ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 16, Issue 12, 2023

Online - 2455-3891
Print - 0974-2441

Research Article

# A CLINICOPATHOLOGICAL STUDY OF LESIONS OF BONE

**KAUSHIK BHUVA[1], ANAND VACHHANI[1], PARITOSH PARMAR[2], DIPMALA PATEL[3]***

**[1]Department of Pathology, Shantabaa Medical College and General Hospital, Amreli, Gujarat, India. [2]Department of Anaesthesiology, Shantabaa Medical College and General Hospital, Amreli, Gujarat, India. [3]Department of Pathologist, Lotus Pathology Laboratory, Ahmedabad, Gujarat, India.**

***Corresponding author: Dipmala Patel; Email: dipmalapatel11111@gmail.com**

***Received: 02 June 2023, Revised* and *Accepted: 15 July 2023***

**ABSTRACT**

**Objective:** The objective is to study the clinico-pathological diagnosis of bone lesions.

**Methods:** The present study was a prospective and observational (non-interventional) type of study. A total of 100 patients from March 2012 to April 2013 were recruited. All excised bone specimens received in the Department of Pathology, SBKS MI and RC, Pipariya, constituted the study material. The specimens were subjected to a detailed histopathological examination. In each case, the pathological reaction pattern was studied carefully and documented.

**Results:** The total number of cases studied was one hundred, of which 63 were males and 37 were females in the age group of 3 years–65 years. The most common presenting symptoms were pain and swelling in all bone lesions. Out of 100 cases, non-neoplastic cases were 54% and neoplastic cases were 46%. Among 46% of neoplastic lesions, we found that 30% were benign and 16% were malignant. Among non-neoplastic lesions, 14% were tumor-like lesions, 13% were non-specific osteomyelitis, 12% were tuberculosis inflammation, and 15% were avascular necrosis. The most common benign lesion was a giant cell tumor (17%). The most common malignant lesion was osteosarcoma (6%). The most common tumor-like lesion was fibrous dysplasia (9%). The majority of bone tumors were located in the epiphysis of long bones.

**Conclusion:** Light microscopy or histopathological examination is the gold standard in the diagnosis of bone lesions and is invariably accurate when correlated with clinico-radiological features.

**Keywords:** Bone biopsy, Benign lesion, Malignant lesion, Tumor like lesions.

 DOI: http://dx.doi.org/10.22159/ajpcr.2023v16i12.48478. Journal homepage: https://innovareacademics.in/journals/index.php/ajpcr

## INTRODUCTION

Bone is a dynamic, heterogeneous tissue that is structurally important and plays a major role in mineral homeostasis and hematopoiesis. Together, bones and joints provide mechanical support for movement, protect the viscera, and determine the attributes of body size and shape [1].

Bone lesions are diverse in size, grossness, and histologic features and range in their natural history from innocuous to rapidly fatal. This diversity makes it critical to diagnose tumors and tumor-like lesions correctly, stage them accurately, and treat them appropriately so that the patients not only survive but also maintain optimal function of the affected body parts [1]. Apart from secondary tumors, a variety of primary malignant tumors of different histogenesis arise in the bone because of its structural complexity [2].

As a group, these neoplasms affect all ages and arise virtually in every bone, but most develop during the first few decades of life [1]. One important group of cancer patients with special needs are those diagnosed during adolescence and young adulthood. Cancers in this age group, even if cured, can have a devastating effect on future life, including the development of secondary cancers [3]. A systematic approach to clinical history, radiographic evaluation, and histopathology is necessary for an accurate diagnosis [4].

## METHODS

The present study was a prospective and observational (non-interventional) type of study.

The study was conducted from March 2012 to April 2013 at Dhiraj General Hospital and Medical Research Institute, Pipariya, Taluka-Waghodia, District-Vadodara. Who caters to the patients from the districts of Vadodara, Bharuch, and Chotaudaipur in Gujarat state and also from other states, viz., Rajasthan, Maharashtra, and Madhya Pradesh. The study was conducted after taking the consent of patients.

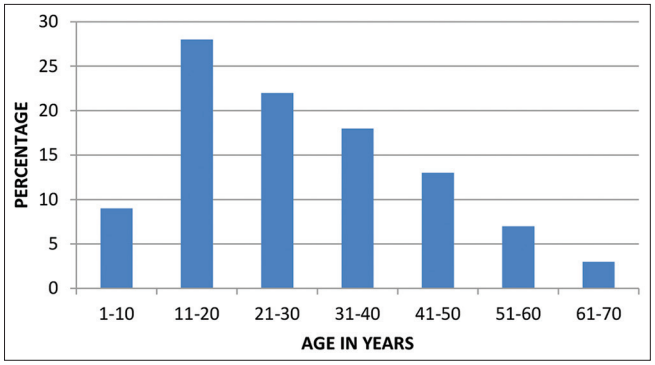
Patients come from orthopedic OPD and wards. A thorough clinical examination, including a history, general examination, and local examination of the lesion, was performed and recorded in the proforma. Routine investigations like hemograms and biochemical investigations were done and recorded.

All the patients were subjected to a radiological (X-ray) examination. Sonography, CT scans, and MRIs were also done whenever required. All the patients' biopsy or radical surgery specimens were sent to our Histopathological Department.

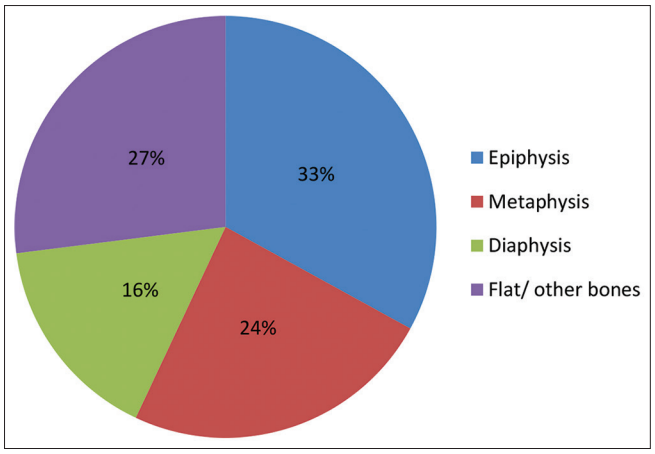
The specimens were studied in gross detail. Tissue sections were given for fixation, decalcification, and routine processing. The sections of 5 microns in thickness were cut from paraffin blocks. The tissue sections were stained with routine Hematoxylin and Eosin stain and special stain wherever necessary.

## RESULTS AND ANALYSIS

The present study was a prospective and observational (non-interventional) type of study. The study was conducted from March 2012 to April 2013 at Dhiraj General Hospital and Medical Research Institute, Pipariya, Taluka-Waghodia, District-Vadodara. Who caters to the patients from the districts of Vadodara, Bharuch, and Chotaudaipur in Gujarat state and also from other states, viz., Rajasthan, Maharashtra, and Madhya Pradesh.




**Graph 1: Age distribution of bone lesions**




**Graph 2: Distribution of bone lesions based on region involved**

The total number of cases studied was one hundred, of which 63 were males and 37 were females in the age group ranging from 3 years to 65 years.

The age- and sex-wise distribution of the cases was carried out as shown in Tables 1 and 2 (Graph 1 and 2).

In the present study, the patients observed were of a wide age range, from 3 years to 65 years. The maximum number (28%) of cases was seen in the age group of 11–20 years. The minimum number (3%) of cases was seen in the age group of 61–70 years.

From Table 2, it is observed that there was a male preponderance for bone lesions (63%) as compared to females (37%). The M: F ratio was 1.7:1.

Table 3 shows that non-neoplastic cases (54%) have a higher incidence than neoplastic lesions (46%).

In the present study, benign lesions were common in females, and malignant and metastatic lesions were common in males. Tumor-like lesions were more common in females, whereas inflammatory lesions were more common in males (Figs 1-3).

In the present study, the incidence of benign and malignant lesions was higher in males. Whereas tumor-like lesions and other bone lesions were common in females.

In the present study, the maximum number of benign lesions was found in the 2$^{nd}$ and 3$^{rd}$ decade, and malignant lesions were found in the 4$^{th}$ and 5$^{th}$ decade. Whereas tumor-like lesions were seen in the 3$^{rd}$ decade. Other bony lesions like osteomyelitis, avascular necrosis, and tuberculosis inflammation were more common in the 6$^{th}$ decade (Figs 4,5).

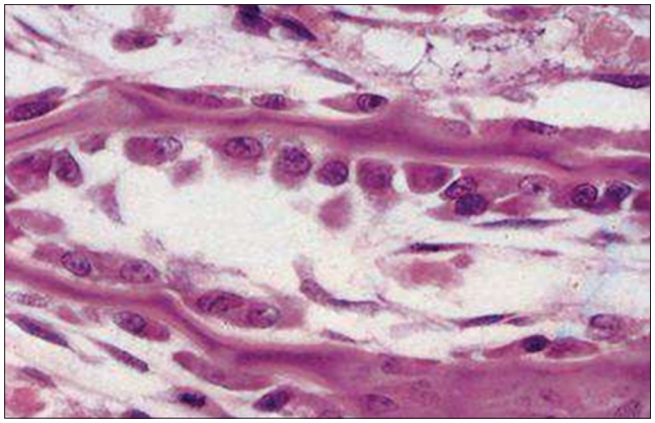


**Fig. 1: Showing rim of osteoblasts (Hematoxylin and Eosin ×400)**

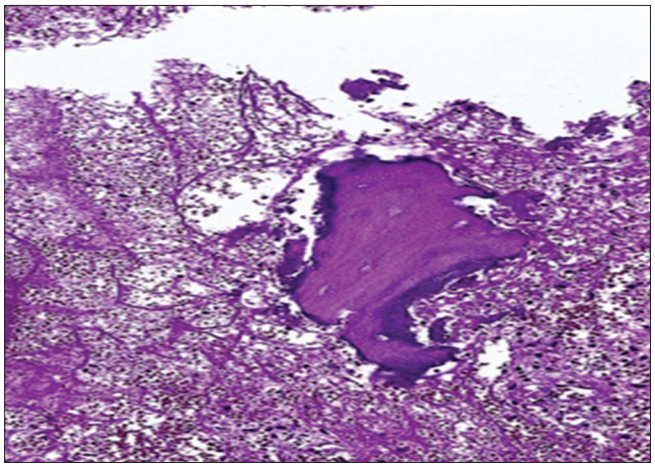


**Fig. 2: Microphotograph of avascular necrosis showing necrotic bone with ragged basophilic edges and empty lacunae. (Hematoxylin and Eosin ×100)**

**Table 1: Age distribution of bone lesions**

| Age | Frequency | Percentage |
|---|---|---|
| 1–10 | 9 | 9 |
| 11–20 | 28 | 28 |
| 21–30 | 22 | 22 |
| 31–40 | 18 | 18 |
| 41–50 | 13 | 13 |
| 51–60 | 7 | 7 |
| 61–70 | 3 | 3 |
| Total | 100 | 100 |

**Table 2: Gender distribution of bone lesions**

| Gender | Frequency | Percentage |
|---|---|---|
| Male | 63 | 63 |
| Female | 37 | 37 |
| Total | 100 | 100 |

Most common benign lesion was giant cell tumor (17%), followed by osteochondroma (4%). Most common malignant lesion was Osteosarcoma (6%). Most common tumor like lesion was fibrous dysplasia (9%).

In the present study, the majority of bone tumors were located in the epiphysis of long bones. Giant cell tumors and avascular necrosis were commonly found in the epiphysis of long bones (Figs

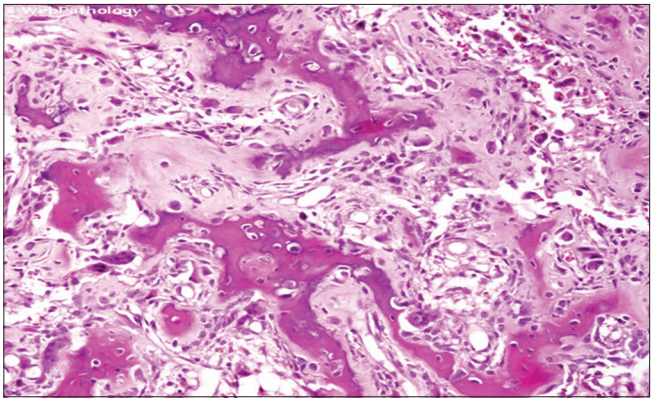


**Fig. 3: Microphotograph of osteoblastoma showing lacelike osteoid and woven bone formation. (Hematoxylin and Eosin ×400)**

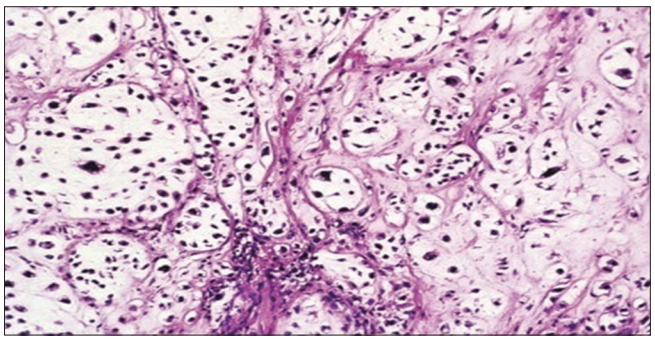


**Fig. 4: Microphotograph of chondrosarcoma showing lobulated appearance with marked cellular pleomorphism, high N/C ratio, many bizarre cells and frequent mitoses. (Hematoxylin and Eosin ×100)**

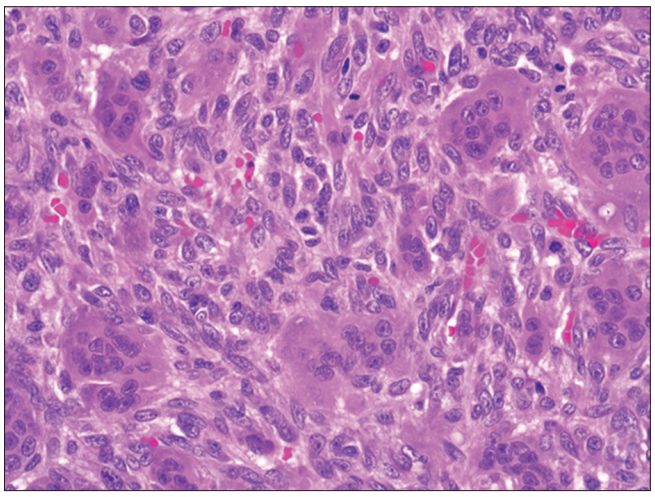


**Fig. 5: Microphotograph of GCT showing numerous multinucleated giant cells in a background of small, ovoid, mononuclear stromal cells. (Hematoxylin and Eosin ×100)**

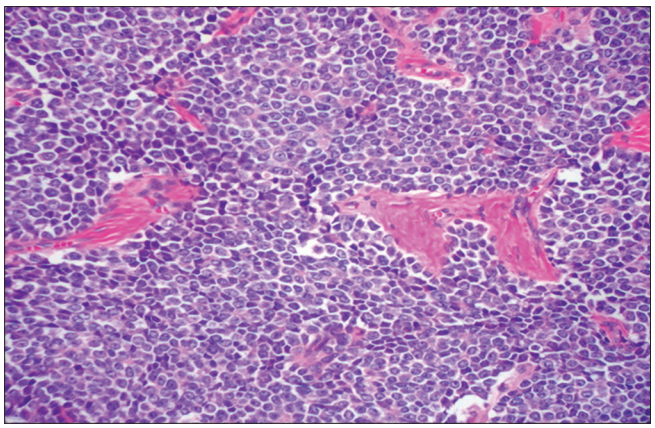


**Fig. 6: Microphotograph of Ewing sarcoma showing sheets of tightly packed; round cells with very scant cytoplasm ("Round blue cell tumor"). (Hematoxylin and Eosin ×100)**

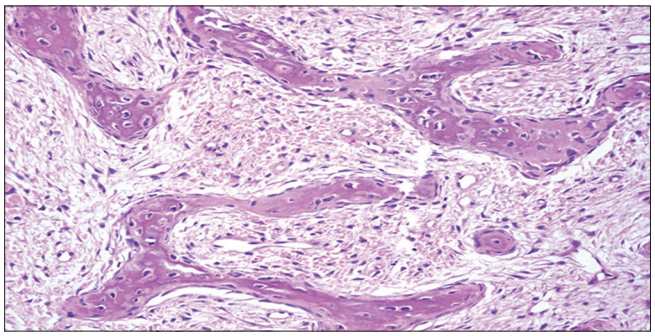


**Fig. 7: Microphotograph of Fibrous dysplasia showing haphazardly distributed irregular bony trabeculae without osteoblastic rimming surrounded by proliferating fibroblasts. (Hematoxylin and Eosin ×100)**

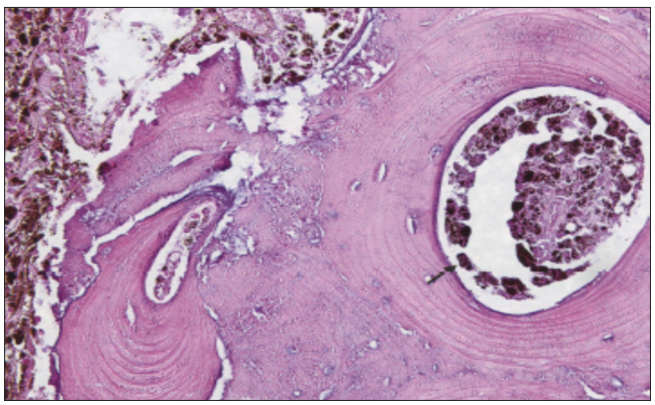


**Fig. 8: Microphotograph of metastatic malignant melanoma showing malignant cells with melanin pigment. (Hematoxylin and Eosin ×100)**

6,7). In malignant tumors, osteosarcoma is commonly found in the metaphysis of long bones. Osteomyelitis was commonly found in the diaphysis of long bones (Figs 8-10).

From the above Table 7, it is observed that the common presenting symptoms were pain and swelling in all bone lesions.

## DISCUSSION

In the present study, patients of a wide range of ages, from 3 years to 65 years, were observed. In the present study, the majority of the lesions (23%) were in the second decade of life, which is similar to the studies conducted in Nigeria by Obalum *et al.* [5] (36.4%) and in India by Popat and Sata [6] (34.3%), as shown in Table 8.

In our study, we found that males were affected more than females. Out of 100 cases, there were 63 males and 37 females in the ratio of 1.7:1, which was similar to the studies conducted in Nigeria by Obalum *et al.* [5] (1.5:1) and in India by Popat and Sata [6] (1.9:1), as shown in Table 8.

Among the 100 cases of bone biopsies analyzed in the present study, non-neoplastic cases were 54% and neoplastic cases were 46%. Among

**Table 3: The distribution of bony lesions during present study**

| Non neoplastic lesions | | | | Neoplastic lesions | |
|---|---|---|---|---|---|
| Inflammatory | | | Tumor like lesions and other bony lesions | Benign | Malignant |
| Number | Specific | Non specific | | | |
| No of cases | 12 | 13 | 29 | 30 | 16 |
| Percentage | 12 | 13 | 29 | 30 | 16 |

**Table 4: Gender distribution of cases based on behaviour of bone lesion**

| Sex | Benign | Malignant | Metastasis | Tumor like lesion | Inflam. and others | Total |
|---|---|---|---|---|---|---|
| Male | 17 | 12 | 1 | 6 | 27 | 63 |
| | 26.9% | 19% | 1.6% | 9.5% | 42.8% | 100% |
| Female | 13 | 3 | 0 | 8 | 13 | 37 |
| | 35.1% | 8.2% | 0% | 21.6% | 35.1% | 100% |
| Total | 30 | 15 | 1 | 14 | 40 | 100 |
| | 30% | 15% | 1% | 14% | 40% | 100% |

**Table 5: Gender distribution of bone lesions**

| Bone lesions | Gender | | | | Total (%) | |
|---|---|---|---|---|---|---|
| | Male (%) | | Female (%) | | | |
| Osteoma | 0 | 0 | 1 | 1 | 1 | 1 |
| Osteoid osteoma | 1 | 1 | 0 | 0 | 1 | 1 |
| Oateoblastoma | 1 | 1 | 0 | 0 | 1 | 1 |
| Osteochondroma | 3 | 3 | 1 | 1 | 4 | 4 |
| Hemangioma | 0 | 0 | 1 | 1 | 1 | 1 |
| Glomus tumor | 1 | 1 | 1 | 1 | 2 | 2 |
| Chondroma | 0 | 0 | 1 | 1 | 1 | 1 |
| Giant cell tumor | 11 | 11 | 6 | 6 | 17 | 17 |
| Ameloblastoma | 0 | 0 | 2 | 2 | 2 | 2 |
| Adamantinoma | 1 | 1 | 0 | 0 | 1 | 1 |
| Chondrosarcoma | 1 | 1 | 2 | 2 | 3 | 3 |
| Osteosarcoma | 6 | 6 | 0 | 0 | 6 | 6 |
| Chordoma | 1 | 1 | 0 | 0 | 1 | 1 |
| Ewing sarcoma | 2 | 2 | 0 | 0 | 2 | 2 |
| Non-hodgkin's lymphoma | 1 | 1 | 0 | 0 | 1 | 1 |
| Multiple myeloma | 0 | 0 | 1 | 1 | 1 | 1 |
| Aneurismal bone cyst | 0 | 0 | 3 | 3 | 3 | 3 |
| Fibrous dysplasia | 5 | 5 | 4 | 4 | 9 | 9 |
| Non ossifying fibroma | 1 | 1 | 1 | 1 | 2 | 2 |
| Osteomyelitis | 6 | 6 | 7 | 7 | 13 | 13 |
| Tuberculosis inflammation | 8 | 8 | 4 | 4 | 12 | 12 |
| Avascular necrosis | 13 | 13 | 2 | 2 | 15 | 15 |
| Metastasis | 1 | 1 | 0 | 0 | 1 | 1 |

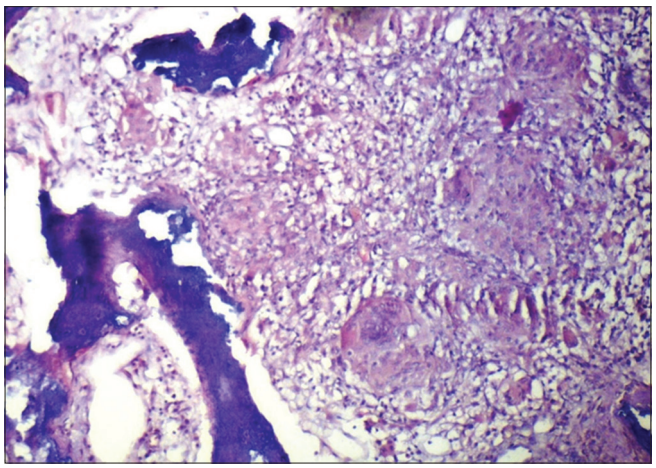


**Fig. 9: Microphotograph of Tuberculosis inflammation showing necrotic bone with epitheloid granuloma, caseous necrosis and langerhans type giant cells. (Hematoxylin and Eosin ×100)**

46% of neoplastic lesions, we found that 30% were benign and 16% were malignant. Among non-neoplastic lesions, 14% were tumor-like lesions, 13% were non-specific osteomyelitis, 12% were tuberculosis inflammation, and 15% were avascular necrosis.

In the present study, non-neoplastic lesions were more commonly encountered, constituting 54% of the total lesions. Our findings were similar to those of the study carried out by Popat and Sata [6]. The incidence of non-neoplastic lesions differed from other studies because inflammatory and other bony lesions were excluded from their study, as shown in Table 9.

The incidence of benign lesions in our study was 30%, which was similar to the studies conducted in Malaya by Peh *et al*. [7], Camarron [8], Bahebeck *et al*. [9], and in India by Popat and Sata [6], as shown in Table 9.

In the present study, 16% of cases were malignant tumors, which was similar to the study conducted in India by Popat and Sata [6], as shown in Table 9.

**Table 6: Distribution of cases based on histopathological diagnosis**

| S. No. | Pathological diagnosis | | | Frequency | Percentage |
|---|---|---|---|---|---|
| 1 | Neoplastic lesion | Benign | Osteoma | 1 | 1 |
| 2 | | | Osteoid osteoma | 1 | 1 |
| 3 | | | Osteoblastoma | 1 | 1 |
| 4 | | | Osteochondroma | 4 | 4 |
| 5 | | | Hemangioma | 1 | 1 |
| 6 | | | Glomus tumor | 2 | 2 |
| 7 | | | Chondroma | 1 | 1 |
| 8 | | | Giant cell tumor | 17 | 17 |
| 9 | | | Ameloblastoma | 2 | 2 |
| 10 | | Malignant | Adamantinoma | 1 | 1 |
| 11 | | | Chondrosarcoma | 3 | 3 |
| 12 | | | Osteosarcoma | 6 | 6 |
| 13 | | | Chordoma | 1 | 1 |
| 14 | | | Ewing sarcoma | 2 | 2 |
| 15 | | | Non Hodgkin's lymphoma | 1 | 1 |
| 16 | | | Multiple myeloma | 1 | 1 |
| 17 | | | Metastasis | 1 | 1 |
| 18 | Non neoplastic | Tumor like lesion | Aneurismal bone cyst | 3 | 3 |
| 19 | | | Fibrous dysplasia | 9 | 9 |
| 20 | | | Non ossifying fibroma | 2 | 2 |
| 21 | | Inflammatory lesion | Osteomyelitis | 13 | 13 |
| 22 | | | Tuberculosis inflammation | 12 | 10 |
| 23 | | | Avascular necrosis | 15 | 15 |

**Table 7: Distribution of presenting symptoms**

| Symptoms | Frequency | Percentage |
|---|---|---|
| Pain | 68 | 68 |
| Swelling | 62 | 62 |
| Difficulty in movements | 20 | 20 |
| Discharging sinus | 8 | 8 |

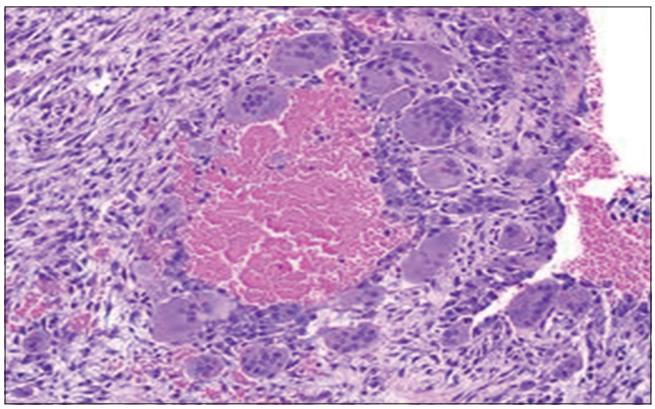


**Fig. 10: Microphotograph of ABC showing vascular space surrounded by multiple osteoclast-like giant cells, inflammatory cells and extravasated RBCs. (Hematoxylin and Eosin ×100)**

In the present study, the most common benign tumor was a giant cell tumor, which was similar to the study conducted in Malaya by Peh *et al*. [7] and in India by Popat and Sata [6], as shown in Table 10. The second most common benign bone tumor encountered during our study was osteochondroma, which was similar to the study conducted in India by Popat and Sata [6]. However, the incidence of osteochondroma was higher in other studies than ours, most probably due to the small sample size as shown in Table 10.

In the present study, osteosarcoma was the most common tumor, accounting for 37.5%. This was similar to the study conducted in Malaya by Peh *et al*. [7,8] and in Cameroon by Bahebeck *et al*. [9]. Our study does not correlate with the study of Obalum *et al*. [5], he reported a higher incidence of osteosarcoma because the frequency of osteosarcoma and other bone tumors was higher in their center. Popat and Sata [6] showed a lower incidence of osteosarcoma because they had taken all osteolytic lesions. They reported 62.5% cases of bone metastasis, as shown in Table 11.

In the present study, we reported 54% of case of non-neoplastic lesions. Among non-neoplastic lesions, 14 cases were tumor-like lesions, 13 cases were non-specific osteomyelitis, 12 cases were of tuberculosis inflammation, and 15 cases were avascular necrosis. Popat and Sata [6] reported 29.4% of cases of osteomyelitis, which is similar to our study. In our study, the incidence of avascular necrosis of bone was 27.2%. As shown in Table 12.

A few of the interesting cases encountered during the present study are discussed below:

- Out of 10 cases 4 were of Koch's spine. A 17-year-old female presented with a history of pain and difficulty in movement of the neck and a past history of pulmonary tuberculosis before 3 months. A radiographic study showed wedging of the C1, C2, and C3 vertebra with necrosis and osteolysis of bone. Histological examination revealed a granulomatous reaction
- We studied 3 cases of aneurysmal bone cysts, of which one was misdiagnosed as chondrosarcoma on X-rays. The patient presented with H/O pain and swelling at the left foot. Radiology revealed an eccentric expansion of the left talus. The microscopic findings revealed the diagnosis of aneurysmal bone cysts
- Another interesting patient was a 30-year-old male who presented with H/O pain and swelling over the left lower end of the femur. Radiological examination showed osteoblastic foci with a sun-ray appearance. Histopathology examination showed osteoid along with other features, revealing a diagnosis of osteosarcoma
- One 19-year female presented with H/O pain and swelling in the left mandible, which was clinically diagnosed as ossifying fibroma. Radiology revealed fusiform thickening with lytic mass in the left lingual region of the mandible. Microscopically, it showed typical features of chondrosarcoma
- One case presented here was a 45-year-old male who presented with a H/O fall 5 days ago with a fracture neck of the femur on the left side and a non-healing ulcer over the right sole for the last year. Radiology examination revealed a fracture in the upper one-third of the left femur. Histopathology examination revealed a nest of spindle-to-round shape tumor cells with pleomorphism and prominent melanin pigment.

**Table 8: Comparison of age and sex distribution of bone lesions**

| Study | 1–10 | 11–20 | 21–30 | 31–40 | 41–50 | 51–60 | 61–70 | Total | Male: Female ratio |
|---|---|---|---|---|---|---|---|---|---|
| Obalum *et al*. [5] (2009) | | | | | | | | | |
| No | 28 | 88 | 48 | 40 | 20 | 12 | 6 | 242 | 1.5:1 |
| % | 11.6 | 36.4 | 19.8 | 16.5 | 8.2 | 5 | 2.5 | 100 | |
| Popat and Sata [6] (2011) | | | | | | | | | |
| No | 2 | 24 | 22 | | 22 | | | 70 | 1.9:1 |
| % | 2.85 | 34.3 | 31.42 | | 31.42 | | | 100 | |
| Present study (2014) | | | | | | | | | |
| No | 9 | 28 | 22 | 18 | 13 | 7 | 3 | 100 | 1.7:1 |
| % | 9 | 28 | 22 | 18 | 13 | 7 | 3 | 100 | |

**Table 9: Comparison of distribution of various bony lesions**

| No | Study | Sample size | Neoplastic lesion | | | | Non neoplastic lesion | |
|---|---|---|---|---|---|---|---|---|
| | | | Benign | | Malignant | | Tumor like lesions/inflammatory and other bony lesions | |
| | | | No | % | No | % | No | % |
| 1 | Peh *et al*. [7] (1988) | 209 | 67 | 32.05 | 118 | 56.5 | 21 | 10 |
| 2 | Rao *et al*. [8] (1994) | 523 | 235 | 45 | 206 | 39.4 | 82 | 15.6 |
| 3 | Bahebeck *et al*. [9] (2003) | 268 | 90 | 33.6 | 139 | 52 | 39 | 14.5 |
| 4 | Obalum *et al*. [5] (2009) | 242 | 96 | 40 | 112 | 46.3 | 34 | 14.05 |
| 5 | Popat and Sata [6] (2011) | 70 | 20 | 28.6 | 16 | 22.8 | 34 | 48.6 |
| 6 | Present study (2014) | 100 | 30 | 30 | 16 | 16 | 54 | 54 |

**Table 10: Comparison of distribution of benign bone tumors**

| Study | Peh *et al*. [7] (1988) | | Bahebeck *et al*. [9] (2003) | | Obalum *et al*. [5] (2009) | | Popat and Sata [6] (2011) | | Present study (2014) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | No | % | No | % |
| Osteoma | 1 | 1.5 | - | - | 16 | 16.6 | - | - | 1 | 3.3 |
| Osteoid osteoma | 5 | 7.5 | 9 | 10 | - | - | - | - | 1 | 3.3 |
| Osteoblastoma | - | - | 4 | 4.4 | 4 | 4.5 | - | - | 1 | 3.3 |
| Osteochondroma | 27 | 40.3 | 26 | 28.8 | 36 | 37.5 | 2 | 10 | 4 | 13.3 |
| Giant cell tumor | 28 | 41.8 | 17 | 18.8 | 28 | 29.1 | 16 | 80 | 17 | 56.6 |
| Ameloblastoma | 1 | 1.5 | - | - | - | - | - | - | 2 | 6.6 |
| Hemangioma | - | - | - | - | - | - | - | - | 1 | 3.3 |
| Glomus tumor | - | - | - | - | - | - | - | - | 2 | 6.6 |
| Chondroma | 3 | 4.5 | 13 | 14.4 | 10 | 10.4 | - | - | 1 | 3.3 |
| Chondroblastoma | 1 | 1.5 | 4 | 4.4 | 2 | 2.1 | 2 | 10 | - | - |
| Chondromyxoid fibroma | - | - | 4 | 4.4 | - | - | - | - | - | - |
| Neurofibroma | - | - | 4 | 4.4 | - | - | - | - | - | - |
| Other | 1 | 1.5 | 9 | 10 | - | - | - | - | - | - |

**Table 11: Comparison of distribution of malignant bone tumors**

| Study | Peh *et al*. [7] (1988) | | Bahebeck *et al*. [9] (2003) | | Obalum *et al*. [5] (2009) | | Popat and Sata [6] (2011) | | Present study (2014) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | No | % | No | % |
| Osteosarcoma | 35 | 29.7 | 48 | 34.5 | 66 | 59 | 2 | 12.5 | 6 | 37.5 |
| Chondrosarcoma | 7 | 6 | 9 | 6.47 | 24 | 21.4 | - | - | 3 | 18.7 |
| Ewing sarcoma | 9 | 7.6 | 7 | 5.1 | 8 | 7.14 | 4 | 25 | 1 | 6.25 |
| Multiple myeloma | 7 | 6 | 1 | 0.7 | - | - | - | - | 1 | 6.25 |
| Lymphoma | 3 | 2.5 | 33 | 23.7 | - | - | - | - | 1 | 6.25 |
| Angiosarcoma | - | - | - | - | - | - | - | - | - | - |
| Malignant fibrous histiocytoma | 2 | 1.7 | 2 | 1.43 | - | - | - | - | - | - |
| Fibrosarcoma | 1 | 0.8 | 18 | 13 | 10 | 8.9 | - | - | - | - |
| Undifferentiated | - | - | - | - | - | - | - | - | - | - |
| Chordoma | - | - | - | - | - | - | - | - | 1 | 6.25 |
| Adamantinoma | - | - | - | - | - | - | - | - | 1 | 6.25 |
| Metastasis | 53 | 44.9 | 17 | 12.2 | - | - | 10 | 62.5 | 1 | 6.25 |
| Others | 1 | 0.8 | 4 | 3 | 4 | 3.6 | - | - | - | - |

**Table 12: Comparison of distribution of non-neoplastic lesions**

| Study | Peh *et al.* [7] (1988) | | Bahebeck *et al.* [9] (2003) | | Popat and Sata [6] (2011) | | Present study (2014) | |
|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | No | % |
| Solitary bone cyst | 4 | 16.6 | - | - | 2 | 6 | - | - |
| Aneurismal bone cyst | 7 | 29.2 | 2 | 5.1 | 2 | 6 | 3 | 5.55 |
| Non ossifying fibroma | 3 | 12.5 | 11 | 28.2 | - | - | 2 | 3.7 |
| Fibrous dysplasia | 5 | 20.8 | 20 | 51.3 | 4 | 11.7 | 9 | 16.6 |
| Eosinophilic granuloma | 4 | 16.6 | - | - | 2 | 6 | - | - |
| Hyperparathyroidism | 1 | 4.2 | - | - | - | - | - | - |
| Osteomyelitis | - | - | - | - | 10 | 29.4 | 13 | 24.1 |
| Tuberculosis inflammation | - | - | - | - | 14 | 41.2 | 12 | 22.2 |
| Avascular necrosis | - | - | - | - | - | - | 15 | 27.2 |
| Unicameral bone cyst | - | - | 6 | 15.4 | - | - | - | - |
| Other | - | - | - | - | - | - | - | - |

## CONCLUSION

In the present study of lesions of bone, all the age groups had common clinical features. Though the diagnosis of a neoplastic lesion is a challenging task, the radiological evidence with the differential diagnosis in most cases was helpful too. The histopathological diagnosis has a superior role to play as the diagnosis decides the decision for management that ranges from simple curettage with a bone graft, resection, and reconstruction to amputation surgeries. Having a representative biopsy needs to be emphasized, as the tumors of bone have various histological features in the same lesion; hence, a biopsy diagnosis may be misleading in a few instances. Special stains and immunohistochemistry are helpful only in small round cell tumors, and ancillary techniques like karyotyping are helpful in further categorizing them. Hence, light microscopy or histopathological examination is the gold standard in the diagnosis of bone lesions and is invariably accurate when correlated with clinico-radiological features.

## FINANCIAL SUPPORT AND SPONSORSHIP

Nil.

## CONFLICT OF INTEREST

There was no conflict of interest.

## REFERENCES

1. Rosenberg AE. Bones, Joints, and soft tissue tumours. Kumar V, Abbas AK, Fausto N. Robbin and Cotran Pathologic Basis of Disease. 7th ed., Ch 26. India: Elsevier Inc; 2004. p. 1273-324.
2. Katchy KC, Ziad F, Alexander S, Gad H, Abdel Mota'al MA. Malignant bone tumours in Kuwait: A 10-year clinicopathological study. Int Orthop 2005;29:406-11. doi: 10.1007/s00264-005-0014-6, PMID 16200421
3. Birch JM, Alston RD, Kelsey AM, Quinn MJ, Babb P, McNally RJ. Classification and incidence of cancers in adolescents and young adults in England 1979-1997. Br J Cancer 2002;87:1267-74. doi: 10.1038/sj.bjc.6600647, PMID 12439716
4. Negash BE, Admasie D, Wamisho BL, Tinsay MW. Bone tumours at Addis Ababa university, Ethiopia: Agreement between radiological and histopathological diagnoses, a-5-year analysis at Black-Lion teaching Hospital. Int J Med Med Sci 2009;1:119-25.
5. Obalum DC, Giwa SO, Banjo AF, Akinsulire AT. Primary bone tumours in a tertiary hospital in Nigeria: 25 year review. Niger J Clin Pract 2009;12:169-72. PMID 19764668
6. Popat VC, Sata VR. Role of histopathology in lytic lesions of bone. Internet J Orthopedic Surgery 2011;19:1.
7. Peh SC, Cheah PL, Sengupta S. The pathology of tumour and "tumour-lee" lesions of bone in the university hospital, Kuala Lumpur. Malays J Pathol 1988;10:45-50.
8. Rao VS, Pai MR, Rao RC, Adhikary MM. Incidence of primary bone tumours and tumour like lesions in and around Dakshina Kannada district of Karnataka. J Indian Med Assoc 1996;94:103-4, 124. PMID 8810207
9. Bahebeck J, Atangana R, Eyenga V. Bone tumours in Cameroon: Incidence, demography and histopathology. Int J Orthop 2003;27:315-7.