

Clinical and Epidemiological Aspects of Bone Metastases: Experience of the Orthopedic and Traumatological Surgery Department of the Ibn Sina Hospital in Rabat

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Abstract

Case Report

The occurrence of a bone metastasis marks a turning point in the evolution of a cancer patient. Except for a very particular primary cancer, the chances of definitive cure have practically disappeared and the treatment is therefore essentially oriented towards the patient's quality of life. This highlights the need for close medical and paramedical collaboration, each of the specialists being at the service of the other to increase the effectiveness of the treatment and limit its heaviness for the patient as much as possible. We mainly detail the surgical strategies and combinations of techniques likely to meet the patient's needs, without going back over the basic techniques, but specifying the specificities of the gestures according to the location of the damage.

Keywords: Bone, Metastases, Prevention, Surgery, Tumor.

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I) INTRODUCTION

Of all the possible metastatic sites, bone is the most common metastatic site. Thus, the term bone metastases or metastatic bone cancer refers to cancer that started in another part of the body and has spread to the bones.

The etiologies are dominated by so-called "osteophilic" solid tumors.

Examples include breast, prostate, lung, kidney and bladder cancers.

The doctor can discover bone metastases through follow-up and monitoring of a known neoplasia, or in the opposite case, these metastases may be indicative of a primary tumour. Clinically, this type of metastasis is known mainly by its bone pain, pathological fractures, or during neurological complications. They are very often osteolytic (due to significant bone destruction), sometimes osteocondensing (due to excess bone formation) or mixed.

Nowadays the number of unidentified primary neoplasms is low. This is due to the progress made in recent years in the field of imaging, biology with tumor

markers, the conditions for performing bone biopsies directed percutaneously, as well as the use of anatomopathological and immunohistochemical techniques.

II) CLINICAL ASPECTS:

1) Circumstances of Discovery

Bone metastases can be diagnosed in three circumstances:

- Monitoring and surveillance of known neoplasia: this mode of presentation is the most frequent, particularly for breast cancer.
- Primary tumor extension assessment.
- Inaugural bone metastases: the most frequent primary tumors identified at the origin of these inaugural metastases are the prostate, the lung and the kidney. Whereas breast metastases are rarely inaugural.

Among the revealing clinical manifestations of bone metastases, there is bone pain, which is the main revealing symptom. They can be bony or root. The pains are described as being violent, permanent, of variable location evolving by flare-ups and resistant to the usual analgesics.

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They are mainly nocturnal and called osteocopes, with an inflammatory rhythm and increasing intensity.

Functional impotence is the partial or total loss of the functions of a limb, of a segment of a limb.

This sign exists in case of intense pain, or fracture.

Bone swelling is much rarer, Conroy targets it in only 3.3% of cases.

It concerns the superficial bones such as the skull, the scapula, the clavicle, the ribs, and especially the sternum.

An alteration in general condition often accompanies bone metastases and is manifested by weight loss and asthenia.

Sometimes, bone metastasis can be revealed by digestive disorders (nausea, vomiting, diarrhea), neuropsychic (sluggishness), cardiac, polyuria and dehydration, caused by neoplastic hypercalcemia.

Neurological involvement is common, revealing bone metastasis in more than 10% of cases. It is, depending on the level and the modalities of tumor development, a spinal cord compression syndrome, a cauda equina syndrome or a radicular compression syndrome.

These syndromes can be progressive events during a known metastasis, or the revealing fact of the metastasis.



Figure 1: Main medical and surgical specialties involved in the management of bone metastases



Figure 2: X-ray of the right femur showing lytic metastasis of the trochanteric mass with rupture of the cortex by a metastasis of a breast cancer

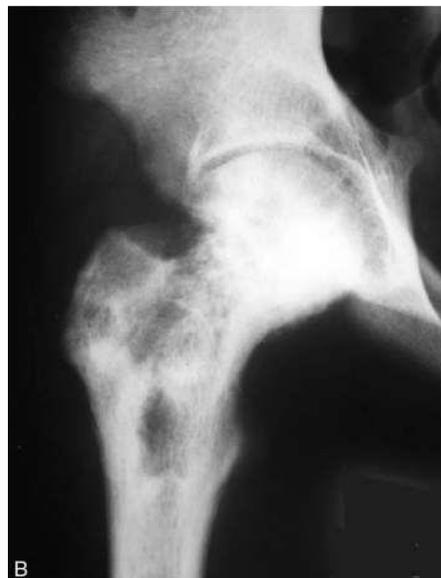


Figure 3: Condensing metastasis of the entire upper end of the femur through prostatic metastasis

2) Discovery Moment

The delay between the diagnosis of the primary tumor and the discovery of bone metastases is variable.

According to Marie Vandecandelaere's study, the time to discovery of bone metastases varies from 0 to 55 months with an average time of 36 months, or 3 years after diagnosis of the primary tumor.



Figure 4: Pain of the low part of the back



Figure 5: Knee pain which is a subjective sign

3) Types of Metastases

Bone metastases can be metachronous or synchronous with a known tumor or revealing, requiring the search for the primary tumor.

They can also be osteolytic, osteocondensing or mixed.



Figure 6: Pathological left subtrochanteric fracture following metastasis of breast cancer

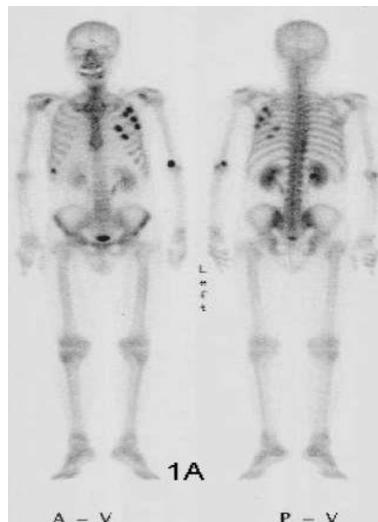


Figure 7: Anterior and posterior bone scan images, revealing left humeral and rib metastases

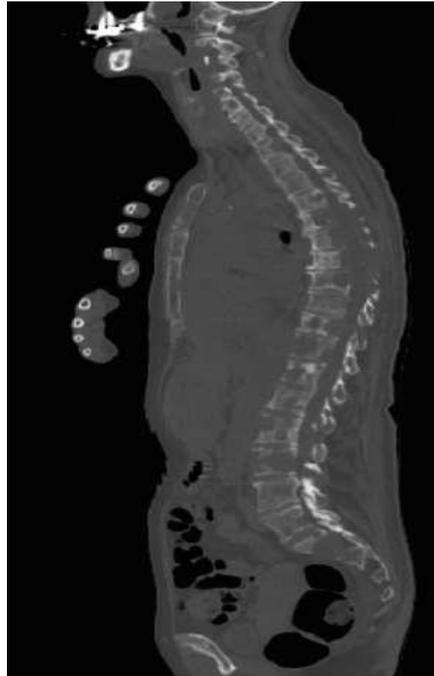


Figure 8: CT scan in bone window reconstructed in the sagittal plane. Tiered spinal osteolytic metastases, some of which invade the posterior wall

III) Epidemiological Aspects

Séries	Délai de découverte des métastases osseuse (mois)		
	Minimum	maximum	moyenne
Marie.V et al. N=132	0	55	36

Figure 9: Discovery delay of bone metastases

1) Age of Apparition of Bone Metastases

According to Le Fevre's study, the average age of onset of bone metastases is 63 years with extremes of 25 and 88 years.

In Claire Destombe's study, the average age of onset is 63.5 years.

In another study by Marie Vandecandelaere *et al.*, the average age of onset is 62 years.

Séries	Age moyen	Extrêmes d'âge
LEFEVRE et al. Strasbourg, 2017 N=91	63	25-88
DESTOMBRE et al. Brest, 2007 N=152	63,5	31-86
VANDECANDELAERE et al. Lille, 2004 N=132	62	38-85

Figure 10: Distribution of each cases following the age

2) Distribution of Bone Metastases According to Sex

In Le Fevre's study, a slight female predominance can be noted, which is explained by the incidence of breast etiology with a sex ratio (M/F) of 0.93.

The opposite can occur in Claire Destombe's series, we notice a clear male predominance, two men

for one woman with a sex ratio (M/F)=2.23 with predominance of prostate pathology.

On the other hand, we clearly observe the same male predominance in Marie Vandecandelaere's study with a sex ratio (M/F)=2.47 with a predominance of pulmonary neoplasia.

Séries	Femme		Homme		Sexe-ratio H/F
	N	%	N	%	
LEFEVRE et al. Strasbourg, 2017 N=91	47	48%	44	52%	0,93
DESTOMBRE et al. Brest, 2007 N=152	47	31%	105	69%	2,23
VANDECANDELAERE et al. Lille, 2004 N=132	38	29%	54	71%	2,47

Figure 11: Distribution of the cases following the sexe

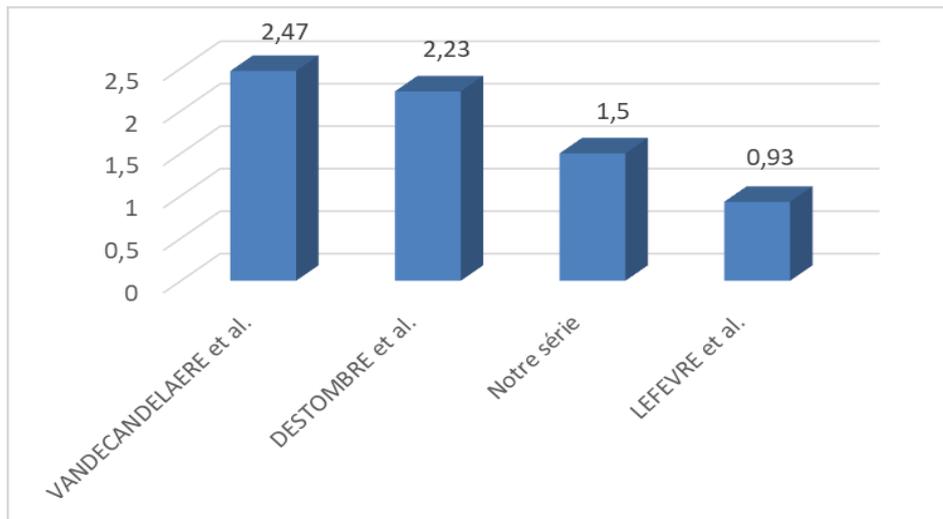


Figure 12: Comparison of the sex ratio according to the different series

3) ETIOLOGICAL FORMS

3.1) Breast Cancer

Bone metastases complicate 40% of breast cancers. The women concerned are generally between 45 and 70 years old. Metastases most often occur within 5 years after treatment of the breast tumor, but sometimes more than 10 years.

The metastases are mainly osteolytic, or mixed, often diffuse, generally affecting the spine, pelvis, skull, ribs and sternum, sometimes also the long bones. Mammography is essential in the diagnosis, which shows signs of malignancy.

3.2) Adenocarcinoma of the Prostate

It also occupies a very high frequency, the first etiology in men from the age of 60. Bone metastases complicate 24% of prostate cancers.

Metastases usually have a condensing aspect, but sometimes mixed or rarely osteolytic. These metastases are most often diffuse, multifocal with a preference for the pelvis and the spine. The scintigraphy always shows an intense later hyperfixation.

3.3) Lung Cancer

Affected more frequently in smoking men, manifested by cough, hemoptysis, cervico-brachial neuralgia, digital clubbing.

Chest x-ray, CT scan, fibroscopy with lavage or biopsy of suspicious lesions often make it possible to make the diagnosis of adenocarcinoma or squamous cell carcinoma.

Bone metastases are often early, revealing, lytic, affecting the dorsal spine and the ribs, and are rarely condensing.

Bone is most often affected in small cell lung cancer, with rapid spread of lesions.

3.4) Kidney Cancer

Nature and site of the metastases: revealing, osteolytic, pelvirachidian, especially lumbar, sometimes pseudo-aneurysmal.

3.5) Thyroid Cancer

Less frequent but very osteophilic.

Nature and location of bone metastases: osteolytic, bulky, sometimes pseudo-aneurysmal, and rarely condensing.

Métastases ostéocondensantes (15%)	Métastases ostéolytiques (75%)	Métastases mixtes (10%)
Prostate (70%)	Sein +++	Sein
Sein (10%)	Poumon ++	Poumon
Tumeurs carcinoïdes	Rein	Col utérin
Vessie	Thyroïde	Ovaire
Tumeurs neuroendocrines	Vessie	Testicule
Nasopharynx	Tube digestif	Tube digestif
Médulloblastome	Mélanome	
Carcinomes mucineux digestifs	Sarcome d'Ewing	
	Myélome multiple	

Figure 13: Most osteophytic cancer

Séries	Tumeur primitive	Nombre	Pourcentage %
ALACAY et al. 1995, Paris N=179	Poumon	23	13%
	Prostate	50	28%
	Sein	11	6%
	Rein	13	7%
	Thyroïde	3	1,5%
CONROY et al. 1988, Nancy N=429	Poumon	95	22,1%
	Prostate	33	7,7%
	Sein	140	32,6%
	Rein	18	4,2%
	Thyroïde	43	10%
VANDECANDELAERE et al. Lille, 2004 N=132	Poumon	55	41%
	Prostate	18	13%
	Sein	24	18%
	Rein	20	15%
	Thyroïde	2	1,5%

Figure 14: Primary tumor according to each one of the studies

IV) CONCLUSION

Bone metastases are a frequent reason for hospitalization in oncology and trauma settings.

Due to the significant incidence of OM, the management of OM is increasingly part of the clinical concerns.

Therapeutic possibilities can very often be combined to improve the quality of life of patients.

Multidisciplinary discussion is the cornerstone of an optimal therapeutic decision.

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