Chapter 11
Langerhans Cell Histiocytosis

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Definition: A histiocytary proliferation of granuloma-like aspect with unknown etiology that may involve bone marrow, internal organs, skin, and mucosae.

(a) Localized in the skeleton: solitary or multiple eosinophilic granuloma
(b) Chronic disseminated: including Hand-Schuller-Christian disease
(c) Acute/subacute diffused: including Letterer-Siwe disease

11.1 Eosinophilic Granuloma

Epidemiology: More frequently solitary, multiple <10 %. More frequently in males. 5–10 years of age.

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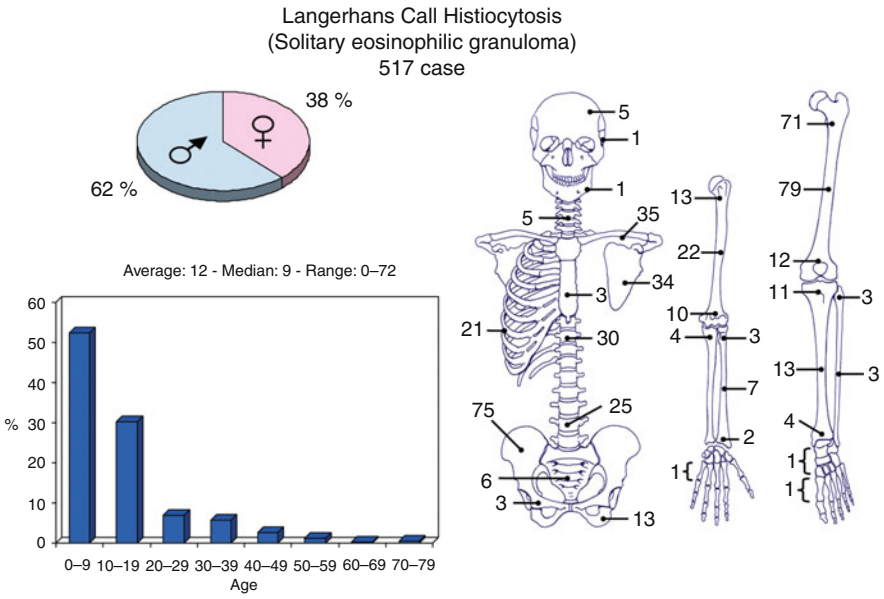


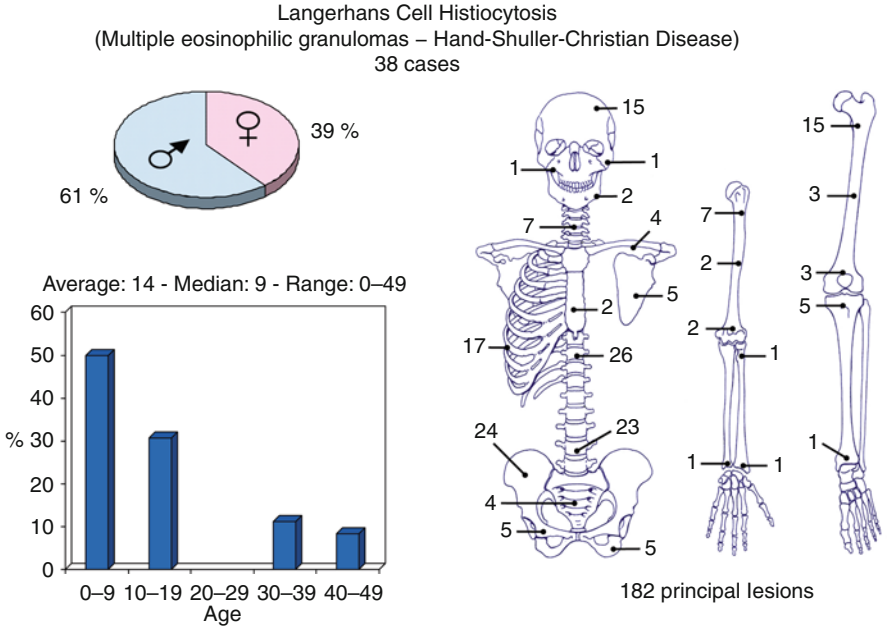
Location: Flat and short bones of the trunk: skull (parietal, frontal site), ribs, pelvis, vertebral body, clavicle, and scapula. Among long bones: proximal half of the femur, humerus, and tibia (diaphyseal localization is typical). Very rare in the hand and foot.

Clinical: Pain, wide swelling in superficial bones, rare pathologic fracture, radicular pain, rarely signs of medullary compression, and deformities of the column in vertebral lesions. Rare mild increase in sedimentation rate and mild eosinophilia.

Imaging: Standard X-rays show an osteolytic lesion with variable features. Sometimes rounded, often polycyclic, well-defined margins, thin sclerotic rim, and overall benign-looking appearance. Sometimes "moth-eaten" pattern with ill-defined margins, no sclerotic rim, and "onionskin" periosteal reaction mimicking a malignant process (e.g., Ewing sarcoma). Uniform, rapid flattening of the vertebral body reduced to a thin bony lamina (vertebra plana) is typical. Bone scan sometimes shows multiple lesions. On MRI light gray, intermediate low signal on T1, and a higher than fat, bright signal on T2.

Pathology: Soft, semiliquid, yellowish gray, with areas of hemorrhage or necrosis. Background of large pale-staining cells (histiocytes) with infiltration of leukocytes, without intercellular matrix, punctuated by nodules of small eosinophilic cells. Histiocytes have wide cytoplasm, with ill-defined membrane, with reniform, indented, pale nucleus, small nucleolus, and may be collected in nests or nodules or form a more rarefied background to the infiltration of eosinophiles with small lobate, dark nucleus, and cytoplasm stuffed with bright red granules. Few neutrophiles and lymphocytes. Abundant reticulum surrounding small group of cells. Sporadic giant cells, foam cells, mitotic figures.

Course and Staging: Rapid growth, spontaneously self-limiting and tendency to healing with at least partial bone repair, rare evolution into multiple type, exceptional transformation into chronic diffused type. Usually, stage 2, rarely stage 3.
Treatment: Needle biopsy, frozen section, and steroid injection treatment of choice. Clinically very successful with complete or almost complete repair in 2 years. Bracing or casting required in the spine. Radiotherapy may be used (2–3,000 r). Systemic cortisone and chemotherapy are used in multiple lesions.

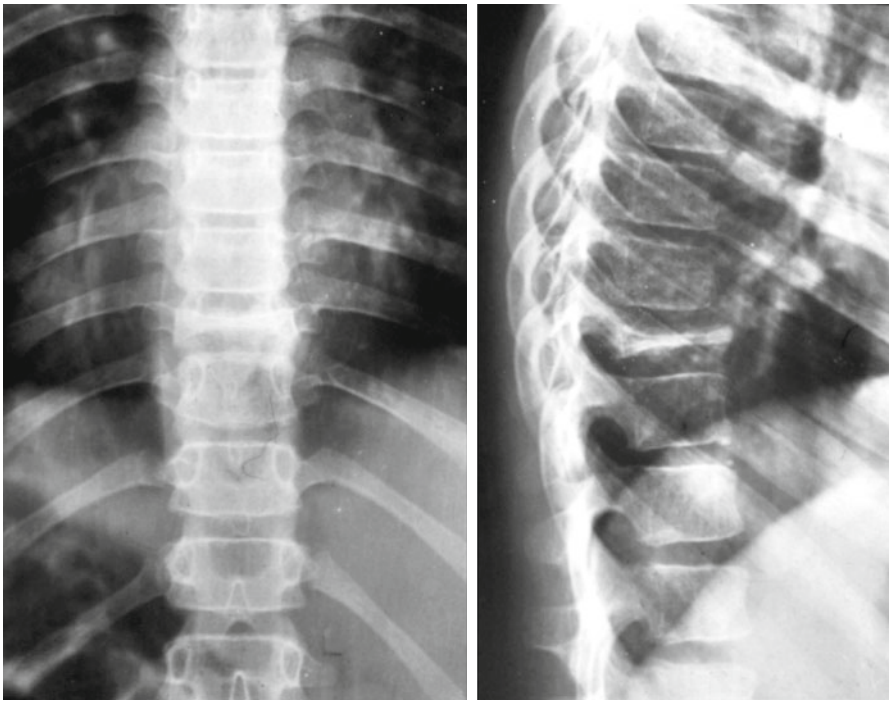


Key Points

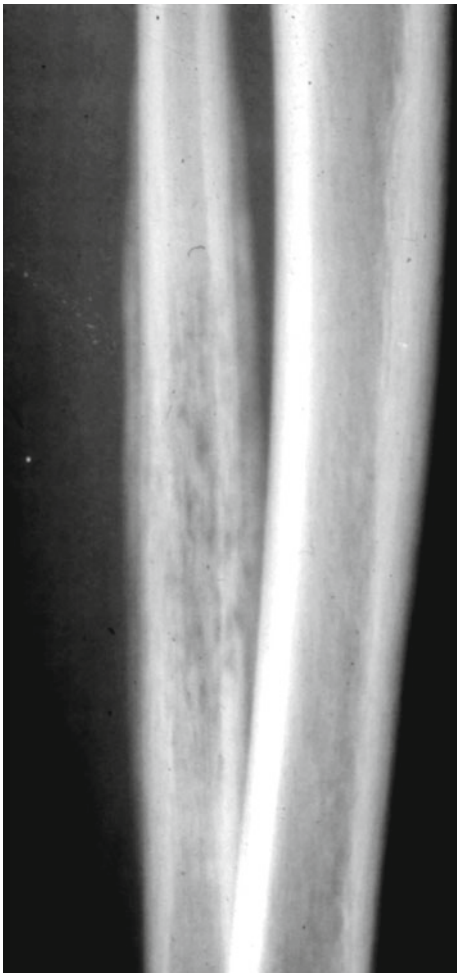
Clinical	Pain, swelling, rapidly increasing
Radiological	Variable aspects, from benign to aggressive aspects
Histological	Histiocytes, leukocytes, eosinophilic cells
Differential diagnosis	Osteomyelitis, Ewing sarcoma

Immunohistochemical Panel

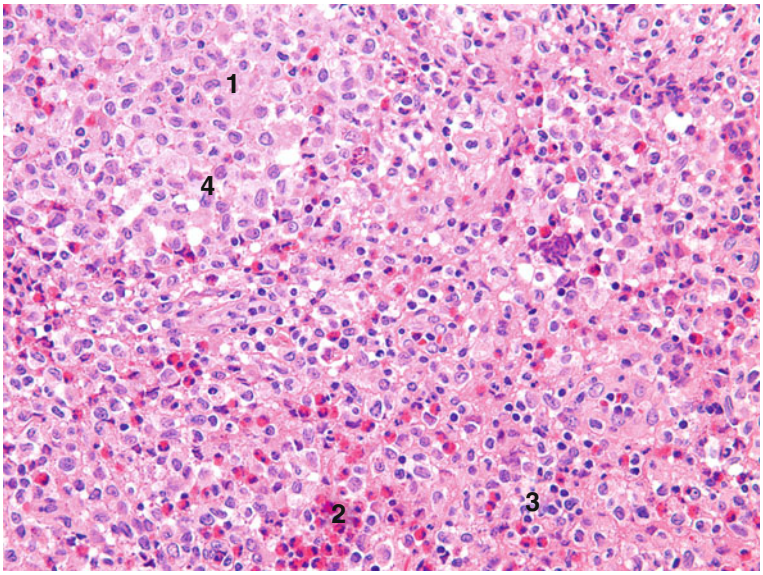
CD1a	+
S100	+
Langerin	+



AP and lateral radiographs of the spine: complete vertebral collapse of T9. No soft tissue mass



Radiograph of the fibula: poorly limited lytic lesion of the shaft, with irregular periosteal bone formation. Differential diagnosis with Ewing sarcoma or an acute infection may be very difficult at the onset of disease



(1) Background of large Langerhans cells, generally organized in a more or less loose net, rarely collected in nests or nodules. (2) Infiltration of eosinophilic granulocytes (active areas of recent lesions). (3) Mixed inflammatory cells (eosinophiles, neutrophiles, and lymphocytes). (4) Coffee bean nuclei, with indentations in the nuclear membrane, typical and diagnostic feature of Langerhans cells

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