

Morphological Pattern of Bone Lesions: Study of 204 Cases

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ABSTRACT

Objective: To study histopathology of bone lesions and correlate them with age, gender and site of occurrence

Subjects and Methods: Retrospective study done of all bone lesions in for a period of 6 years from January 2008-December 2014 was done.

Results: Bone lesions were more common in males 124 (60.8%) than in females 80 (39.2%) (p-value < 0.005)

The most frequent age group affected with bone lesion was less than 20 105(51.5%). Amongst non-neoplastic lesions, nonspecific osteomyelitis 24(11.8%) and actinomycosis 19 (9.3%) affected all age groups.

The most common benign tumors was osteochondroma representing 50(24.5%) while Giant cell tumor was the second frequent 31(15.2%). Osteosarcoma was diagnosed in 14(13.6%) cases

Amongst the tumor like lesions, the commonest were the simple cyst 11(5.4%) predominant in age 20-40. (p-value < 0.001).

Actinomycosis affected only metatarsal bone 19(9.3%). Nonspecific osteomyelitis 12(5.9%) tuberculous osteomyelitis 5(2.5 %)

The frequent site of benign, malignant bone tumors and tumor-like lesions, was in tibia (p-value < .001)

Conclusion: There is male preponderance for bone lesions. Nonspecific osteomyelitis was most frequent non-neoplastic bone lesions. Among the bone tumors, osteochondroma and osteosarcoma were common. Tibia was the frequent site affected.

KEYWORDS: bone, osteomyelitis, osteochondroma, osteosarcoma site

INTRODUCTION

Bone lesions are less commonly encountered lesions.^[1] A spectrum of pathological bone lesions can be presented in any form from inflammatory to neoplastic conditions. ^[2] Bone lesions often pose diagnostic challenges to surgical pathologists. ^[3] This challenge is magnified in an environment where resources are scarce ^[4]

They may affect children, adults or the elderly persons. They sometimes occur and develop quickly, often revealing themselves through pain, or the appearance of a palpable mass or by restricting the movement of the part involved. ^[5] Clinical symptoms alone are of relatively little significance in most bone lesions as most patients complain of pain or swelling or both. ^[6] The roentgenogram can be considered as gross manifestation of bone lesion. ^[7] It helps in defining exact location of lesion; however, it also has limitations as it reflects the gross manifestation of the lesion only. ^[1]

Histopathological study enables us to understand the spectrum of bone lesions and gives an idea of different bone tumours and tumour-like lesions. ^[5]

The aim is to study histopathology of bone lesions and correlate them with age, gender and site of occurrence.

SUBJECTS AND METHODS

A retrospective review of histopathological reports of all bone specimens received in the IbnSina pathology laboratory in Aden for a period of

6 years from January 2008 December 2014 was done. All the histopathological request forms and slides of bone biopsies were reviewed for relevant information of age, gender, histopathological interpretation and the anatomical site of occurrence. Data processing and data analysis were done using the Statistical Package for the Social Sciences (SPSS-20). Percentage was calculated and approximated. Chi-Square test was applied to identify any significant relationship between the study variables with a significant level of p-value lesser than 0.05. All tumors of hematopoietic and odontogenic origin were excluded in this study

Ethics statement

Ethical approval was obtained from Research and Ethics Committee faculty of Medicine and Health Sciences university of Aden. (REC 37-2018)

RESULTS

The total 204 cases of bone lesions were divided into 4 broad categories: Non-neoplastic bone lesions 73(35.8%) benign neoplastic lesions 88(43.1%) malignant neoplastic lesions 14(6.9%). and tumor-like lesions 29(14.2%), Bone lesions were more common in males 124(60.8%) than in females 80(39.2%) with male to female ratio as 1.5:1.

Table-1: Frequency of bone lesions according to sex

Histological types	Gender		Total
	Female	Male	
Non-neoplastic bone lesions	33(16.2%)	40(19.6%)	73(35.8%)
Benign neoplasia	23(11.3%)	65(31.9%)	88(43.1%)
Malignant neoplasia	9(4.4%)	5(2.5%)	14(6.9%)
Tumor-like lesions	15(7.4%)	14(6.9%)	29(14.2%)
Total	80(39.2%)	124(60.8%)	204(100.0%)

p-value < 0.005

Non-neoplastic bone lesions and benign lesions were more frequent in males 40(19.6%) and 65(31.9%) cases respectively. While malignant lesions and tumor-like lesions were more frequent in females 9(4.4%) and 15(7.4%) cases

respectively. There was a significant relationship between distribution of bone lesions and the gender of patient's p-value < 0.005.

Amongst non-neoplastic lesions, nonspecific osteomyelitis 24(11.8%) was commonest followed actinomycosis 19(9.3%) and osteosclerosis 17(8.3%). Exuberant fracture callus and tuberculosis osteomyelitis was less frequent 7(3.4%) and 6(2.9%).

In less than 20 years of age, nonspecific osteomyelitis 10(4.9%) was predominant followed osteosclerosis 5(2.5%) and tuberculous osteomyelitis 4(2.0%). While in age group 20 -40 years was more frequent affected with nonspecific osteomyelitis 11(5.4%) followed by actinomycosis 9(4.4%) and osteosclerosis 9(4.4%), above 40 years actinomycosis was predominant 7(3.4%) than nonspecific osteomyelitis 3(1.5%).

The most common benign tumors was osteochondroma representing 50(24.5%) of the total bone lesion, 38(18.6%) occurred in the age group less than 20.

Giant cell tumor was the second frequent was seen in 31(15.2%) predominant in the age group 20-40 representing 18(8.8%). Enchondroma 4(2.0%) occurred in equal frequency 2(1.0%) in age group less than 20 and 20-40 years.

Osteosarcoma was diagnosed in 14(13.6%) cases affected only age group less than 20, no case was found above 20 years.

Amongst the tumor like lesions, the commonest were the simple cyst accounted for 11(5.4%) frequent in age group 20-40, 6(2.9%). Aneurysmal bone cysts accounted for 10(4.9%) was common in age less than 20, 10(4.9%) while fibrous dysplasia was the least common 8 (4%) and occurred in equal frequency 4 (2.0%) in age groups and less 20 and 20-40years.

The most frequent age group affected with bone lesion was less than 20 accounted for 105(51.5%) followed 82(40.2%) in 20-40 years, above 40years was the least affected presenting 17(8.3%) of total cases There was a significant

relationship between bone lesions and age group of patients p-value < 0.001.

Table 2: Age group distribution of bone lesions

Histological Subtypes	Less than 20years	20 -40 years	Above 40 years	Total
Non-neoplastic bone lesions				
Actinomycosis	3(1.5%)	9(4.2 %)	7(3.4%)	19(9.1%)
Nonspecific Osteomyelitis	10(4.9%)	11(5.4%)	3(1.5%)	24(11.8%)
Tb Osteomyelitis	4(2.0%)	2(1.0%)	0(0.0%)	6(3%)
Exuberant fracture callus	3(1.5%)	4(2.0%)	0(0.0%)	7(3.5%)
osteosclerosis	5(2.5%)	9(4.2 %)	3(1.5%)	17(8.2 %)
Benign and malignant neoplasia				
Osteochondroma	38(18.6%)	11(5.4%)	1(0.5%)	50(24.5%)
Giant cell tumor	11(5.4%)	18(8.8%)	2(1.0%)	31(15.2%)
Enchondroma	2(1.0%)	2(1.0%)	0(0.0%)	4(2.0%)
Osteoma	0(0.0%)	2(1.0%)	1(0.5%)	3(1.5%)
Osteosarcoma	14(6.9%)	0(0.0%)	0(0.0%)	14(6.9%)
Tumor-like lesions				
Simple cyst	5(2.5%)	6(3%)	0(0.0%)	11(5.4%)
Aneurysmal bone cysts	6(2.9%)	4(2.0%)	0(0.0%)	10(4.9%)
Fibrous dysplasia	4(2.0%)	4(2.0%)	0(0.0%)	8(4%)
Total	105(51.5%)	82(40.1%)	17(8.3%)	204(100 %)

p-value < 0.001

The commonest site affected with actinomycosis was metatarsal bone 19(9.3 %). Nonspecific osteomyelitis 12(5.9%), tuberculous osteomyelitis 8(3.9%) and exuberant fracture callus 3(1.5%) commonly affected tibia. While osteosclerosis 8(3.9%) occurred predominantly in the facial bones 8(3.9%) followed by femur 5(2.5%).

The commonest site of benign bone tumors, osteochondroma and giant cell tumor was the tibia 26(12.7%) and

20(9.8%). Enchondroma 4(2.0%) was only diagnosed in metacarpal bones. All cases of osteoma occurred in the facial bones around the orbit 3(1.5%), Osteosarcoma was predominant in tibia 6(2.9%) followed by femur 5(2.5 %).

The majority of tumor-like lesions, simple cyst 5(2.5%) aneurysmal bone cysts 8(3.9%) and fibrous dysplasia 5(2.5%) occurred in tibia. There was a significant relationship between bone lesions and location p-value < .001

Table 3. Frequency of bone lesions according to site

Histological Subtypes	Metatarsal bone	Tibia	Femur	Humerous	Facial	Metacarpal	Total
Non-neoplastic bone lesions							
Actinomycosis	19(9.3%)	0(0 %)	0(0%)	0(0 %)	0(0 %)	0(0 %)	19 (9.3%)
Nonspecific Osteomyelitis	1(0.5%)	12(5.9%)	8(3.9%)	2(1 %)	0(0 %)	1 (0.5%)	24(11.8%)
Tb Osteomyelitis	1(0.5%)	5(2.5 %)	0(0%)	0(0 %)	0(0%)	0(0%)	6(3%)
Callus	1(0.5%)	3(1.5%)	1 (0.5%)	2(1 %)	0(0 %)	0(0 %)	7 (3.5%)
Osteosclerosis	0(0%)	4(2.0%)	5(2.5%)	0(0 %)	8(3.9%)	0(0 %)	17 (8.3%)
Benign and malignant neoplasia							
Osteochondroma	0(0%)	26(12.7%)	19(9.3%)	5(2.5%)	0(0 %)	0(0 %)	50(24.5%)
Giant Cell Tumor	0(0%)	20(9.8%)	5(2.5%)	5(2.5%)	0(0 %)	1(0.5%)	31(15.2%)
Enchondroma	0(0%)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	4(2.0%)	4(2.0%)
Osteoma	0(0%)	0(0%)	0(0 %)	0(0%)	3(1.5%)	0(0%)	3(1.5%)
Osteosarcoma	1 (0.5%)	6(2.9%)	5(2.5 %)	2(1 %)	0(0 %)	0(0 %)	14(6.9%)
Tumor-like lesions							
Simple Cyst	0(0 %)	5(2.5 %)	3 (1.5%)	3(1.5%)	0(%)	0(0%)	11(5.4%)
Aneurysmal Bone Cysts	0(0 %)	8(3.9%)	1 (0.5%)	1 (0.5%)	0(0 %)	0(0 %)	10 (4.9%)
Fibrous Dysplasia	0(0%)	5(2.5%)	2(1.0%)	1 (0.5%)	0(0 %)	0(0 %)	7(4%)
Total	23(11.3%)	94(46.1%)	49(24.0%)	21(10 %)	12(5.9%)	6(2.9%)	204(100%)

p-value < 0.001

DISCUSSION

The bony lesions amount to a small proportion of all the lesions that exist in a population. [1] Pattern of bone lesions is reported less frequently [8]

In our study males were more commonly affected than females This is in agreement with Karia et al [1] Deoghare et.al [9] and Jain et.al [10] who reported the same. In this series non- neoplastic and benign lesions were more common than malignant lesions .Similar findings were reported in other studies [1,2]

The most common non-neoplastic condition was osteomyelitis in less than 20 years to 40 years age in our study. Pyogenic osteomyelitis is still frequently seen in the developing world, [11] it implies inflammation of bone and marrow; it may be complication of any systemic infection but frequently manifest as a primary solitary focus of disease. [2] Majority of the cases were located in tibia and femur similar to studies in literature. [12,13]

Although Actinomyces is a common organism in the mouth flora, it is an uncommon pathogen in osteomyelitis occurring in the extremity [14] There are several reports of actinomycosis affecting foot. [15,16,17] Actinomycosis of foot was the second most frequent after nonspecific osteomyelitis predominant in 20-40 years in the present study.

The incidence of tuberculosis has been increasing, especially in the past 2 decades. Skeletal tuberculosis is very rare compared with the frequency of the pulmonary form [18] Tuberculous osteomyelitis predominantly affected tibia in our series in age group less than 20 years, it was less common cause of osteomyelitis contrary to the study of several authors. [2,5,6] Others non neoplastic lesions was callus which is generated during fracture healing, is commonly discarded during surgical procedures. [19] Reactive lesions of bone and periosteum produce bone and cartilage matrix, resulting in confusion with osteosarcoma, [20] in our series exuberant fracture callus was 3.4% predominantly in

tibia misdiagnosed as osteosarcoma similar findings were observed by other studies. [21,22] Austin and Moule used the term osteosclerosis in 1984 to describe regions with increased bone density not directly related to infections or systemic diseases, [23] in the present study osteosclerosis was predominant in the facial bone in the mandible in 20-40 years similar to the document in the literature. [24,25]

Benign neoplasia were more common than malignant which are in conformity with other studies done by Karia et al [1] and Deoghare et al. [9]

In our study, the most frequent benign bone tumor was osteochondroma (24.5%), This corresponds to study done by others [10,26] In the current study giant cell tumor was the second common benign neoplasia affecting tibia. Sharply contrasting with these findings is a study conducted by Deoghare et al. [9] and Kazi et al [27] giant cell tumor was found to be the commonest benign bone tumor. Most commonly in femur followed by tibia. The others benign tumors in less frequency were enchondroma and osteoma in the present study.

The most common malignant tumour was osteosarcoma in our study affecting long bones. Others like Modi et al. [2] and Patel et al. [5] also reported similar findings. The age distribution was in less than 20 years, and we found no case above 20 contrary to the studies done by Rhutso [3] and Katchy et. Al. [28]

Among the tumor-like lesions, simple cyst and was found to be the commonest with total of 11(5.4%) cases contrary to Mohammed et al report fibrous dysplasia was the most common tumour-like lesion. [29] Other tumor-like lesion was aneurysmal bone cysts with predilection to the metaphysis of long bones, [30] most of cases were in patients under the age of 20 years as it is usually diagnosed at adolescence. [30]

CONCLUSION

There was male preponderance for bone lesions. Nonspecific osteomyelitis was most frequent non neoplastic bone lesions. Among the bone tumors, osteochondroma and osteosarcoma were common. Tibia was the frequent site affected

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Conflict of interest statement:

The authors declare that they have no competing interest.

REFERENCES

1. Karia KM, Iqbal M B, Patil AA, Agrawal NS, Kumar H. Study to correlate the histopathological spectrum of bone lesions with demographic profile of patients in a tertiary care institution. *Clin Cancer Investig J* 2017;6:254-7.
2. Modi D, Rathod GB, Delwadia KN, Goswami HM. Histopathological study of bone lesions - A review of 102 cases. *IAIM*, 2016; 3(4): 27-36.
3. Rhutso Y, Laishram RS, Sharma L D, Debnath K. Histopathological evaluation of bone tumors in a tertiary care hospital in Manipur, India. *J Med Soc* 2013;27:135-9
4. Obafemi J A, Kayode A A, Ayodele E O, Akinola A. Histopathological pattern of primary bone tumours and tumour-like lesions in Ile-Ife, Nigeria. *The Pan African Medical Journal*. 2018;29:193
5. Patel D, Patel P, Gandhi T, Clinicopathological study of bone lesions in tertiary care center—a review of 80 cases. *International Journal of Advanced Research* 2015; 3(7):1267-1272.
6. Kethireddy S, Raghu K, Chandra Sekhar KPA, et al. Histopathological evaluation of neoplastic and non-neoplastic bone tumours in a teaching hospital. *J. Evolution Med. Dent. Sci.* 2016;5(86):6371-6374
7. Rasik N H, Jigar R M, Bharti M J, Peeyush K S, Reena B. Analysis of bone lesions in tertiary care center - A review of 79 cases. *Int J Med Sci Public Health*. 2013; 2(4): 1037-1040
8. Muhammad R and Ashok KT. Spectrum of Bone Lesions at Pakistan Institute of Medical Sciences .*Journal of Islamabad Medical & Dental College (JIMDC)*; 2012 (2):-69-71
9. Deoghare S B, Prabhu MH, Syed Sarfaraz Ali, S.S. Histomorphological Spectrum of Bone Lesions at Tertiary Care Centre. *Int. J. Life. Sci. Scienti. Res.*,2017. 3(3): 980-985
10. Jain K, Sunila, Ravishankar R, et al. Bone tumors in a tertiary care hospital of South India: A review 117 cases. *Indian J Med PaediatrOncol* 2011;32:82-5.
11. Ikpeme I, Ngim N, Ikpeme A. Diagnosis and treatment of pyogenic bone infections. *African Health Sciences*. 2010;10(1):82-88.
12. Hanif G, Zaman S, Hussain M, Mahmood N, Shahid A and Ghazal A. Clinico-Morphological pattern of bone lesions in children. *Biomedica* 2009 ; 25:59-62.
13. Bauer T, Lhotellier L, Mamoudy P, Lortat-Jacob A. Infection on continuous bone of lower limb: 127 cases *Rev Chir Orthop Reparatrice Appar Mot.* 2007 Dec;93 (8):807-17
14. Pang DK, Abdalla M. Osteomyelitis of the foot due to *Actinomyces meyeri*: a case report. *Foot Ankle*. 1987 Dec;8(3):169-71.
15. Reiner S.L., Harrelson J.M., Miller S.E., Hill G.B., Gallis H.A. Primary actinomycosis of an extremity: a case report and review. *Rev Infect Dis*. 1987;9(3):581–589.
16. Mahgoub E.S., Yacoub A.A. Primary actinomycosis of the foot and leg: report of a case. *J Trop Med Hyg.* 1968;71(10):256–258.
17. Bettesworth J, Gill K, Shah J. Primary Actinomycosis of the Foot: A Case Report and Literature Review. *The Journal of the American College of Certified Wound Specialists*. 2009;1(3):95-100.
18. Gursu S, Yildirim T, Ucpinar H, et al. Long-term follow-up results of foot and ankle tuberculosis in Turkey. *J Foot Ankle Surg.* 2014 Sep-Oct;53(5):557-61.
19. Han W, He W, Yang W, et al. The osteogenic potential of human bone callus. *Scientific Reports*. 2016;6:36330.
20. Hoch B, Montag A. Reactive bone lesions mimicking neoplasms. *SeminDiagnPathol*. 2011 Feb;28(1):102-12.
21. Azorín D, López-Pino MA, González-Mediero I, Epeldegui T, López-Barea F. Long bone florid reactive periostitis ossificans: a case in the distal femur

- mimicking osteosarcoma. *J PediatrOrthop B*. 2008 Nov;17(6):301-5.
22. Fariba B, Mohammad S, Reza N M, Ali A. Exuberant callus formation misdiagnosed as osteosarcoma: a case report. *Chinese-German J ClinOncol*. March 2013, Vol. 12, No. 3, P137–P139
23. Austin BW, Moule AJ. A comparative study of the prevalence of mandibular osteosclerosis in patients of Asiatic and Caucasian origin. *Aust Dent J*. 1984 Feb;29 (1):36-43.
24. Tolentino E de S, Gusmão PHC, Cardia GS, Tolentino L de S, Iwaki LCV, Amoroso-Silva PA. Idiopathic Osteosclerosis of the Jaw in a Brazilian Population: a Retrospective Study. *Acta Stomatologica Croatica*. 2014;48(3):183-192. doi:10.15644/asc48/3/2.
25. Misirlioglu M, Nalcaci R, Adisen MZ, Yilmaz S. The evaluation of idiopathic osteosclerosis on panoramic radiographs with an investigation of lesion's relationship with mandibular canal by using cross-sectional cone-beam computed tomography images. *J Oral MaxillofacRadiol* 2013;1:48-54.
26. Gayathri T. Shashikala V., Sody R. Spectrum of tumour and tumour-like lesions of bone in a Tertiary Care Hospital in North Karnataka, India. *Indian Journal of Pathology and Oncology*, January - March, 2018;5(1):75 - 80
27. KaziNishat A B, Syed S A., Ayub A., Abdul Gani M, Nurul A, Subrata R. Study of Bone Tumors in a Tertiary Care Hospital of Dhaka City. *Journal of Current and Advance Medical Research* January 2018, Vol. 5, No. 1, pp. 23-28
28. K. C. Katchy. F. Ziad. S. Alexander. H. Gad. M. Abdel Mota'al. Malignant bone tumors in Kuwait A 10-year clinicopathological study. *International Orthopaedics (SICOT)* (2005) 29: 406–411.
29. Mohammed A, Isa HA. Pattern 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
30. Boubbou M, Atarraf K, Chater L, Afifi A, Tizniti S. Aneurysmal bone cyst primary - about eight pediatric cases: radiological aspects and review of the literature. *The Pan African Medical Journal*. 2013;15:111. doi:10.11604/pamj.2013.15.111.2117
31. Aycan OE, Çamurcu İY, Özer D, Arıkan Y, Kabukçuoğlu YS. Unusual localizations of unicameral bone cysts and aneurysmal bone cysts: A retrospective review of 451 case. *ActaOrthop Belg*. 2015 Jun;81(2):209-12.

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