the malignant ones, osteosarcoma was the most common diagnosis in malignant tumors, and among benign tumors, osteochondroma was the most frequent diagnosis.

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Everyday may not be a **good day** but there is good in every day.

"Unknown"

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Karam Ali Shah	Concept & Design study.	
2	Qaiser Husain Naqvi	Data collection, Drafting	
3	Saeed Ali Shah	Review of literature, Data analysis.	
4	Zahoor Illahi Soomro	Data collection and Data collection.	
5	M. Azeem Akhund	Revisiting critically, Proof reading.	
6	Allah Nawaz Abbasi	Proof reading and Final approval of version.	