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Evaluating Bone Metastases

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Incidence and Prevalence of Bone Metastases

Approximately 60%–84% of patients diagnosed with solid tumors develop bone metastases (Berger & Koprowski, 1999). The third most common site of metastatic disease is the skeleton, and metastasis is the most frequently occurring bone malignancy (Jacofsky, Frassica, & Frassica, 2004). Prostate, breast, lung, kidney, and thyroid cancers account for 80% of skeletal metastases, which occur most often in the spine, pelvis, ribs, skull, and proximal femur (Jacofsky et al.).

Metastasis of tumor cells involves a cascade of events, including detachment from the primary tumor site, invasion of the vasculature, migration and adherence to distant capillaries of the bone, extravasation, and proliferation. Once tumor cells have invaded the bone matrix, they produce growth factors that can directly or indirectly stimulate osteoclasts to degrade the bone. In response, the bone releases growth factors that stimulate tumor cell growth, which establishes a cycle of bone destruction and local tumor growth (Lipton, 2004).

Types of Bone Metastases

As a metastatic lesion grows in the medullary cavity, the surrounding bone is remodeled by osteoclastic or osteoblastic processes. The relationship between the osteoclastic and osteoblastic remodeling processes determines whether a predominant lytic, blastic, or mixed pattern is seen on radiographs (Peh & Muttarak, 2005).

Osteolytic lesions are characteristic of multiple myeloma and cancers of the lung, thyroid, kidney, and breast. Tumor cells responsible for the lesions cause...