Metastatic Lesions

55

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Definition: Secondary localization in bone of malignant epithelial neoplasm.

Importance: Bone is the most common anatomic site for metastases. Lung, breast, gastrointestinal, and prostatic carcinomas frequently spread to the bone. In fact, metastases represent the most common neoplasm encountered in the skeleton.

Epidemiology: Autopsy reports, revealed bone metastases in approximately 30% of patients affected by breast, prostate, thyroid, lung, and kidney cancer. Adult and elderly patients are most often involved. However, thyroid or breast cancers may also be observed in younger patients. Male predominance is observed.

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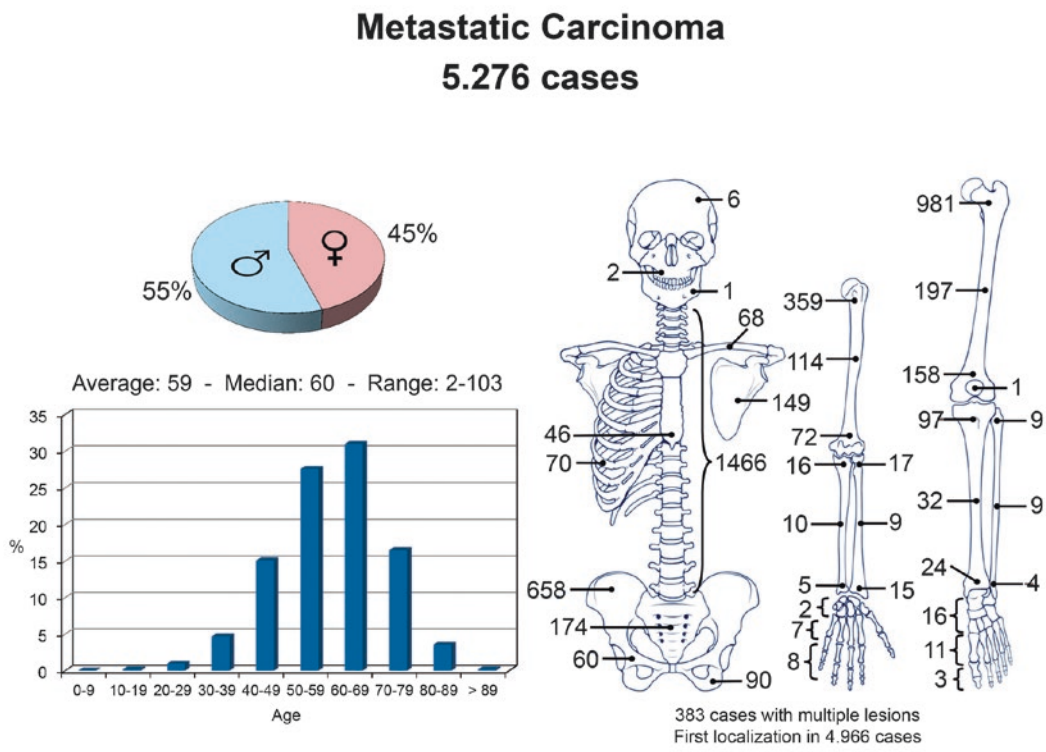


Localization: Metastases may affect any skeletal sites; however, the axial skeleton and the proximal region of the appendicular skeleton represent the most common locations. Extremities and cranial bones are rarely involved. Multiple lesions are often observed. Organs other than the skeleton can be frequently involved configuring a disseminated multisystemic disease.

Clinical: Pain, swelling, and pathological fractures are the typical presenting symptoms. In about 20% of cases, the site of the primary origin is unknown.

Imaging: Standard radiography may be negative (40% of cases). Frequently, bone metastases appear as osteolytic lesions. Isotope scan and MRI are much more sensitive than x-ray in detecting bone metastases. PET-CT is very useful to detect bone lesions and to evaluate the progression of the disease.

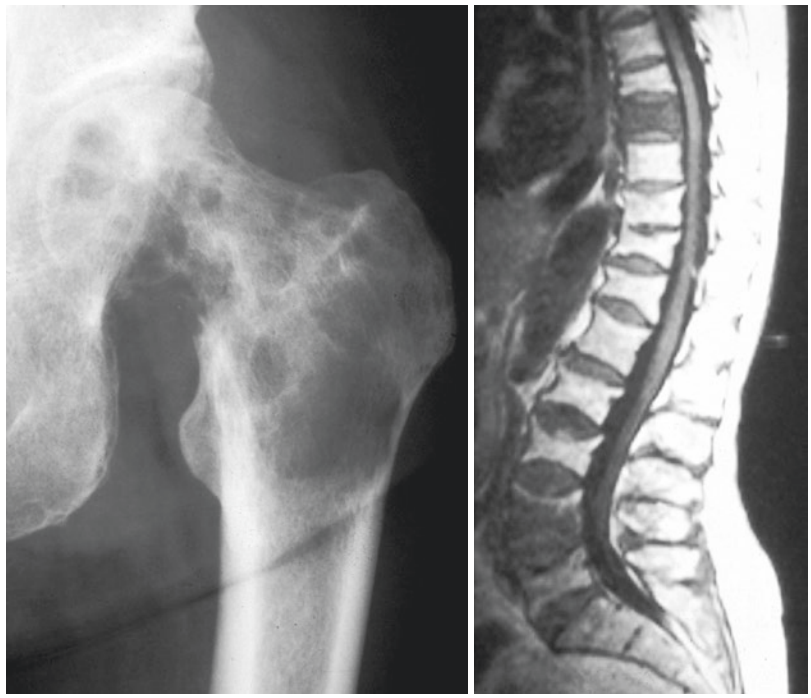
Histopathology: Histologically metastases tend most often (but not always) to reproduce the morphology of the primary lesion. Of course, immunohistochemical analysis can help identifying the site of origin in case of poorly differentiated morphology.

Treatment: In metastatic patients to improve the quality of life represents the most important aim. Palliative treatment is indicated in presence of diffused disease. An adjuvant treatment using chemotherapy, low dose radiotherapy, and surgery is useful in patients with indolent disease. In case of good prognosis chemotherapy, high dose radiotherapy and wide resection with stable reconstruction can be combined to achieve long survival.

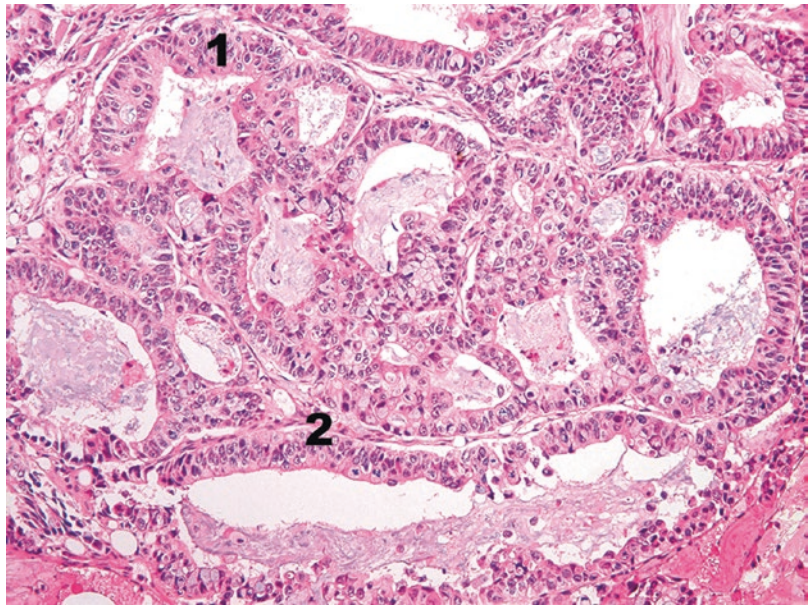
Key points	
• Clinical	Most frequent bone lesion. Adults, pain Pathologic fracture
• Radiological	Permeative or purely lytic lesions
• Histological	Epithelioid morphology, depending on primary lesion
• Differential diagnosis	Metastatic melanoma, lymphoma, epithelioid angiosarcoma

Immunohistochemical panel								
	Breast	Prostate	Lung	Thyroid	Kidney	Colon	Urothelial	Melanoma
CK AE1/AE3	+	+	+	+	+	+	+	–
CK 7	+	–/+	+	+	–	–	+	–
CK 20	–	–/+	–	–	–	+	+	–
TTF1	–	–	+ (Adcr)	+	–	–	–	–
P40	–	–	+ (Sq. cr.)	–	–	–	+	–
Thyroglobulin	–	–	–	+	–	–	–	–
CDX-2	–	–	–	–	–	+	–	–
ER	+/–	–	–	–	–	–	–	–
PRG	+/–	–	–	–	–	–	–	–
PSA	–	+	–	–	–	–	–	–
Nk3x1	–	+	–	–	–	–	–	–
AMACR	–	+	–	–	–	–	–	–
GATA3	+	–	–	–	–	–	+	–
PAX8	–	–	–	–	+	–	–	–
CD10	–	–	–	–	+	–	–	–
S-100	–	–	–	–	–	–	–	+
HMB-45	–	–	–	–	–	–	–	+
MART-1	–	–	–	–	–	–	–	+
MYTF	–	–	–	–	–	–	–	+

Adcr Adenocarcinoma, *Sq. Cr.* squamous carcinoma



Radiograph and sagittal spine T1 MR image. Heterogeneous mainly lytic lesion, destroying the femoral neck cortex. Multiple metastases of the spine



Metastatic adenocarcinoma. Malignant epithelial cells (1) forming glandular structures (2) are seen

Metastasis from non-sarcoma—origin on 2150 cases			
Breast	555	25.8	
Kidney	416	19.3	
Lung	381	17.7	62.9
Gastro-enteric	152	7.1	
Prostate	129	6.0	
Thyroid	117	5.4	18.5
Melanoma	60	2.8	
Undifferentiated	59	2.7	
Bladder urothelium	59	2.7	
Hepatic	54	2.5	
Uterus	41	1.9	
Bilio-pancreatic	27	1.3	
Ovary	16	0.7	
Other	15	0.7	
Neuroendocrine	12	0.6	
Oropharynx	12	0.6	
Sarcomatoid	11	0.5	
Brain	4	0.2	
Pheochromocytoma	4	0.2	
Larynx	4	0.2	
Paraganglioma	4	0.2	
Skin	3	0.1	
Salivary	3	0.1	
Adrenal gland	3	0.1	
Testis	3	0.1	
Mesothelioma	2	0.1	
Parotid	2	0.1	
Wilms	2	0.1	
	2150	100.0	

Rarely the origin of a metastatic lesion in bone can be from a visceral or a soft tissue sarcoma. The most represented tumor is uterine leiomyosarcoma (see table).

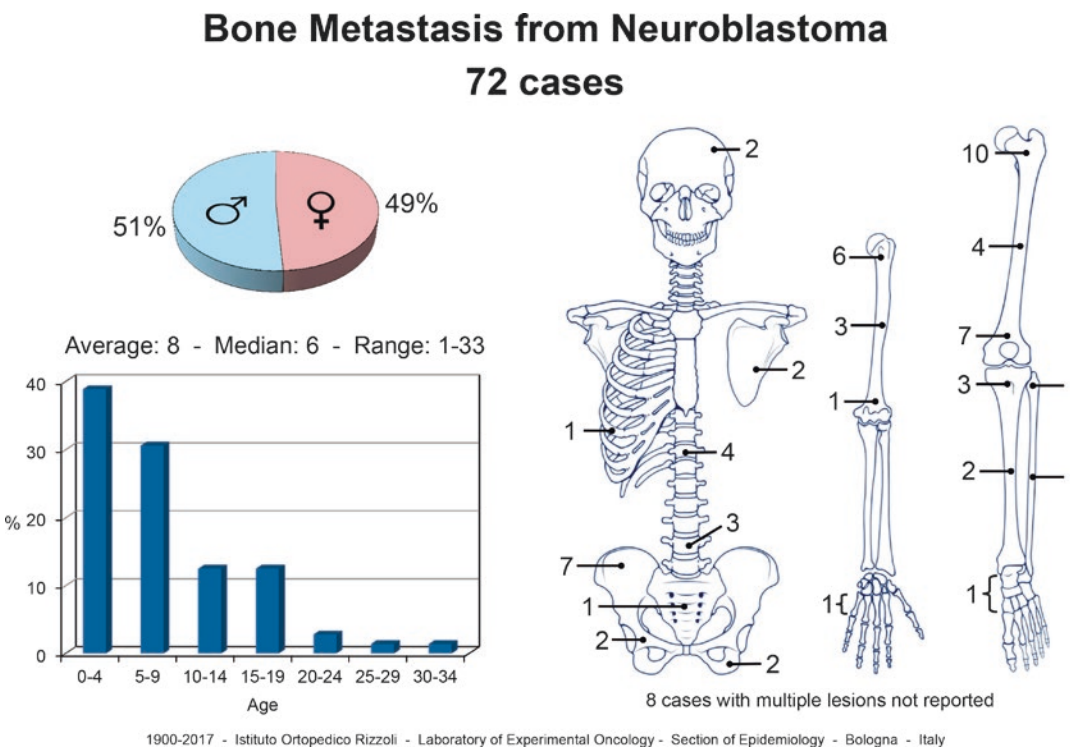
Metastasis from sarcoma—Origin on 43 Cases	N.	%
Uterine leiomyosarcoma	26	60.5
Unknown	4	9.3
Meningeal hemangiopericytoma	3	7.0
Fibrosarcoma	2	4.7
Gist	2	4.7
Myoepithelioma	2	4.7
Angiosarcoma	1	2.3
Renal pecoma	1	2.3
Rhabdomyosarcoma uterus	1	2.3
Malignant Peripheral Nerve Sheath Tumor (MPNST)	1	2.3
	43	100.0

55.1 Metastatic Neuroblastoma

Neuroblastoma is a tumor of neuroblasts affecting children usually under 5 years of age.

These lesions enter into differential diagnosis with Ewing Sarcoma of bone.

The age is lower (Ewing sarcoma is rare below 5 years of age), the skeletal lesions are frequently multiple, there is a retroperitoneal or mediastinal mass, and catecholamine metabolites are found in urine. Histologically, differentiation is more difficult, but neuroblastoma often has more evident rosettes, more large, "pear" shaped, pleomorphic and hyperchromatic nuclei with more abundant cytoplasm.



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