Primary malignant bone tumour in a tropical African University Teaching Hospital

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Summary

Bone tumours are relatively rare tumours as compared with all other tumours. The relative frequency has not been well documented in this environment. The aim of the study was to define the frequency of primary malignant bone tumours in an African University teaching hospital in Ibadan.

The medical records of 114 patients with malignant bone tumours recorded in the Cancer Registry of the University College Hospital, Ibadan, Nigeria between January 1977 and December 2000 were reviewed retrospectively. Primary malignant bone tumours represented 0.53% of all the 21390 cancers seen in the teaching hospital in the period studied, with a male female ratio of 1.4:1.

About 45% of tumours occurred among patients<20 years of age. Osteogenic sarcoma was the most common primary malignant bone tumour while the mandible was the most commonly affected bone. In contrast to previous studies, Burkitt's lymphoma affected the mandible more commonly than the maxilla.

The relative frequency of primary malignant bone tumours is low in our environment as observed in other developing countries.

Keywords: ***Bone, Neoplasms, Malignant, Pathology.***

Résumé

Les tumeurs d'os sont des tumeurs relativement rare en comparaison d'autres tumeurs. On n'a pas encore bien documenté sa fréquence relative dans cet environnement.

L'objet de cette étude était de définir la fréquence des tumeurs malignes primaire d'os dans un hospitalier universitaire africain de l'enseignement à Ibadan.

Les dossiers médicaux de 114 patients atteint de tumeurs malignes d'os enregistrés dans le Bureau du Cancer du Collège Hospitalier Universitaire à Ibadan au Nigeria entre janvier 1977 et décembre 2002 ont été rétrospectivement passés en revue.

Les tumeurs malignes primaires d'os constituaient 0,53% de tous les 21390 cas de cancers qui se sont présentés dans cet hôpital au moment de cette étude, avec la proportion mâle femme de 1,4 :1.

Environ 45% des tumeurs avaient eu lieu parmi les patients < de l'âge de 20 ans. Sarcome ostéogenèse était la tumeur maligne primaire d'os la plus fréquente tandis que l'os du mandibule était le plus concerné. Par contraste avec des études précédentes, la lymphome de Burkitt touche la mandibule plus fréquemment que le maxillaire.

La fréquence relative des tumeurs maligne primaire d'os est en baisse dans notre environnement par rapport à ce qu'on a remarqué dans les autre pays en développement.

Introduction

Primary malignant tumours arising from bone are comparatively rare, representing only 0.5% of all cancers world-wide.[1] Primary bone cancer accounts for 0.2% of all new cancers in the United States of America with approximately 2100 new cases diagnosed annually.[2] With respect to age distribution, primary malignant bone tumours are seen relatively more commonly in younger individuals compared to older patients, amongst whom secondary tumours predominate. Bone neoplasms also comparatively rare in the paediatric age group, the predominant examples being cases of osteogenic sarcoma and, among Caucasians, Ewing's sarcoma.[3,4] Between 1960 and 1984, primary malignant bone tumours represented 0.6% of male, and 0.8% of female cancers respectively in children less than 15 years at the Ibadan Cancer Registry.[5] The corresponding relative frequencies of male and female bone cancers were 2.9% and 2.8% respectively. The incidence rates of these tumours differ as shown in the Cancer Registries in other African and Western countries.[5,6] Between 1985 and 1992 the age standardized rate for malignant paediatric bone neoplasms in Ibadan, Nigeria was 2.1 per million, and these neoplasms accounted for 2.9% of all childhood neoplasms.[7] A recent study demonstrated a relative decline in the frequency of childhood bone neoplasms in Ibadan from 2.5% to 1.3% of all childhood neoplasms.[4]

The problem of bone tumours in this environment has not specifically been addressed during the past two decades.[8] The aim of the study was therefore to define the frequency of primary malignant bone tumours seen in our hospital in Ibadan.

Materials and Methods

We retrieved the records of all cases of primary malignant bone tumours in the Cancer Registry of the University College Hospital, Ibadan, Nigeria January 1977 and December 2000. Clinical case notes were also retrieved and reviewed.

Cases were excluded from study if the affected bone was not specified in available clinical records, where the specimen was brought from a centre outside the University College Hospital, Ibadan and where the tumours were odontogenic. Twenty two cases of primary malignant bone tumours from outside the hospital and twenty five cases of odontogenic tumours were excluded from the study.

The histological slides were reviewed for correctness of the diagnoses and when necessary new slides were cut from the paraffin blocks and stained with haematoxylin and eosin.

Results

General findings

The total number of cases of malignant neoplasms recorded in the Cancer Registry during the January 1977 and December 2000 was 21390. The total number of bone tumours seen was 959 (4.5%) with 114 cases being primary malignant bone tumours.

Thus, primary malignant bone tumours represented 11.8% of all the bone tumours while it represented 0.53% of all cancers recorded in the Ibadan Cancer Registry between 1977 and 2000.

Table 1 Sex distribution of primary malignant bone tumour in Ibadan

	Male	Female
Osteogenic Sarcoma	43=37.7%	27=23.6%
Chondrosarcoma	12=10.5%	4=3.2%
Giant Cell Tumour	5=4.3%	8=7.4%
Burkitt's Lymphoma	5=4.3%	4=3.2%
Fibrosarcoma	1=0.8%	2=1.6%
Plasmacytoma	1=0.8%	0=0%
Ewing's Sarcoma	1=0.8%	0=0%
Haemangioendothelioma	0=0%	1=0.8%
Total	68	46
	(58.9%)	(41.1%)

Males accounted for 58.9% of cases with primary malignant bone

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Table 2 Distribution of primary malignant bone tumours in relation to different bones of the body

	Osteogenic Sarcoma	Chondrosarcoma	Giant Cell Tumour	Burkitt's Lymphoma	Fibrosarcoma	Plasmacytoma	Ewing's Sarcoma	Haemangioendothelioma	Total
Mandible	15	3	2	8	1	-	1	1	31
Femur	20	3	2	-	2	-	-	-	27
Tibia	12	1	5	-	-	-	-	-	18
Maxilla	6	1	2	1	-	-	-	-	10
Humerus	7	2	-	-	-	-	-	-	9
Ilium	2	3	-	-	-	1	-	-	6
Fibula	2	-	1						3
Forearm Bones	1	1							2
Ribs	1	1							2
Skull	2								2
Calcaneum	1	1							2
Sternum		1							1
Clavicle	1								1
Total	70	16	13	9	3	1	1	1	114
%	60.7	14.3	11.6	8.0	2.7	0.9	0.9	0.9	100

Table 3 Age distribution of primary malignant bone tumours

	Age distribution in years						
Histology Type	0 -9 YRS	10 - 19YRS	20 - 29 YRS	29 - 39 YRS	40 - 49 YRS	50 - 59 YRS	>60YRS
Osteogenic Sarcoma	2	35	18	10	2	1	2
Chondrosarcoma		2	3	5	5	1	0
Giant Cell Tumour		3	4	3	2	1	0
Burkitts Lymphoma	2	6	1				0
Fibrosarcoma			1		1	1	0
Plasmacytoma			1				0
Ewing's Sarcoma		1					0
Haemangioendothelioma		1					0
Total	4	48	28	18	10	4	2
	3.5%	42.10%	24.56%	15.78%	8.77%	3.5%	1.75%

tumours seen while females accounted for 41.1% giving a male to female ratio of 1.4:1. Giant cell tumor was more common in females compared to the other types of tumours Table 1.

Tumour type

The histological types of bone tumours seen are shown in Table 1. Osteogenic sarcoma was the most common primary malignant bone tumour accounting for 60.7% of all the tumours, while chondrosarcoma, and malignant giant cell tumour represented 14.3% and 11.6% of all the tumours respectively. Plasmacytoma, Ewing's sarcoma and haemangioendothelioma, were relatively rare, each representing 0.9% of cases seen. Figure 1 and 2 show typical pictures of osteosarcoma and chondrosarcoma respectively.

Site of distribution: Table 2

The bone most commonly affected by primary malignant tumours was the mandible. Other bones affected in decreasing order of frequency were femur, tibia, maxilla, humerus, ilium, and fibula. Osteogenic sarcoma most commonly affected the femur. Other bones affected in descending order were the mandible, tibia, maxilla, humerus, and ilium.

Chondrosarcoma was seen most commonly affecting the mandible, femur, and ilium.

Burkitt's lymphoma affected the mandible in 8 out of 9 cases. A single case of plasmacytoma was recorded in a male adult in the iliac bone. In a similar manner, Ewing's tumour was seen affecting the mandible in a teenager male. The other rare tumour found in our study was haemangioendothelioma, which was seen in a teenage female.

Age distribution: Table 3

Most (44.6%) malignant bone tumours were seen in children and young adults less than 20 years old.

Osteogenic sarcoma and Burkitt's lymphoma constituted the main tumours in the age group 0-20 years.

The majority (50.6%) of osteogenic sarcomas occurred among patients less than 20 years while about 3% were seen in the older patients (above 60 years of age).

Eight out of the nine cases (88.9%) of malignant lymphoma were seen in childhood and early adult life (less than 20 years).

Discussion

The incidence of primary malignant bone tumours is variable but globally low. In most developing countries, trauma, metabolic bone disease, and bone infection are prominent among patients attending the Orthopaedic Clinics.[1] However, neoplastic diseases affecting the bones are being seen increasingly in orthopaedic practice.[2] In 1971, the annual reported incidence of malignant bone tumours in Sweden was 0.28 cases per 100,000 populations.[6] In African countries such as Uganda and Zimbabwe, the incidence is low and the rates vary between 0.5 and 1.6 per 100,000 population[9]. In our own study, primary malignant bone tumours accounted

for 0.53% of all new cancers.

This low incidence may be a function of several factors. One important factor is that several of our patients report to hospitals only after initial failure in the hands of traditional healers, probably as a result of the rising cost of modern medical care although in a few cases, the choice is dictated by traditional beliefs. In most of these cases, their records are unobtainable and it is almost impossible to access the diagnoses made.

Primary malignant bone tumours typically occur below 70 years compared to the secondary varieties, which are seen in an older age group.[11,14] Most malignant bone tumours (44.65%) in our study occurred in children and adolescents (less than 20 years) with the oldest patient being a 69 year-old.

Osteogenic sarcoma and chondrosarcoma were the most common tumours in our study and this correlates with findings in Sweden.[5] In addition, these tumours predominated in males rather than in females as is also described in the Swedish study. Osteogenic sarcoma is described as the most common primary malignant bone tumour, and occuring most commonly in the metaphysis of the femur.[10] This frequency of occurrence is thought to correspond to the periods of peak skeletal growth in childhood, which is reported to occur at the age of twelve years for females and fourteen years for males.[11]

In addition, osteogenic sarcoma is believed to be chiefly an affliction of the young with adolescents in the second decade being most commonly affected. This age distribution appears to be universal.[12]

In this study, the femur was involved in 26.5% of cases with osteogenic sarcoma and this was the highest site-specific occurrence corresponding to similar findings by Price[9] in Britain. However, the mandible was found the second most common area affected in contrast to the tibia in a series by Price.[13] In addition, about 51% of cases were seen below 20 years of age. It thus seems that the behaviour of osteogenic sarcoma in Nigeria does not differ significantly from that in other parts of the world.[14] It is pertinent to note the rarity of osteogenic sarcoma secondary to Paget's discase of bone in this environment. Although chondrosarcoma is generally less common, it is believed to occur second to osteogenic sarcoma[15] in terms of frequency and was seen as the second most common primary malignant bone tumour in this series, representing 14.3% of cases.

Burkitt's lymphoma has a predilection for the jaw and commonly affects the Maxilla[15] but in this study, eight out of the nine cases (89%) affected the mandible, and all the affected children were below 10 years.

Ewing's sarcoma, well recognised to be associated with a specific cytogenetic defect (tll: 22), is generally uncommon in Black African children and almost exclusively limited to Caucasians, as reiterated by the present study.[4]

Conclusion

Osteogenic sarcoma is the most common primary malignant bone tumour in Ibadan, and occurs predominantly in the second decade of life. It is followed next in incidence by chondrosarcoma, while Ewing's sarcoma is a rarity in this environment.

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