

Clinicopathologic Review of Primary Osteosarcoma of Bone: 7 Years Study at Khulna Medical College Hospital

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Conventional osteosarcoma is a high grade malignant neoplasm that occurs predominantly in the metaphysis of the long bone of adolescents and young adults, definite male predominance and unusual in patient younger than 5 years. It is subdivided into osteoblastic, fibroblastic and chondroblastic types. About 50% of all osteosarcoma are osteoblastic, 25% fibroblastic and 25% chondroblastic. A total of 36 patients who had pathologically verified primary osteosarcoma of bone treated at Khulna Medical College Hospital and private clinics at Khulna city over a 7 years period (2001-2008) by using histopathological procedure. This study was carried out to obtain information concerning site of occurrence of bone tumor, histology, metastasis and survival data. Of the 36 histologically diagnosed tumors, 22 (61.1%) were male and 14 (38.9%) were females, giving a male to female ratio 1.5 :1. Peak age incidence of occurrence of these tumors was in the 2nd (50.0%) and 3rd (33.3%) decades. Lower end of the femur was the most frequent site of the primary lesion with 20 cases (44.4%) of the tumor followed by the upper end of the tibia was the second most frequent site accounting 7 (19.4%) cases. Fibula and humerus both were in 4 cases and upper end of the femur was in 3 cases. The facial bones especially mandible accounted for 2 cases. Second decade of life is the highest incidence of the tumor with 88.9% of the cases, occurring in patient in less than 25 years old. Three years survival for the series was 21.7% with only 12.6% surviving five years. Person with facial bones had the highest survival rate those with lesions in the humerus, tibia, distal end of the femur had decreasingly lower survival rate. Patient with a tumor larger than 10 cm not survived longer than five years. Patient with osteoblastic tumors had the poorest survival rate, followed by those with chondroblastic lesions and those with fibroblastic tumor survived longest. In the overall study of 36 cases tumor in the distal end of the femur and the proximal end of the tibia accounted 20 cases presenting 55.6% cases.

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Key words: Bone, osteosarcoma, histopathology, survival

Introduction

Osteosarcoma is the most common primary aggressive malignant bone tumor excluding plasma cell myeloma, an estimated 30% of malignant bone tumor.¹ Intrasketal osteosarcoma occurs most commonly during the second

decades.² The metaphyseal ends of the long bones such as distal femur, proximal tibia, proximal humerus and proximal femur are the most common sites. It occur twice as often in male than as in female.³ Single most

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important diagnostic criteria is the identification of malignant cells producing osteoid bone.⁴ Classification into osteoblastic, fibroblastic and chondroblastic variants based on histological types is of some prognostic value. Distant spread is predominantly by the blood stream into the lung and to other bone and less often to the liver, kidney, muscle and Brain.⁵ This study was carried out to obtain information concerning site of occurrence of bone tumor, histology, metastasis and survival data in patients treated in Khulna region of Bangladesh.

Methods

A total number of 36 patients were included in this study. Most of the patients were admitted in the Orthopaedic unit of Khulna Medical College Hospital and different private clinics of Khulna City since 1995 – 2002. Full clinical histories including age, sex and anatomic sites of tumor and tissue section were available and histopathological confirmation of the diagnosis of osteosarcoma were included in this study.

Results

Among the study group 22 (61.1%) were male and remaining 14 (38.9%) cases were female. Male to female ratio was 1.5 : 1. The age distribution of the patients by decades is shown in table I. Highest incidence of osteosarcoma in second decades of life in 18 (50.0%) cases. Of which 10 were male & 8 were female followed by the third decade of life in 12 (33.3%) case of which 8 were male and 4 were female and fourth decade of life in 4 (11.1%) case, respectively.

Most of the tumors were concentrated either site of the knee joint. Among the 36 cases, lower end of the femur was the most frequent site of the primary lesion with 16 cases (44.4%) of the tumor . upper end of the tibia was the second most frequent site with 7 case (19.4%) . Fibula and humerus both were in 4 cases and upper end of the femur

was in 3 cases. The facial bones especially mandible accounted for 2 cases.

Table I: Distribution of osteosarcoma according to their age and sex

Groups	Male	Female	Number (%)
I (0-10)	02 (5.5%)	0	02 (5.5%)
II (11-20)	10 (27.8%)	08 (22.2%)	18(50.0%)
II (11-20)	08 (22.2%)	04(11.1%)	12(33.3%)
IV (31-40)	02 (5.5%)	02 (5.5%)	04(11.1%)
Total	22 (61.1%)	14 (38.9%)	36 (100%)

Table II: Primary sites and histologic types of osteosarcoma

Primary sites	Number	Histopathology		
		OB	CB	FB
Lower end of the femur	16(41.7%)	07	05	04
Upper end of the tibia	07(19.4%)	04	02	01
Fibula	04(11.1%)	02	01	01
Humerus	04(11.1%)	03	01	00
Upper end of the femur	03(4.3%)	02	01	01
Facial bone	02(5.5%)	00	01	00
Total	36	18	11	07

OB = Osteoblastic, CB = Chondroblastic, FB=Fibroblastic

Distribution of metastasis

Among the 36 cases, 4 cases of primary tumor metastasis were found in lung.

Survival data

Eight cases were alived three years after the diagnosis of osteosarcoma; remaining 28 cases have been followed for 4- 5 years,

Survival by primary site of occurrence

Survive for a specific period of time after their diagnosis. In most cases statistic refer to the 5 years survival rate. Distal tumors have been associated with a more favorable prognosis. Most frequent site of occurrence was femur, tibia, and humerus respectively whereas axial skeletal primary tumor has a worse prognosis. Patient with osteosarcoma

of craniofacial and other flat bone have good survival. Poorest survival rate lesion originating in the humerus and have the highest survival rate followed by the tibia and femur

Survival by age of the study group

Three years survival rate of 4(11.1%) case for the patient between 30-50 years of age, compared with patient aged between 20 to 30 years, in 12 (22%) cases. For patient aged between 10 to 20 year, in 18(22%) for those aged less than 10 yrs. in 02 cases.

Table III: Survival rate irrespective of anatomic site with treatment employed

Sites	No of pts	Survival Rate (y)		Treatment Employed		
		< 3	4-5	Sur	Chem	Comb
Femur	18	03	15	06	03	09
Tibia with Fibula	12	03	09	04	02	03
Humerus	04	01	03	01	00	02
Facial Bone	02	00	02	00	02	00
Total	36	09	29	11	07	14

Sur = surgery, Chem = Chemotherapy, Comb = combination

Modalities of therapy employed

In general treatment for osteosarcoma can include surgery, radiation therapy, chemotherapy and combination of these. Surgical procedure done in 27 (76.5%) cases, included amputation 23 (66%) cases which included above the knee-amputation in 3 (18%) cases of tibial lesion, forequarter amputation in 1 case, mainly lesion of the humerus, rest of the cases the treatment consisted of radiation and chemotherapy in 9 cases. Of which, only chemotherapy alone in 5 cases.

Discussion

This study of 36 cases of osteosarcoma representing a institutional experience of 7 years and a unique opportunity to obtained information concerning site of occurrence, histology, metastasis and survival data .

The anatomic site of the tumor showed a strong correlation with survival that was seemingly relatable to the patients early awareness of the tumor, the prompt initiation of therapy and the surgical accessibility of the tumor. Prognosis is a medical opinion as to the likely causes and outcome of disease in osteosarcoma depend on, size and location of the tumor, whether the cancer is localized metastatic or recurrent, how much of the cancer is taken out by surgery or killed by chemotherapy and patient age with general health conditions. Distal tumors have been associated with a more unfavorable prognosis, whereas axial skeletal of primary tumor have a good prognosis.⁶

In our study, major portion of osteosarcoma occur in distal part of extremities had poor prognosis. This observation was in agreement with above statement.

The characterization of the tumor studied according to the production on neoplastic osteoid, chondroid and fibroblastic when cases related showed that the patient with fibroblastic tumors had the best chance of survival, followed patient with by chondroblastic lesions and finally osteoblastic lesion, who had the poorest prognosis. Osteosarcoma of jaw and distal extremities below elbow and knee have a better prognosis than other. The site of the proximal end of the femur were associate with lowest survival rate. Patient with tumors of the facial bone as a group had the best survival.^{7,8}

In our study conventional osteosarcoma of fibroblasts had good response which concord

with previous result cited by Dahline & William.

Size of the tumor more than 10 cm long survived five yrs. and lesion in the facial bone & extremities had better survival rate than those of other bone. Patient more than 26 years of age had a better chance of survival than those less than 26 years of age.⁸

Our result parallel the findings of previous reported in the world literature and show a similar survival rate.

Lung being the most common site for metastasis. Propensity of osteosarcoma to produce early distant metastasis is the basis for the poor prognosis of the tumor. In 36 cases, the 2 leading sites of metastasis were lung (75%) and other bone (25%).^{9,10}

In our study an incidence generally conforming to the finding of Sim & Vinni investigators.

After surgery alone 5 years survival figures publishes before 1972 consistently showed about 20%. Subsequently the use of neoadjuvant chemotherapy has result in 70% survival at 5 years. Patient who have complete surgical ablation of the primary and metastasis tumor following chemotherapy may attain long term survival. Since only 8 (21%) patient survived three years, it can be concluded that surgery, irradiation and chemotherapy individually or in various combination could not altered the mortality rate substantially, those who did survive were alive only because of surgical removal of either the primary lesion or the metastasis . No measurable effect was relatable to the irradiation or chemotherapy employed.^{6,10,11}

These findings are in agreement with the observation of Taylor and Livin in their 1982 review.

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