

Original research article

## Patterns of Benign Bone Tumors and Tumor-like Lesions: A Retrospective Study

Abhishek Sinha<sup>1</sup>, Swami Vivekanand<sup>2</sup>, Shipra Bharti<sup>3</sup>

<sup>1</sup>Senior Resident, Department of Radiodiagnosis, Katihar Medical College & Hospital

<sup>2</sup>Professor and Head, Department of Radiodiagnosis, Katihar Medical College & Hospital

<sup>3</sup>Senior Resident, Department of Obstetrics and Gynaecology, Katihar Medical College & Hospital

Corresponding Author: Shipra Bharti

### Abstract

**Background:** Primary bone tumors account for 0.2-0.5% of all malignancies, are rare and mostly benign in nature. The overall incidence of benign bone tumors is debatable because majority of the patients are without symptom and their clinical manifestations are unspecific thus these tumors remain largely undiagnosed. In addition to radiography, CT and MRI are very helpful in the diagnosis of solitary bone lesions.

**Objective:** To retrospectively evaluate epidemiology and distribution of newly diagnosed benign bone tumors in Department of Radiodiagnosis, Katihar Medical College & Hospital.

**Materials and Methods:** Computed tomography (CT) and/or magnetic resonance imaging (MRI) examinations performed between 1<sup>st</sup> January 2018 and 31<sup>st</sup> December 2019 in musculoskeletal radiology section of the department of radiodiagnosis were reevaluated by an experienced radiologist.

**Inclusion Criteria** – All CT and/or MRI examinations performed between 1<sup>st</sup> January 2018 and 31<sup>st</sup> December 2019 in musculoskeletal radiology section of the department of radiodiagnosis, Katihar Medical College & Hospital. **Exclusion Criteria** – CT and/or MRI of Benign bone lesions of the axial skeleton.

**Result:** During study period, 300 patients (132 females, 168 males) aged between 10 and 66 years (mean age  $31.48 \pm 14.8$  years) with benign bone tumors and tumor-like lesions were diagnosed for the first time. Osteochondroma was diagnosed in 40% of the patients. Osteochondroma lesions were most commonly located around knee joint. Enchondroma, Fibroxanthoma and Osteoid Osteoma were diagnosed in descending order of prevalence respectively. Male predominance was seen in all cases except in Enchondroma where female predominance in prevalence of cases was seen.

**Conclusion:** Benign bone tumours and tumor-like lesions are most frequently seen in children and young adults, although they may also present in later stages of life. Although plain radiography is essential for diagnosis, CT and MRI examinations provide additional information. Treatment is indicated for symptomatic patients and for the patients with a risk of pathological fracture or deformity

**Key words:** Benign bone tumour, CT scan, MRI, Osteochondroma, Enchondroma

## INTRODUCTION

Primary bone tumors account for 0.2-0.5% of all malignancies, are rare and mostly benign in nature [1]. The overall incidence of benign bone tumors is debatable because majority of the patients are without symptom and their clinical manifestations are unspecific thus these tumors remain largely undiagnosed [2,3]. Benign bone tumors are mostly diagnosed incidentally when radiological examinations are done for some other conditions. Since many bone tumors have a predilection for age, sex and anatomic locations these information's may establish a first step in the diagnosis [4]. Epidemiological data regarding musculoskeletal tumors are not profound and as per few researches, distribution of primary bone tumors has variation in different regions across the world [5]. Therefore, epidemiological knowledge of every region can be useful in early diagnosis of the tumor. In addition to radiography, CT and MRI are very helpful in the diagnosis of solitary bone lesions [6]. The aim of this study was to prospectively evaluate epidemiology and distribution of newly diagnosed benign bone tumors in our radiology department.

## METHODS

This study was designed as a retrospective study. Computed tomography (CT) and/or magnetic resonance imaging (MRI) examinations performed between 1<sup>st</sup> January 2018 and 31<sup>st</sup> December 2019 in musculoskeletal radiology section of the department of radiodiagnosis were reevaluated by an experienced radiologist. Benign bone lesions of the axial skeleton are not included into the study. Obtained data was analyzed according to age, gender, anatomic location and radiological diagnosis.

## RESULTS

There were 300 patients (132 females, 168 males) aged between 10 and 66 years (mean age  $31.48 \pm 14.8$  years) with benign bone tumors and tumor-like lesions diagnosed for the first time. Patients were categorised according to radiological diagnosis, age, gender, and anatomic location (Table 1). Most common diagnosis was osteochondroma seen in 40% (n= 120) of the patients. Mean age was  $28.18 \pm 18.7$ . There were a male dominance with 78 males and 42 females. Lesions were most commonly located around knee joint especially at tibia. Other lesions were seen at humerus, scapula, phalanges of hand and iliac bone in descending order. In 12 patients lesions were multiple indicating osteochondromatosis. Cartilage cap thickness was measured in MRI examinations and being under 1.5 cm there was no malignant degeneration suspicion in the study population. 96 patients i.e. 32% of study population, were diagnosed as enchondroma. 58 patients were female whereas only 38 patients were male. Most common location was femur, followed by tubular bones of hand. Rare locations such as iliac bone were also seen. Fibrous cortical defects and non-ossifying fibromas, collectively known as fibroxanthoma or metaphyseal fibrous defect, were the third common (n= 63) seen benign bone lesion in the study population. It was seen to be evenly distributed among both males and females with 28 females and 35 males. It was most commonly observed in femur. Osteoid osteomas comprised only 07% of the total study population. There was a male predilection (18 males and 3 females) and long tubular bones were most common locations. Lesions like aneurysmal bone cyst and fibrous dysplasia were rarely encountered and were not included into the study for statistical purposes.

## DISCUSSIONS

It is important to have knowledge of the properties of benign bone lesions. Since they are frequently asymptomatic and are rarely seen, the diagnosis may be delayed. The incidence of benign bone tumors and tumor-like lesions varies depending on the type of the lesion. Benign bone tumours and tumor-like lesions are most frequently seen in children and young adults,

although they may also present in later stages of life [3]. In the present study also, it has been observed that younger population are frequently affected. Common benign bone tumors include osteochondroma, enchondroma and osteoid osteoma whereas common tumor-like lesions include non-ossified fibroma, simple bone cyst, and fibrous dysplasia [7]. The most common benign bone tumor is osteochondroma [8]. In this study also, the most frequent lesion was found to be osteochondroma, which is consistent with the previous literatures. Although plain radiography is essential for diagnosis, CT and MRI examinations provide additional information [9]. Epidemiologic studies also have contribution in differential diagnosis and management of benign bone lesions. Treatment is indicated for symptomatic patients and for the patients with a risk of pathological fracture or deformity [10]. In conclusion our findings were overall consistent with the literature.

**Table 1:** Distribution of benign bone tumors diagnosed in our radiology department between January 2018 and December 2019.

Lesion	Number of cases	Male: Female	Percentage (%)	Mean age $\pm$ SD (years)
Osteochondroma	120	78:42	40	28.18 $\pm$ 18.7
Enchondroma	96	38:58	32	36.90 $\pm$ 13.7
Fibroxanthoma	63	35:28	21	22.66 $\pm$ 12.7
Osteoid osteomas	21	18:3	07	16.33 $\pm$ 4.24

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