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Original Article

Spectrum of Bone Lesions at Pakistan Institute of Medical Sciences

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Abstract

Objective: To study demographic details of bone lesions diagnosed at Pakistan Institute of Medical Sciences (PIMS), Islamabad

Patients and Methods: A retrospective analysis of histopathology reports of 222 patients diagnosed to have various types of bone lesion, in the department of pathology at Pakistan Institute of Medical Sciences, Islamabad during a period of five years (July 2005- June 2010) was conducted. These biopsies were evaluated on hematoxylin and eosin (H&E) stained sections from paraffin embedded tissue blocks. Special stains performed whenever required.

Results: Pyogenic osteomyelitis comprised 43.6% of all bone pathologies, followed by granulomatous most probably tuberculous osteomyelitis in 7.6%. Chronic osteomyelitis was more commonly observed in 20-30 years of age group and males were affected more as compared to females. The commonest age group for benign lesion was 11-20 years. Primary malignant tumors were noted in 4.9% cases and metastatic tumors were seen in 14.4%. The commonest age group for metastatic tumors was more than 50 years of age. Males were affected more as compared to females in overall bone lesions. Femur was the commonest site in primary bone lesions. Jaw bones and scalp were more commonly involved metastatic tumors.

Conclusions: Metastatic tumors were more common than primary malignancies. Scalp and mandible involvement was seen in metastatic tumors and bones of lower limbs were more commonly involved in primary bone lesions. Males were more commonly affected than females in this study.

Key words: Primary bone tumors, Metastatic tumors, Tumor like lesions.

Introduction

Bone infections, tumor like lesions and neoplasms are not common lesions and pathologists generally lack clinical experience with these lesions. Histopathologist requires clinical and radiological details for final diagnosis. Benign, malignant and non-neoplastic bony lesions occur at typical sites and certain age groups. Non-specific osteomyelitis can be diagnosed in younger age group and clinically presents as acute, chronic or granulomatous inflammation.[1] Although acute osteomyelitis seems to be less prevalent, the timely diagnosis and management in cases of osteomyelitis is a major challenge. Staphylococcus aureus accounts for 40-80% of infections followed by group A beta-haemolytic streptococcus.[2] In USA the wide spread use of Hemophilus influenzae vaccine has virtually eliminated acute osteomyelitis caused by this organism.[3]

The world Health Organization (WHO) has estimated that one third of the global population is infected with Mycobacterium tuberculosis (MTB). Tuberculosis has been reported in all bones of the body.[4] The positive yield of MTB by different available methods is reported less frequently. Therefore clinical correlation with other supportive tests in combination may be helpful for diagnosis and management.

Bone tumors in comparison to the myriad of other tumors are relatively uncommon, constituting only 0.5% of all types of cancer.[5] Bone tumors remain a daunting challenge to the orthopedic surgeons and the pathologists. The majority of primary bone tumors present during childhood and late adolescence, coinciding with the growth spurt and time of maximum constructive activity of bone. They frequently affect long bones and tend to occur at the ends of bones where growth is maximum. Osteosarcoma is the most common primary malignant bone tumor in children followed by Ewing's sarcoma and lymphoma.[6] Tumor like bone lesions include various non-neoplastic lesions originating from or affecting the bone as solitary or some times multiple lesions. These include simple bone cyst, aneurysmal bone cyst, intra-osseous ganglion, epidermal cyst and sub-chondral cyst.[7, 8]

This study was designed to study demographic details of bone lesions diagnosed at PIMS.

Materials and Methods

A retrospective study was performed at the department of pathology, PIMS, from July 2005 to June 2010. The histopathological reports, slides and request forms were retrieved from records of department. Total number of bone specimens received during the study period was 270. Out of these, 48 specimens were excluded due to non-representative tissue for diagnosis. The remaining 222 biopsy specimens of bone lesions with appropriate diagnosis were included in the study. Results were entered on SPSS version 15. Mean and standard deviation were calculated for quantitative variables e.g. age. Frequencies and percentages

were calculated for qualitative variables like histological diagnosis, gender, site of involvement etc.

Results

Frequencies of various histological diagnoses, gender, age and site distribution are summarized in Table 1 and 2. Among 222 cases, a total of 114 (51.2%) cases of osteomyelitis were diagnosed. Out of these 92 were of chronic osteomyelitis, 5 were acute and 17 were tuberculous osteomyelitis. Eighty one were males and 33 were females. Sixty six cases were in the age range of 11-30 years of age group. Sites of involvement were lower limbs in 86, upper limbs in 10, and scalp in 6 cases. In the remaining 12 cases site was not known.

Bone tumors were diagnosed in 108 (48.8%) cases. Benign tumors and tumor like lesions were diagnosed in 65 (29.3%) cases. These included 15 (6.7%) cases of osteochondroma, 12 (5.4%) of aneurysmal bone cyst, 8 (3.6%) of fibrous dysplasia, 6 (2.7%) of giant cell tumor, 4 (1.8%) of osteoma, and 3 (1.4%) of chondroma. The lower limb was affected in most cases (Table 1). Males were 41 and remaining were females.

Most of the lesions were in the age group of 11-20 years (Table 2). Primary malignant tumors were seen in 11 (4.9%) cases. Among these 7 cases were of osteosarcoma and 4 cases were of Ewing's sarcoma. In 9 cases lower limb was involved. Males were affected in 6 cases and females in 5 cases. Ewing's sarcoma was most frequently seen in first decade and osteosarcoma in second decade.

Metastatic cancers were seen in 32 (14.4%) cases. Among them squamous cell carcinoma was seen in 14 (6.3%) cases and metastatic malignant neoplasm in 5.0%. The remaining patients had small cell carcinoma, meningioma, adenocarcinoma, renal cell carcinoma and follicular cell carcinoma of thyroid. The mean age was more than 51 years in most cases. Out of 32 cases of metastatic tumors, 22 were males and 10 were females. In majority of squamous cell carcinoma patients, mandible was involved.

Table 1: Frequency of bone lesions according to site (n=222)

Diagnosis	Upper limb	Lower Limb	Face / Scalp	Spine	Unknow	Total (%)
Osteomyelitis	7	74	0	0	16	97 (43.7)
TB Osteomyelitis	3	8	0	4	2	17 (7.6)
Osteochondroma	7	7	0	0	1	15 (6.7)
Chondroma	3	0	0	0	0	3 (1.4)
Osteoma	0	1	3	0	0	4 (1.8)
Osteomalacia	0	2	0	0	0	2 (0.9)
Osteoid Osteoma	0	1	0	0	0	1 (0.5)
Bone Cyst	1	9	1	1	2	14 (6.3)
Fibrous Dysplasia	0	5	3	0	1	9 (4.1)
Giant cell tumor	4	1	0	0	1	6 (2.7)
Osteosarcoma	0	6	0	0	1	7 (3.1)
Ewing's Sarcoma	0	2	0	0	2	4 (1.8)
Metastatic Cancer	0	8	20	0	4	32 (14.4)
Others	2	4	4	0	1	11 (5.0)

Discussion

Pattern of bone lesions is reported less frequently. Osteomyelitis is common in 10 to 30 years of age group and potentially serious disease.[9] This disease is less common in developed countries but constitutes most of the bone pathology lesions in developing countries. Majority of the cases are located in lower limbs followed by upper limbs in this study. The similar findings also reported by Hanif et al and Rasool et al.[10, 11] Tuberculous osteomyelitis has been reported in all bones of body.[12] In addition, the spine is the most frequently involved site in adults whereas it is rare in children, as reported in our study.

Bone tumors are more common in adolescence age group. Osteosarcoma is the second commonest cause of death due to cancer in children. It is most frequently seen in young people in the second and early third decades of life as over 60% of diagnosis are made between 10-20 years of age group.

The similar findings were observed in this study. It usually occurs in metaphyses of long bones most frequently in order of distal femur, proximal tibia, proximal humerus and proximal femur.[13] In contrast to osteosarcoma, Ewing's sarcoma tends to occur at much younger age group. Ewing's sarcoma is comparatively rare but highly malignant neoplasm. It not only affects long bones but also spine, pelvis and ribs.[14] This is in contrast to our findings that 2 out of 4 cases were diagnosed in lower limbs. Ewing's sarcoma was equally distributed in both sex and first decade of life in the present study, which is in contrast to Cotteril et al, who analyzed 975 cases of Ewing's sarcoma and found age range of 8 months to 47 years with a higher incidence in males under 15 years of age.[15] Another study carried out by Muzaffar et al on frequency of bone cancer at Agha khan University Hospital found that osteosarcoma was the most common primary bone malignant tumor followed by Ewing's sarcoma. They also found that bone tumors are relatively more prevalent in males.[16] The metastatic tumors are common in old age group and uncommon in pediatric age group. These findings also observed by Tsukushi et al.[17]

Tumor like bone lesions include various bone cysts, ganglion cyst etc. We found 12 (5.4%) cases of aneurysmal bone cyst in males and females 2:1, majority of the cases

were in 10-20 years of age group and lower limb was commonly involved.

Table 2: Frequency of bone lesions according to Age & Sex (n=222)

Diagnosis	Age (Yrs)	Male	Female
Osteomyelitis	3-75	71	26
TB Osteomyelitis	7-64	10	7
Osteochondroma	14-41	12	3
Chondroma	20-23	0	3
Osteoma	24-64	0	4
Osteomalacia	19-65	2	0
Osteoid Osteoma	18	1	0
Bone Cyst	8-23	10	4
Fibrous Dysplasia	10-71	4	5
Giant cell tumor	14-51	4	2
Osteosarcoma	13-40	4	3
Ewing's Sarcoma	8-23	2	2
Metastatic Cancer	21-70	22	10
Others	11-40	6	5

Spence et al also observed the same findings.[18] Metastatic tumors were observed in 11.1% cases by Jain et al[19] and common sites for metastatic tumors were femur with pelvis, spine and humerus with ribs. In contrast our study revealed jaw bones were the commonest site for metastatic tumors.

Conclusion

Osteomyelitis is the most frequent bone pathology. Among the malignant bone tumors osteosarcoma is more prevalent in males than females followed by Ewing's sarcoma. In the majority of primary bone lesions, lower extremity is the most frequent site of involvement. Metastatic tumors are more common in elderly age group.

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