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Primary bone tumors: Epidemiological, diagnostic and therapeutic aspects at Owendo University Teaching Hospital: About 30 cases

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Abstract

Primary bone tumors pose, in our Gabonese context, diagnostic and management problems due to their rarity and the often late circumstances of discovery. In our department, a few studies concern primary bone tumors. This was a retrospective study with description which took place from June 1, 2018 to June 1, 2022. Statistical analysis was performed with Microsoft Excel version 2019. Categorical variables were expressed as percentages and the interpretation was made by comparing the percentages. We collected 30 patients including 17 men and 13 women. The age group of [0-20 years old] was predominant (60%) with an average age of 22.1 years. Pupils and students predominated with 66.7%. Circumstances of discovery were pain in 43.3% and swelling in 26.7%. The tibia was the most concerned bone with 40% followed by the femur with 26.7%. Among benign tumors, giant cell tumors were predominant with 23.3%, while osteosarcomas predominated among malignant tumors with 20%. In surgical treatment, excision was the most used method with 26.6%. We noted 30% of complications. With a follow-up of 12 months, the evolution without signs of recurrence was predominant with 76.7% (n=23).

Keywords: Primary bone tumors, epidemiology, diagnosis, treatment

Introduction

Bone under normal conditions contains different types of cell lines. Each of these lineages can cause a type of tumor. Bone tumors are tissue proliferations that develop inside a bone or on its surface; they constitute an important cause of consultation in medicine and surgery and represent the second cause of mortality after cardiovascular diseases [1]. Primary bone tumors are relatively rare and account for less than one percent (1%) of all malignancies [2]. Malignant tumors carry a high mortality rate because the 5-year relative survival doesn't exceed 53.9% for osteosarcoma, 75.2% for chondrosarcoma, and 50.6% for Ewing sarcoma [3]. In addition to their non-specific semiology, these tumors pose diagnostic problems due to their rarity, their etiology, the permanent changes in their bone tissue characterized by the succession of osteoclastic and osteoblastic phases and finally to the circumstances of discovery of certain tumors. Revealed by pathological fractures [4]. Imaging represents a crucial examination in the diagnostic process but is not confirmatory. The biopsy is the fundamental step in the diagnostic process and diagnostic confirmation is essentially based on the anatomopathological examination of the excision specimen. These bone tumors also pose therapeutic problems due to late consultations of patients, thus complicating the planning of their care which, moreover, is multidisciplinary. Despite the above-mentioned problems, bone tumors do not receive much attention from our practitioner-researchers and in Gabon few studies have focused on this problem. We therefore undertook the present study with the aim of describing the epidemiological, diagnostic and therapeutic aspects of these tumors in our structure in order to improve their management.

Materials and Methods

Study framework: Our study took place at Owendo University Teaching Hospital, located in south of Libreville after Nomba bridge, in Akurnam II district.

Type and period of study

This was a retrospective study with a descriptive aim which took place over a period of 4 years from June 1, 2018 to June 1, 2022.

Inclusion and non-inclusion criteria

The study concerned all patients admitted and treated in the department for primary bone tumors mentioned in the clinic, suspected on radiographic examination and confirmed histologically. Patients evacuated outside the country, those who abandoned the initial treatment started in the department to the detriment of traditional treatment and those who presented incomplete medical records constituted the non-inclusion criteria.

Collection of data

Data collection was carried out using a survey form designed for the study and which recorded the following study variables from the department's medical files and for each patient meeting our selection criteria: sociodemographic data, revealing clinical signs, location of the tumor, results of standard radiography of the pathological skeleton, cytopathological results of the biopsy or surgical specimens and the treatments carried out. The bone biopsy and surgical specimens were analyzed by pathologists from the cytopathology laboratory of the University of Health Sciences. The Libreville Cancer Institute (ICL) was called upon to monitor certain patients requiring additional adjuvant treatments.

Statistical analyzes

All data collected were entered and processed with Microsoft Excel version 2019 software. Categorical variables were expressed as percentages. The interpretation of the data was made by comparing percentages.

Results

We collected 30 patients including 17 men (56.7%) and 13 women (43.3%), i.e. a M/F sex ratio of 1.30 in favor of men. The average age was 22.1 years with extremes of 2 and 60 years inclusive. The age group from 0 to 20 years old was predominant with 60.0% (n=18). Pupils and students predominated with 66.7% (n=20) over all other socio-professional categories. The majority of cases encountered came from Libreville with 70% (n=21) (table 1).

Tables 1: Distribution of patients according to origin

Variable	Effective	%	
Cities	Libreville	21	70
	Koulamoutou	3	10
	Lambaréné	2	6,66
	Port-Gentil	2	6,66
	Oyem	1	3,33
	Franceville	1	3,33

The circumstances of discovery were pain in 43.3% (n=13), swelling in 26.7% (n=8) and pathological fracture in 20% (n=6) (figure 1 and table 2).



Fig 1: 13-year-old patient who consulted for a large painful atraumatic knee that had been swollen for more than a month with dermabrasions on the side, the examination revealed osteosarcoma of the distal femur

Tables 2: Distribution of patients according to the circumstances of discovery

Variable	Effective	%	
Circumstances of discovery	Pain	13	43, 3
	Swelling	8	26, 7
	Pathological fracture	6	20
	Functional discomfort	2	6,7
	Haemorrhage	1	3, 3

A minimum period of 120 days had elapsed between the appearance of symptoms and the actual consultation in 56.7% (n=17). The majority of patients had undertaken traditional treatment with 56.7% (n=17) before a consultation in the department. The pelvic limb was the most frequent location with 73.3% (n=22) of cases. The tibia was the bone most affected with 40% (n=12) followed by the femur with 26.7% (n=8) (Table 3).

Tables 3: Distribution of patients according to the site of the tumor

Variable	Effective	%	
Tumor site	Humerus	3	10
	Radius	3	10
	Ulna	0	0
	hand	2	6, 6
	femur	8	26, 7
	tibia	12	40
	fibula	0	0
	foot	2	6, 6

Concerning the tibia, the upper third was the preferred site of the tumor with 50% (n=6/12) and for the femur, it was the distal third with 75% (n=6/8). Benign bone tumors predominated in the series with 53.3% (n=16); the different tumors encountered in the series after the pathological examinations are summarized in Table 4 below:

Tables 4: distribution of patients according to anatomopathological results

Variable		Effective	%	
Anatomopathological results	Benign Tumors	Osteoma osteoid	2	6,7
		Osteoblastoma	1	3,3
		Chondroma	1	3,3
		Osteogenic exostosis	3	10
		Fibroma	1	3,3
		Aneurysmal cyst	1	3,3
		Giant cell tumors	7	23,3
	Malignant tumors	Osteosarcoma	6	20
		Chondrosarcoma	3	10
		Fibrosarcoma	2	6,7
		Lymphoma	1	3,3
		Myeloma	1	3,3
		Edwin's tumor	1	3,3

Among benign tumors, giant cell tumors were predominant with 23.3% (n=7), followed by osteogenic exostoses with 10% (n=3) while osteosarcomas predominated among malignant tumors with 20% (n= 6) followed by chondrosarcomas with 10% (n=3). All patients underwent a radiographic examination at the level of the incriminated limb segment (figure 2).



Fig 2: this is a 19-year-old patient, admitted to the department for pain and swelling in the proximal third of the right leg, the x-ray showed lytic images with blurred contours of the proximal tibia, the biopsy confirmed the diagnosis osteosarcoma of the proximal tibia

In this series, patients with malignant tumors underwent extension assessments. 23.3% (n=7) performed a chest x-ray, 13.3% (n=4) performed an abdominal ultrasound, 10% (n=3) performed a thoraco-abdominal CT, 10% (n =3) also performed a bone scan. In this study, patient management was either surgical, medical or mixed. In surgical treatment, excision was the most used method with 26.6% (n=8) (table 5).

Table 5: Distribution of patients according to the different therapeutic options

Variable		Effective	%	
Treatment	Medical	Chemotherapy	1	3,3
		Biopsy	2	6,7
	Surgery	Excision	8	26,7
		Excision and filling	6	20
		Excision and Reconstruction	2	6,7
		Amputation	3	10
		Surgery and chemotherapy	6	20
	Mixed	Surgery and chemotherapy and radiotherapy	1	3,3

In this study, we noted 30% (n=9) of complications. They

were mainly surgical site infections in 13.3% (n=4), tumor recurrences in 10% (n=3) and pulmonary infections in 6.7% (n=2). With a follow-up of 12 months, the evolution without signs of recurrence was predominant with 76.7% (n=23) (table 6).

Table 6: Distribution of patients according to post-therapeutic evolution

Evolution	03 Month		06 Month		12 Month	
No recurrence sign	25	83%	23	77%	23	77%
Recurrence sign	03	10%	03	10%	03	10%
Death	02	7%	04	13%	04	13%
Total	30	100	30	100	30	100

The cost of treatment varied depending on the type of tumor and the type of treatment received, after adding up the expenses incurred per patient, from the first day of the consultation until the end of all sessions of adjuvant treatments (chemotherapy and radiotherapy). For some people) the average cost spent was one million four hundred and sixty-one thousand (1,461,000) CFA Francs or 2,227.03 euros with extremes of four hundred and sixty thousand (701.27 Euros) and four million two hundred and seventy-five thousand CFA francs (6526.71 Euros).

Discussion

The limitations of the study

Our study has some limitations. We encountered a low rate of completion of certain specific examinations as well as certain adjuvant treatments which were not covered by the National Health Insurance and Social Guarantee Fund (CNAMGS); this resulted in an obstacle to the smooth progress of the treatment of these patients until the end, with the consequence of abandoning treatment for some, thus reducing the size of the sample.

Patient frequency

In this study, we collected 30 patients out of a total of 3780 patients consulted, either an incidence of 0.8% (n=3000/3780), the work extended over a period of 4 years, either a frequency of 7, 5 cases per year, this result is comparable to that of Zomalheto Z in Benin who found an incidence of 0.11% in their series.

Sex and age

Those under 20 with a male predominance were the most represented in the series with 60.0% (n=18) with an average age of 22.1 years and extremes of 2 and 60 years. This result is comparable to that of Jonati S in Morocco who found in

their series 47.2% of people under 20 years old with an average age of 24.1 years and extremes of 8 and 80 years. This could be explained by the fact that bone tumors are more common in growing children and adolescents.

Occupation and Origin

Pupils and students represented the largest part of our workforce with 66.7% (n=20) and the majority came from Libreville. This result is comparable to those of Camara C and al. in Mali who had found 51.72% of pupils and students in their series. This could be explained by the fact that bone tumors primarily affect young children and adolescents rather than adults and the origin of patients mainly from Libreville could be explained by the fact that Libreville is the capital of Gabon, it is endowed with a cancer institute and university hospital centers (CHU) more or less equipped to make an early diagnosis and guide the management of bone tumors.

Clinical characteristics

In this series, pain and swelling were the main reasons for consultation with respectively 43.3% (n=13) and 26.7% (n=8) and more rarely pathological fracture^[9, 10]. The absence of tumor-specific symptoms can lead to diagnostic delay and errors^[11]. The minimum time interval between the appearance of symptoms and the actual consultation was 120 days. This rather late time, in our study, is comparable to that found by several authors of the series^[12, 13] and could be explained by the self-medication practiced by several patients before thinking about a regular consultation in a hospital environment; we could also think of the traditional treatments carried out by several patients at bonesetters before going to the hospital, most often, when we already have complications. The pelvic limb was the most frequent location in the series with 73.3% (n=22), this result is slightly higher than that of Grimer R in England^[14] who found 55% of tumor localization in the limb. Pelvic. Tibial and femoral injuries were predominant in the series with respectively 40% (n=12) and 26.7% (n=8), several authors of the series found the same thing as us, sometimes in an order which is not not the same^[15, 16]. This could be explained by the increase in road traffic accidents which expose the pelvic limb more than the thoracic limb.

Anatomopathological characteristics

Histologically, among benign tumors, giant cell tumors were predominant with 23.3% (n=7), this result is similar to that of Kadiri M^[16] who found a predominance of giant cells with 26.6%. Regarding malignant tumors, osteosarcomas were predominant in the series with 20% (n=6), a result comparable to that of Grimer M^[14] who found 30% of osteosarcomas in his series.

Treatment and complications

In our study, excision was the most used treatment method for benign tumors while mixed treatment combining excision and chemotherapy was the most used treatment method for malignant tumors. Several authors of the series proceeded like us^[17-19]. Our study noted 30% of complications which are mainly surgical site infections, tumor recurrences and pulmonary infections. These same complications have been mentioned in several series in the literature^[20-22].

The average treatment cost of the patients in the series was one million four hundred and sixty-one thousand (1,461,000) CFA francs or 2227.03 Euros, this amount seems high for the majority of patients who are schoolchildren and students

without monthly income and most often comes from economically weak families. It is therefore imperative that the state provides full coverage for these patients, through health insurance, in order to benefit from all expensive care. We did not find any comparison of treatment costs in the literature.

Conclusion

With 7.5 cases per year, or less than one case per month, we can conclude that primary bone tumors are rare pathologies in the department. They are mainly observed in children and young adults where they are benign in most cases with a male predominance. Elderly subjects are not spared and here the process is more often malignant.

Clinically, pain and swelling remain telltale signs. With advances in radiological techniques, the type of tumor can be evoked but diagnostic confirmation is made from the pathological examination. Giant cell tumors for benign tumors and osteosarcomas for malignant tumors are the most common in the department with a preferential location in the pelvic limb and with a more marked affinity for the tibia and femur.

Tumor excision or combined with chemotherapy made it possible to treat the majority of cases. The advanced stage and the complications observed sometimes require amputation. The prognosis remains poor in the department because of the cost of treatment which remains expensive for the majority of patients.

Declarations

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Conflict of interest: The authors have no conflicts of interest to declare in relation to the writing of this article.

Ethical approval: authorization for the study was obtained from the competent authorities of the CHUO. Arrangements have been made to guarantee confidentiality and anonymity. Consent from patients or their families in the event of their incapacity was given.

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