

Etiologies of Bone Metastases at the Rheumatology Department (UTH) of Abidjan

Mariam Gbané, Jean Claude Soglo, Mohamed Diomandé, Guy Léopold Kengni, Baly Ouattara, Jean Mermoz Djaha Kouassi, You Nina Carmelle Kpami, Yaya Coulibaly, Edmond Eti

Rheumatology Department, University Teaching Hospital (UTH) of Cocody, Abidjan, Côte d'Ivoire

Email: mariamgbane 05@yahoo.fr

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Abstract

Objectives: The aim of this study was to describe the diagnostic and etiological aspects of bone metastases in the Rheumatology Department of Cocody's University Teaching Hospital (UTH). **Methodology:** This was a descriptive, 11-year retrospective study (January 1, 2006 to December 31, 2016) of inpatient records of bone metastases. The diagnosis was made on clinical (bone signs), radiological (osteolysis, bone condensation) and sometimes histological basis. **Result:** Eighty out of 6, 1111 inpatients suffered from bone metastasis with a hospital frequency of 1.30%. The average age was 60.74 years (range 26 to 81 years). Men were predominant (53 men for 27 women) with a sex ratio of 1.96. The main complaints were pain (97.6%). chronic (90%), severe (73.8%), inflammatory (93.8%). There was sometimes a neurological complication: a motor deficit (21.3%), sensitive (13.8%). These symptoms were associated with fever (56.3%) and altered general state (85%). Bone metastases have been revealing in the vast majority of cases (93.75%); the primary cancer was known only in 5 patients (prostate = 2, breast = 2 and cervix = 1). Bone condensation (61.3%), osteolysis (50%) and mixed lesions (7.5%) where the main radiological lesions observed. The primary tumors were: prostatic (50%), pulmonary (18.8%), mammary (11.3%), uterine (5%), renal (2.5%), hepatic (2.5%), bladder (1.3%) and adrenal (1.3%). **Conclusion:** Bone metastases affect mostly the elderly; inflammatory spinal pain is the main symptom. Bone condensation is the most common radiologic lesion. The prostate, breast and lungs are the main primary tumors.

Keywords

Bone Metastases, Bone Condensation, Prostate Cancer, Africa

1. Introduction

Bone is the third metastatic localization after the lung and liver [1].

It is a frequent location of metastases in many cancers, particularly during prostate, breast and lung cancer [1].

Their occurrence is associated with significant morbidity, decreased quality of life and survival. It is therefore important to make an early diagnosis for optimal management [1] [2].

In sub-Saharan Africa, many studies concerning bone metastases have been published, particularly in Ivory Coast: Kouakou [3]; Daboiko [4]; Konan [5]; in Congo: Brazzaville: Bileckot [6], and in Togo: Oniankitan [7]. The last study in the rheumatology department concerning bone metastases (BM) dates back to 2002. She concluded that: prostate cancer was the most common etiology the objective was to describe the bone metastasis diagnostic arguments and to identify the etiologies of bone metastases in the rheumatology department of Cocody's UTH.

2. Materials and Method

This was a retrospective descriptive study on files from January 1, 2005 to December 31, 2016 in the rheumatology department of Cocody's University Teaching Hospital. It included all patients admitted to hospital for a secondary bone tumor. The diagnosis is based on signs, symptoms and imaging. It was clinically based on bone signs (bone pain, bone swelling, pathological fracture), neurological complications, deterioration of the general state, radiological signs (osteolysis, bone condensation); biological tests and as possible on the histology. This data was processed with the SPSS 18.0 and the entry was made on Word 2013.

3. Results

Six thousand one hundred and eleven patients were hospitalized from January 1st, 2005 to December 31st, 2016 in the Rheumatology department of Cocody's UTH, of whom 80 had secondary bone tumors. The hospital frequency was 01.30%. There were 53 men (66.25%) and 27 women (33.75%) with a sex ratio of 1.96. The average age was 60.74 years with extremes of 26 and 81 years.

Bone metastases have been revealing in the vast majority of cases (93.75%); the primary cancer was known only in 5 patients (prostate = 2, breast = 2 and cervix = 1).

The main complaint was bone pain (97.5%). Pain was chronic (90.0%); progressive (92.5%), inflammatory (93.8%) and severe (73.8%). Other signs were bone swelling (12.5%) and pathological fractures (08.8%).

The spine was the most common seat of pain with a clear predominance for the lumbar segment (Table 1).

The neurological complications were: motor deficit (21.3%), genital sphincter disorders (21.3%) and sensitive deficit (13.8%). These symptoms were associated with fever (56.3%) and an altered general state (85%).

Radiographic lesions of bone metastases are listed in Table 2. Bone condensation was the most frequent radiological lesion of bone metastases (61.3%).

Table 1. Seat of pain.

	Seat of pain	Number (n)	Percentage (%)
	Skull	2	2.5
Spine	Cervical	12	15.0
	Dorsal	29	36.3
	Lombosacral	70	87.6
Upper limbs	Shoulders	12	15
	Forearm	10	12.6
	Elbows	8	10
Lower limbs	Tights	15	18.8
	Pelvis	16	20
	Knees	12	15.1
	Legs	6	7.6
	Ankles	5	6.3

Table 2. Radiological lesions of bone metastases.

Standard x-ray pictures	Number (n)	Percentage (%)
Osteolysis	20	25.0
Vertebral compression	20	25.0
Bone condensations	49	61.3
Mixed pictures	6	7.5

Tumor markers were found in 42 patients (52.6%) and distributed as follows: PSA (n = 38), CA 15-3 (n = 3), alpha fetoprotein (n = 1).

Ultrasound was contributive to investigate for the primary tumor in the most of cases (75.1%).

Tumor biopsy for histological examination was performed in only 14 patients (11.5%) and confirmed prostate adenocarcinoma in 6 patients, ductal carcinoma of the breast in 4 patients, adenocarcinoma of the breast in 2 patients, adenocarcinoma of thyroid in 2 patients.

The main etiologies of bone metastases found in the rheumatology department; have been listed in **Table 3**.

Prostate cancer remains the most common etiology according these 3 studies.

The characteristics of the main primary tumors have been described in **Table 4**.

4. Discussion

The main limitation of this study which is the absence of histology for all patients.

In term of epidemiology and clinic, our results generally meet those of many studies founded in literature, specially:

Table 3. Etiology of bone metastases.

Primitive tumors	Kouakou	Daboiko	Our study
	26 cases (1988-1990)	42 cases (1994-2002)	80 cases (2005-2016)
Prostatic	34.61	54.8%	50%
Pulmonary	7.69	2.4%	18.8%
Breast	3.85	2.4%	11.3%
Thyroid	7.69	7.1%	7.5%
Uterine	-	-	2.5%
Cervix	-	-	2.5%
Renal	-	-	2.5%
Liver	11.54	7.1%	2.5%
Bladder	-	-	1.3%
Adrenal	-	-	1.3%
Colon	-	2.4%	-
Ovary	-	4.8%	-
Unknown	13.06	19%	Excluded

Table 4. Characteristics of primary tumors.

	Prostate (n = 40)	Lungs (n = 15)	Breast (n = 9)	Thyroid (n = 6)	Uterus (n = 4)	Liver (n = 2)
Sex	M	8 M: 7 F	F	5 F: 1 M	F	M
Average age (years)	62,5	56	50	62,5	38	48
Type of bone lesion on x-ray	Bone condensation	Bone lysis	Bone lysis	Bone lysis	Bone Lysis (n = 2) Bone Condensation (n = 2)	Bone lysis

- The occurrence of metastases at a late age [3] [4] [7] [8] [9]. The youngest patient in our study was 26 years old; it was an already known cervical cancer, with bone metastases at the pelvis.
- The male predominance [3] [4].
- The bone pain remains the main symptom [3] [4] [5] [7].
- The lumbar spine is the most regular seat of pain [3] [4] [5] [9]. The bone marrow, site of hematopoiesis, is rich in growth factors that could be used by tumor cells [2].

In our study, bone metastases were revealed in the vast majority of cases (92.75%); same observation with Daboiko [4] (78.6%). Primary cancer was known only in 5 patients.

A known history of a primary tumor makes it easy to diagnose and reduce the diagnosis delay. Thus, any patient with a known history of neoplasia must be

suspected of metastatic spread while facing bone pain [2].

The diagnosis of bone metastasis is based on imaging and histology [1].

The characterization of metastatic bone lesions is a key issue of the patient management. The diagnosis of bone metastasis is evoked on standard X-ray (good specificity), showing lytic, mixed or condensing lesions [1]. M R I. is the gold standard for spine exploration; it can be used to detect spinal metastasis, to have access on tumor extension, to see the level of spinal cord compression and highlight multiple lesions [1].

In our study; we noted a predominance of bone condensation seen on x-ray; this could be explained by the male predominance of our sample and the high incidence of prostate cancer (50%). Indeed, the prostate cancer's cells mostly stimulate osteoblasts cells (bone formation), leading to bone condensation seen on radiographic imaging [2].

Our results are different from those of Kouakou [3] and Daboiko [4] who found a predominance of osteolytic forms respectively 59.5% and 69.2% of cases (studies also performed in our rheumatology department). In these two previous studies; prostate cancer was also the first etiology of bone metastases, but the lesions seen on x-ray were predominantly osteolytic.

Percutaneous bone biopsy under radiological control is a reliable technique with a reliability index greater than 90% [1] [2] [10].

There are two advantages of these bone biopsies:

- Firstly to confirm the malignancy of bone involvement;
- Secondly to identify the primary cancer.

Indeed, in the study of Destombe [11], in France, bone biopsies lead to provide an etiology or at least histological diagnosis in 95% of cases.

Concerning investigations for the primary tumor in our study; the data from anamnesis, physical examination (digital rectal examination in men and breast palpation in women) and imaging, particularly radiographic (chest x-ray), have been used for the diagnosis of the primary tumor (82.5%).

Indeed, the contribution of clinical examination is capital; it requires a careful interrogation, with an investigation on personal and family medical history, a complete clinical examination in particular of the skin, the breasts, the lymph nodes areas, the thyroid, the genital and rectal digital examination and testicles examination [1]. An abnormality discovered leads to perform further investigations. Thus, the ultrasound permitted to give an orientation towards an etiological diagnosis and to limit expensive investigations in our study.

Although the organ biopsy is useful for the certainty diagnosis, histological examination was performed only in 14 patients in our study. Histology remains the most appropriate examination for the diagnosis of primary cancer of bone metastases. The main limitation of this study which is the absence of histology for all patients.

In our daily practice, performing histologic examination comes up with several obstacles related to technical difficulties (no availability of sampling equipment, of special stains especially immunohistochemical examination, also the

cost of biopsy samples and histologic examination).

Prostate cancer was the most common primary cancer found in the 3 studies conducted in the Rheumatology Department of the Cocody's UTH (**Table 3**).

As in the literature [3] [5] [7] [10] [12]; the most osteophilic cancers remain, the prostate, the lung, the breast, the thyroid and the kidney.

These tumors (breast, kidney, prostate) spread preferentially in the bone marrow, as if this microenvironment constituted a "soil" favorable to the growth of these tumor cells [2].

Oniankitan in Togo [7], noted over a period of 17 years, a clear predominance of bone metastases related to prostatic cancers compared to those of breast and cervical cancer.

In Tubiana [1] and Conroy studies [12], breast cancer was the most predominant. In Lille, Vandecandelaere and al [13] showed a predominance of lung cancers compared to prostate and breast cancers.

If the primary tumor site is not obvious, a thoraco-abdominopelvic CT SCAN may be required to look for a primary tumor or other secondary lesions [1] [2] [10] [14] [15].

The chest x-ray should be systematic because the pulmonary origin of these inaugural bone metastases is very common [13] [16].

The positron emission tomography (PET) with 18-fluorodeoxyglucose coupled to the scanner (PET SCAN) has a high sensitivity that allows the detection of many tumor that have escaped other investigations. Its use is becoming more and more common in oncology practice in devolving countries [1].

5. Conclusion

Bone metastases mainly affect adults after 50 years of age with male predominance. The circumstances of discovery are in most cases inflammatory rachialgia. The most common primary cancers are: prostate, lung or breast.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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