



## Assessment of bone tumors and lesions of bone in childrens

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### Abstract

According to previous researches, distribution of primary bone tumors is variable in different parts of the world. Highest rates are seen in Europe and the USA, but Asian countries have lower incidence and prevalence. Hence from the above literature findings there was a need to study the bone tumours in the childrens from the north Indian region.

The study was planned by enrolling 25 patients identified with the pain, swelling, non-healing fractures of bones. The patient's enrolled patients were admitted to Upgraded Department of Paediatrics in Patna Medical College And Hospital, Patna From April 2016 to Dec 2016. The X-ray of affected bone was done in all the childrens. Biopsy was taken from the lesion for histopathological diagnosis of the lesion.

The aim of the study was the demographic and clinical description of bone tumours in the paediatric age group. The most common sites were comparable with literature data except for an increased incidence in the fibula. The data generated from present studies will help in rapid diagnosis and management of bone tumours.

**Keywords:** bone tumors, Childrens, legions, osteosarcoma

### Introduction

Bone tumours occur when abnormal cells in the bones grow in an uncontrolled way. There are 2 main types of bone tumours in children:

- Osteosarcoma forms from cells called osteoblasts. It usually develops at the ends of the long bones, such as the arms or legs.
- Ewing sarcoma (also called Ewing family of tumours) forms from a type of stem cell in the bone marrow. It can form in the bones of the arms, legs, hands, feet, spine, skull, ribs, shoulder blades or hips. Ewing sarcomas can also form in soft tissues near bones. These are called extraosseous or extraskel *et al.* Ewing tumours, and are not discussed in this summary.

Osteosarcoma often develops in bones that are growing quickly, so it can be associated with the teenage growth spurt. Ewing tumours are also more common in teenagers <sup>[1]</sup>.

A risk factor is anything that increases a person's chance of developing a certain condition or disease, such as cancer. In adults, lifestyle and environmental factors (such as smoking or exposure to certain chemicals) can be significant risk factors for developing certain types of cancer. In children, very few risk factors have been identified that increase the chance of developing cancer. For most children with cancer, the underlying cause is unknown. Even if your child has a risk factor, it does not mean they will develop cancer. Many children with a risk factor will never develop cancer, while others with cancer may have had no known risk factors. Even if a child with a risk factor develops cancer, it is usually hard to know how much that risk factor contributed to the

development of their disease. Several research groups are investigating cancer stem cells and their potential to cause tumors along with genes and proteins causative in different phenotypes. Radiotherapy for unrelated conditions may be a rare cause <sup>[2]</sup>.

- Familial cases where the deletion of chromosome 13q14 inactivates the retinoblastoma gene is associated with a high risk of osteosarcoma development.
- Bone dysplasias, including Paget's disease of bone, fibrous dysplasia, enchondromatosis, and hereditary multiple exostoses, increase the risk of osteosarcoma.
- Li-Fraumeni syndrome (germline TP53 mutation) is a predisposing factor for osteosarcoma development.
- Richmond-Thomson syndrome (i.e. autosomal recessive association of congenital bone defects, hair and skin dysplasias, hypogonadism, and cataracts) is associated with increased risk of this disease.
- Large doses of Sr-90 emission from nuclear reactor, nicknamed bone seeker increases the risk of bone cancer and leukemia in animals, and is presumed to do so in people <sup>[3]</sup>.

Despite persistent rumours suggesting otherwise, there is no clear association between water fluoridation and cancer or deaths due to cancer, both for cancer in general and also specifically for bone cancer and osteosarcoma <sup>[4]</sup>. Series of research concluded that concentration of fluoride in water doesn't associate with osteosarcoma. The beliefs regarding association of fluoride exposure and osteosarcoma stem from a study of US National Toxicology program in 1990, which showed uncertain evidence of association of fluoride and

osteosarcoma in male rats. But there is still no solid evidence of cancer-causing tendency of fluoride in mice [5]. The statistic analysis of the data shows no significant difference in occurrences of osteosarcoma cases in different fluoridated regions. Another important research involved collecting bone samples from osteosarcoma patients to measure fluoride concentration and compare them to bone samples of newly diagnosed malignant bone tumors. The result is that the median fluoride concentrations in bone samples of osteosarcoma patients and tumor controls are not significantly different. Not only fluoride concentration in bones, Fluoride exposures of osteosarcoma patients are also proven to be not significantly different from healthy people [6].

Osteosarcoma is the eighth-most common form of childhood cancer, comprising 2.4% of all malignancies in pediatric patients, and about 20% of all primary bone cancers. Incidence rates for osteosarcoma in U.S. patients under 20 years of age are estimated at 5.0 per million per year in the general population, with a slight variation between individuals of black, Hispanic, and white ethnicities (6.8, 6.5, and 4.6 per million per year, respectively). It is slightly more common in males (5.4 per million per year) than in females (4.0 per million per year). It originates more frequently in the metaphyseal region of tubular long bones, with 42% occurring in the femur, 19% in the tibia, and 10% in the humerus. About 8% of all cases occur in the skull and jaw, and another 8% in the pelvis [7]. Around 300 of the 900 people diagnosed in the United States will die each year. A second peak in incidence occurs in the elderly, usually associated with an underlying bone pathology such as Paget's disease of bone.

According to previous researches, distribution of primary bone tumors is variable in different parts of the world. Highest rates are seen in Europe and the USA, but Asian countries have lower incidence and prevalence. Hence from the above literature findings there was a need to study the bone tumours in the childrens from the north Indian region.

### Methodology

The study was planned by enrolling 25 patients identified with the pain, swelling, non-healing fractures of bones. The patient's enrolled patients were admitted to Upgraded Department of Paediatrics in Patna Medical College and Hospital, Patna April 2016 to Dec 2016. The X-ray of affected bone was done in all the childrens. Biopsy was taken from the lesion for histopathological diagnosis of the lesion.

All the cases were informed consents of their parents. The approval of the institutional ethical committee was taken prior to conduct of the study.

The following was the inclusion and exclusion criteria for the present study:

- **Inclusion criteria:** Patients with the pain, swelling, non-healing fractures of bones.
- **Exclusion criteria:** Patients with physical bone injuries

### Results & Discussion

The data from the 25 patients were collected and presented as below. The study patients were having symptoms with the pain, swelling, non-healing fractures of bones. The table 1 indicates the demographic parameters

**Table 1:** Demographic parameters

Factor	Parameter	No. of Cases
Age distribution	Below 5 years	1
	5-10 years	3
	Above 10 & upto 15 years	21
Total		25
sex	Male	9
	Female	16
Rural/Urban	Rural	17
	Urban	8
Total		25
Presenting complaint	Only pain	14
	Pain and Swelling	8
	Pathological Fracture	3
Total		25

**Table 2:** Histopathological Observation of Lesion

Type of lesion	Bone Type	No. of Cases
Benign		17
Osteochondroma	Femur	13
Osteoid osteoma	Femur	4
Malignant		2
Chondrosarcoma	Femur/Tibia	1
Ewing's Sarcoma		1
Tumor-like lesion		6
Fibrous Dysplasia	Femur	2
Non-ossified Fibroma	Femur/Tibia/Metacarpal bones	2
Simple Bone Cyst	Femur/Humerus	1
Aneurysmal Bone cyst	Humerus/Femur	1

Bone tumors are classified as benign or malignant according to the tissue of origin, as well as their patterns of growth and behaviour [8-9]. The majority of paediatric bone tumors are of benign character with distinctive and specific radiographic and clinical features, obviating the need for biopsy [10]. Common benign bone tumors include osteochondroma, endochondromatoid stoma, osteoblastoma, chondroblastoma and hemangioma. Also, tumor-like lesions that may occur frequently in children include non-ossified fibroma, simple bone cyst, and fibrous dysplasia [11].

In a study by Yüçetürk *et al.* [12], the number of malignant tumors was determined to be greater, which was reported to be due to benign tumors being treated at external healthcare centers. In paediatric cases, the most feared and most commonly seen malignant bone and soft tissue tumors are osteosarcoma, Ewing sarcoma and rhabdomyosarcoma [13].

Osteosarcoma is the most common primary malignancy according to several studies [14]. It is reported to constitute about 35-68% of all primary malignant bone tumors [15]. Ewing's sarcoma accounted for 15.9% of all malignant tumors, making it the second most common primary malignancy in bone. Chondrosarcoma was the third [16] (8.0%). Ewing's sarcomas are tumors of the young, with 80% occurring in patients under 20 years. They rarely occur above the age of 30 [17]. We did not have any Ewing's sarcoma patient older than 35 years.

In our study, the most frequent benign bone tumor was osteochondroma, followed by enchondroma and giant cell tumor. Osteochondroma accounted for 63.9% of benign bone tumors and 35% of all bone neoplasms. The femur and the

tibia were the most affected anatomical sites. The highest percentage of osteochondroma has been reported in our series among all the reviewed papers [18]. The real frequency of this tumor may be more in our population because of its clinical diagnosis by radiographs. Only excisional biopsies were included in study.

### Conclusion

The aim of the study was the demographic and clinical description of bone tumours in the paediatric age group. The most common sites were comparable with literature data except for an increased incidence in the fibula. The data generated from present studies will help in rapid diagnosis and management of bone tumours.

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