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Bone Tumors of Members in Avicenne Teaching Hospital of Rabat

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Abstract: The purpose of this work was to analyze the epidemiological aspects of member's primary bone tumors of our center to improve the management and compare with international experience. We retrospectively analyzed the records of 128 patients treated for member's bone tumors in orthopedic and trauma surgery department of Rabat teaching hospital from January 2010 to December 2015. We collected and analyzed data on age, sex, profession, ethni, anatomical seat and histology. Middle age was 35.48. There were 64 men and 64 women. 77% was a native in center of the kingdom of Morocco. 32.8 % was unemployed and 21% was student. Tumor interested femur in 39 patients and leg in 30. Of the 72 patients (56.3%) diagnosed with malignant tumors. There were 26.6% of giant-cell tumors, 14.1% of osteosarcoma, 12.5% of chondroma, 11.7 of osteochondroma, 9.4 of liposarcoma, 6.3 of chondrosarcoma, 4.7% of osteoid osteoma, 3.9 of lipoma and ewing sarcoma and 3.1% only of bone metastase. The age distribution showed a peak in young adults that comprised predominantly of malignant lesions. Malignant bone tumors most often involved the femur, leg, scapula, and the humerus. Our results parallel the findings previously reported in the world literature and show a similar distribution and epidemiology as in other underdeveloped and developed countries.
Keywords: Bone tumors, Epidemiology, RABAT, Malignant, Giant-cell tumors.

INTRODUCTION

Primary bone tumors are rare, with a prevalence of about 5500 cases per year, whereas metastatic bone tumors are quite common [1].

The incidence of benign bone tumors is considerably higher. Primary malignant bone tumors represent less than 0.2% of all malignant tumors [2]. Their incidence varies mainly by age [3]. In Morocco few studies have been devoted to these tumors. In this work we will evaluate the epidemiological profile of bone tumors in our department on two levels, first a global study of all the tumors found (primitive and secondary, benign and malignant) and then we will stop on each tumor and study its own profile Epidemiological studies.

MATERIALS AND METHODS

This is a retrospective longitudinal study carried out in the department of traumatology and orthopedic surgery of the Avicenna University Hospital of Rabat. Our study covers a period of 6 successive years from january 2010 to december 2015. The study focused on patients with bone tumors hospitalized during the study period.Patient present had a bone tumor suspected by standard radiography and confirmed by pathology anatomy. The collection of data took place in two stages, among the more than 200 registered patients, 140 cases were found, of which 128 were exploitable. The data was entered and analyzed using the IBM SPSS 20 software.

RESULTS AND ANALYSIS

128 patients were identified with a diagnosis of bone tumor with the following distribution. There were 64 men (50%) and 64 women (50%) with a male-female ratio of 1. The mean age of the patients was 35.48 years. 75% of the patients originated from the center of the Kingdom, 25% from Rabat, 10% from the southern regions and the rest from the extreme north. Only two patients were foreigners, one from Mali and the other from Mauritania. The majority of our patients were without occupation with a percentage of 32.8, followed by the students in 2nd position with a percentage of 21.9 then by the workers 13.3%, the official 11.7% and the marching 9.4%. The anatomical localization was as follows: Femur (30.5%, 39 cases) Leg (23.4%, 30 cases) Hand and wrist (12.5%, 16 cases) Ankle and foot (9.4% (6.3%, 8 cases), Forearm (4.7, 6 cases), Clavicle (0.8%, 1 case) in 2.4% of cases (3 patients), the lesions were multifocal. Of the 128 cases in the study, 56.3% of the tumors (72 patients) were malignant, of which 3.1% metastasis (4 patients)

and 43.7% of the tumors (56 patients) were benign. The most common histological type of bone tumor was the giant cell tumor, accounting for 26.6% of all bone tumors (34 patients), followed by the ostéosarcomea (14.1%; 18 patients), le chondroma (12.5%; 16 case), l'ostéochondroma (11.7%; 15 case), le liposarcoma(9%; 12 case), chondrosarcoma (4,8%; 27 case), Osteoide osteoma(4.7%; 6 case), chondroblastoma (2,5%; 14 case), chondrosarcoma(2,5%; 14 case), lipoma (3.9%, 5 case), Ewing sarcoma (3.9%; 5 case) And others (less than 1%).

Four metastases with osseous localization were found in our series

- Two metastases secondary to a breast neoplasm
- A metastasis secondary to a neoplasm of the prostate
- A metastasis secondary to a neoplasm of the thyroid gland

In patients over 60 years (6.3, 8 patients) 62.5% have a malignant tumor and 37.5 have a benign tumor.

In patients aged 40 to 60 years (28.1, 36 patients) 63.9% have a malignant tumor and 36.1 have a benign tumor. In patients aged 20 to 40 years (48.4, 62 patients) 53.2% have a malignant tumor and 46.8 have a benign tumor. In patients under the age of 20 years (17.2, 22 patients) 50% have a malignant tumor and 50 have a benign tumor. Each location showed variability in malignancy.

Scapula: Malignant tumors(55.6 ;5 patients) Benign tumors(44.4%;4 patients) Hand and wrist: Malignant tumors(31.2%;5 patients) Benign tumors(68.8%;11 patients) Leg :Malignant tumors(66.7% ;20 patients) Benign tumors(33.3%;10 patients) Ankle and foot: Malignant tumors(33.3% ;4 patients) Benign tumors(66.7% ;10 patients) Femur: Malignant tumors (66.7% ;26 patients) Benign tumors (33.3% ;13 patients) Basin: Tumeurs malignes (75% ;3 patients) Benign tumors (25% ;1 patients). Humerus: alignant tumors (62.5% ;5 patients) Benign tumors(37.5% ;3 patients). Forearm: Malignant tumors (50%; 3 patients) Benign tumors (50%; 3 patients).

Each tumor had its own epidemiological characteristics represented in the following table: (The table shows the most frequent tumors in our series).

Table-1

Tumors	Peak of age	Sex ratio	Predominant location
Giant cell tumors	20 - 40	0.4	Upper extremity of the Tibia
Ostéosarcoma	40 - 60	0.8	Lower end of femur
Chondroma	40 - 60	3	Finger (43.8%, 7 patients
Ostéochondroma	20 - 40	0.87	Lower extremity of femur (53.3%, 8 patients)
Liposarcoma	20 - 40	3	Lower extremity of femur (41.7%, 5 patients)
Chondrosarcoma	20 - 60	1.66	Lower extremity of femur(37.5 ; 3 patients)
Osteoide osteoma	20 - 40	2	Upper extremity of the Tibia (33.33%; 2 patients)
Ewing sarcoma	40 - 60	4	5 patients with 5 different sites
Lipoma	40 - 60	0.25	5 patients with 5 different sites

Bone metastases accounted for 3.13 percent of all tumors in the series. Four metastases with osseous localization were found in our series.

Two metastases secondary to a breast neoplasm in two women, one aged 40 years and the other aged 53 years and both metastasis located at the level of the humeral diaphysis.

A metastasis secondary to a neoplasm of the prostate in a man of 62 years is also located at the level of the humeral diaphysis.

A metastasis secondary to a neoplasm of the thyroid gland is localized at the level of the iliac bone in a woman of 48 years.

The bone metastasis in our department then has a sex ratio of 0.33 and is mainly due to metastases of a breast neoplasm.

DISCUSSION

The distribution of primary bone tumors varies greatly in different regions of the world. Europe and the US have high impacts whereas they are less alarming in Asia [3].

The epidemiological study of these tumors has a very important aspect and is at the origin of several discoveries from the genetic and molecular point of view and has an impact on the treatment and the prognosis, the literature is rich in an article that is interested in Bone tumors nevertheless the epidemiological aspect remains insufficient even more in the third world countries and the countries of the Maghreb.

In Morocco, no epidemiological studies have been carried out on bone tumors per se, but a study carried out in 2008 on the general activity of the service showed a percentage of 0.2% of all hospitalized patients

constituting 20% of the pathology Non-traumatic service, our series is the first of its kind and will be an important starting point for a better exploitation of the data of our service and a better management and survival of our patients.

Table-2: Age

	Avivenne th rabat 2008	Avivenne th rabat 2010-2015	Handrik van den ber (8)	Rob grimer (10)
Middle age	30	35.48	----------	32
Pic of age	20 - 40	20 - 40	16 - 18	15 - 19 75 - 79

The average age of our series is close to that of the literature, but the peak of age is far from being similar because the majority of our patients are young with an age varying between 20 and 40 years whereas the literature shows a Peak bimodal towards adolescence and subjects aged over 75 years. Compared to the study conducted in 2008, there is an increase in the average age.

Table-3: Sex

	Avivenne th rabat 2008	Avivenne th rabat 2010-2015	Rob grimer
Sex ratio	1.5	1	1,6

Rob Grimer found a slight male predominance contrary to our study which shows an equality between the two sexes whereas in 2008 one was closer to literature.

Table-4: Anatomical seat

	Avivenne th rabat 2010-2016	Rob grimer
Under limbs	65 %	55%
Upper limbs	24%	20%
Basin	4%	20%
Shoulder	7%	5%

The two studies are concordant except for the localization at the level of the basin. The latter being a site of frequent localization for bone tumors, our study underestimated this localization this would be due to the small size of the sample.

Table-5: Histologie

	Avivenne th rabat 2008	Avivenne th rabat 2010-2015	Rob grimer
GTC	16%	26,6%	1.6%
Chondroma	5.6%	12.5%	-
Osteochondroma	12%	11.7%	-
Osteoide osteoma	12%	4.7%	-
Osteosarcoma	3.2%	14.1%	30%
Chondrosarcoma	4.8%	6.3%	29%
Ewi ng sarcoma	3.2%	3.9%	20%
Chordoma	0%	0%	5%
Liposarcoma	4.8%	9.4%	4.4%

While The NCIN Study Agrees With The Results Of Our Series, Rob Grimer Finds 4 Main Tumors Predominant In His Series With Different Percentages Of Our Series osteosarcome 30% chondrosarcome 29% ewing sarcoma 20% and chordome 5%.

Table-6: Age and histologie

Age range	Avivenne th rabat	NCIN **(6)**
Less than 20 years	50 %	91%
Between 20 and 40 years	53.2 %	84%
Between 40 and 60 years	63.9%	79%
More than 60 years	62.5%	80%

Our series has fewer malignant tumors for all age groups and this is due to the high prevalence of TCG in our series.

The malignancy in our series becomes important only beyond the age of 40 years or it is greater than 60% whereas it is clearly clear of the young age for the NCIN.

Table-7: Location and histologie

Location	Avivenne th rabat	NCIN
Uper limbs	39%	50%
Under limbs	10.1%	19%
Basin	2.3%	16%
Shoulder	4.7%	2%

It is clear for both studies that malignant tumors have an affinity for the lower limbs first and then following the upper limbs stretched as belts are the prerogative of benign tumors.

Profession

32.8% of our patients will be unemployed, but this percentage might well be unreal because 76.5% of our patients have an age ranging between 20 and 60 years corresponding to the working age, this could be due to the collection of data, As it could be real and this will be explained by the disabling character of bone tumors thus preventing any professional activity.

Ethnic group

The cities most represented in our series are respectively Rabat, Salé, Témara, Khmissat, and Kenitra but more than 16% are of origin of the south of Morocco and more than 10% of the extreme north.

Our series has deliberately taken into consideration the ethnicity of the individuals and not their residences, because the flap university hospital only drains the center and the north of the kingdom from an administrative point of view, so we were able to have this ethnic diversity.

Our series will be the first in Morocco to have studied this ethnic aspect of bone tumors, and this can only be beneficial because it is from which one could derive genetic data.

Specific discussion of each tumor

Primary tumors

Table-8: 9. 1.1-CGT

	AVICENNE RABAT	Haque / Moatasim	Hôpital militaire Rabat
Pic of age	20 - 40	20 - 40	20 - 40
Sex ratio	0.41	0.6	1.44
Predominant location	Near of the knee	Near of the knee	Near of the knee

According to the literature, TCG appears most often between the ages of 20 and 40, with a female predominance and is mainly localized in the knee region (50-65%) Haque / Moatasim 2008 [7]

Our study is confirmed by the literature. In our Moroccan context a study carried out at the military hospital in Rabat in 2012 shows the same data except apart from sex ratio, this could be explained by their small sample of 13 patients. [8]

Table-9: 9.1.2-Ostéosarcoma

	AVICENNE RABAT	Mirabello / Troisi / Savage	SAHLOUL
Pic of age	Before 20 years 20 - 40	Before 20 years More than 50 years	16 - 40
Sex ratio	0.8	1.4	0.4
Predominant location	Femur Humérus Tibia	Femur Basin Tibia Humérus	Femur Tibia

Osteosarcoma affects mainly children and young adults under 20 years of age, but can occur in people of all ages, with a second peak at age 50, most often at the level of Lower limbs: Femur 40%; Tibia 20%; Basin 8% and when present on the upper limb they most often sit at the level of the Humerus (10%).

Mirabello / Troisi / Savage 2009 [9]. Our results are similar to those found in the literature with regard to localization, a slight difference is noticed for sex ratio when the predominant age the difference is manifest compared to Mirabello / Troisi / Savage 2009. In the Maghreb context, a study carried out in Tunisia H. Nouri 2015 shows an age peak similar to our study [10].

Table-10: 9.1.3-Chondroma

	AVICENNE RABAT	Dahlin	CHU Mustapha Alger
Pic of age	20 - 40	10 - 39	35
Sex ratio	3	1.3	0.7
Predominant location	Hands	Hands and Feet	hands

Les chondromes peuvent se présenter à tout âge mais 59% se produisent entre les âges de 10 et 39ans, ils se localisent dans les os longs tubulaires plus communément les mains et les pieds 87% et ont une légère prédominance masculine Dahlin 1978 [11]. There is a large difference in sex ratio; our sample consists of 12 men for every 4 women with chondroma, whereas a study carried out in Algiers at CHU Mustapha shows a female predominance [12].

For the last two studies the small sample size may explain the defect. The chondrome is often asymptomatic and can go unnoticed, in our sample among the 14 men carrying the chondrome 7 uses much their hands (worker, student) while the 4 women found are without profession. One can explain this rarity of the female sex by the lack of utility of the hands of the feminine sex which leaves past a lot of woman unnoticed carrying chondrome.

Table-11: 9.1.4-Ostéochondroma

	AVICENNE RABAT	Subbarao	Tunisie Sousse
Pic of age	16 - 40	15 - 20	20 - 40
Sex ratio	0.87	1	1.06
Predominant location	Femur and feet	Femur and humérus	Femur Humerus Tibia Feet

Our results are more or less in line with the literature because osteochondroma can be encountered at any age but is predominant in young adults and is predominantly sexual, and most often encountered at the level of the bones mainly the femur 38% Subbarao 2012 [13].

In Tunisia, a study carried out on 95 patients over a period of 10 years and published in 2008 shows results close to our study [14].

Table-12:9.1.5-Liposarcoma

	Avicenne rabat	Layfield	Sahloul Tunisia
Pic of âge	20 - 40	40-60	35 years
Sex ratio	3	1.4	0.25
Predominant location	Femur, Peroné	Femur, Tibia	Femur

Liposarcomas are the prerogative of the soft tissues and the retroperitoneal cavity; they rarely sit in the bone and constitute 4% of all bone tumors [5].

Our study shows data comparable to the literature, despite the very strong male predominance, but it still remains in the small sample.

The liposarcomas affect mainly adults and are only observed very exceptionally in children and adolescents; they show a slight male predominance and are located mainly at the femur Layfield 2002 [15].

A study conducted at the Sahloul Hospital 2010 also shows a similar topographic distribution of liposarcomas and the same peak of age and a strong female predominance [16].

Table-13: 9.1.6-Chondrosarcoma

	AVICENNE RABAT	DeLaney / Liebsch / Pedlow
Pic of age	20 - 60	50 - 70
Sex ratio	1.6	1.5
Predominant location	Femur, Scapula	Femur, Basin

Chondrosarcoma is the prerogative of the elderly with a peak of age between 50 and 70 years of age, and is most often found in the femur and trunk mainly in the DeLaney / Liebsch / Pedlow basin [17].

Table-14: 9.1.7-Osteoide osteoma

	AVICENNE RABAT	Kransdorf	Tunisie Sousse
Pic of age	20 - 40	15 - 30	20
Sex ratio	2	1.35	1.5
Predominant location	Femur and Tibia	Femur and Tibia	Femur and Tibia

50% of the osteoid osteoids are localized in the femur and tibia, they affect the young adult with a masculine predominance Kransdorf 1991 [18]. In the Maghreb context, our studies show similar data and are confirmed by studies carried out in Tunisia 2008 [19].

Table-15: 9.1.8-Ewing sarcoma

	AVICENNE RABAT	Duchman / Benjamin / Gao	Marrakech
Pic of age	40 - 60	Less than 20 years	20
Sex ratio	4	1.4	1
Predominant location	Femur	Femur et Tibia, Basin	Femur, Basin

Ewing sarcoma is the prerogative of young subjects under the age of 20 years (80%) has a slight male predominance and is located mainly in the long bones of the lower limbs (40%) and in the pelvis (20%)

Duchman / Benjamin / GAO 2015 [13]. In Marrakech, a study published in 2008 shows the same data from the literature [20]. Our study is very discordant regarding the peak age, but this can be explained by the fact that our service does not support children under 16 and therefore highlights adult forms only.

Metastases

These are the most frequent bone tumors (60%) [21]. Our series has only 4 metastasis spread over a period of 5 years, this number is considered to be very insufficient relative to the size of our samples. Only one explanation will be the non-archiving of records. The skeleton is the fourth metastatic site after the ganglia, lung and liver. Cancers that metastasize most to the skeleton are, in order of decreasing frequency: breast, prostate, lung, kidney and thyroid gland [21]. In this context our study revealed two bone metastases from a breast neoplasm, one from a neoplasm of the prostate and one from a neoplasm of the thyroid gland. Secondary tumors are seen more readily in the second half of life with a peak age of 50 to 60 years [22].

The most affected sites at the limb and belt levels are the femur, humerus and pelvis. About 65% to 75% of patients with breast cancer or prostate metastases will develop bone metastases [23]. 68% of patients with breast cancer metastasis and 49% of patients with prostate cancer metastasis will develop bone metastases within 2 years [24].

CONCLUSION

Our retrospective study carried out in the department of orthopedic surgery and traumatology of the Avicenne Hospital in Rabat concerning bone tumor pathologies that bone tumors constitute a lesion infrequent in this service is a percentage of 0.82%. All patients hospitalized in the service. The ethnicity of the hospitalized patients is distributed throughout the kingdom but the region of the center remains predominant.

This pathology is especially the prerogative of the young adult. Les tumeurs osseuses malignes sont les plus fréquentes contrairement à la littérature, et se localisent préférentiellement au niveau des os long des membres inférieurs tandis que les tumeurs bénignes se localisent au niveau des extrémités (main et pied). Giant cell tumors are frequent, mainly affect young adult female and are located mainly near the knee and far from the elbow. Each tumor of the series presents its own epidemiological characteristics more or less concordant with the literature. Metastases represent only 0.02% of the series but this number is certainly underestimated. He epidemiological profile of bone tumors in our department differs somewhat from other studies performed elsewhere and can be the basis for further research into the cytogenetic and molecular biology aspects that are topical in the search for bone tumors.

CONSENT

The patient has given their informed consent for the case to be published.

COMPETING INTERESTS

The authors declare no competing interest.

AUTHORS' CONTRIBUTIONS

All authors have read and agreed to the final version of this manuscript and have equally contributed to its content and to the management of the manuscript.

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