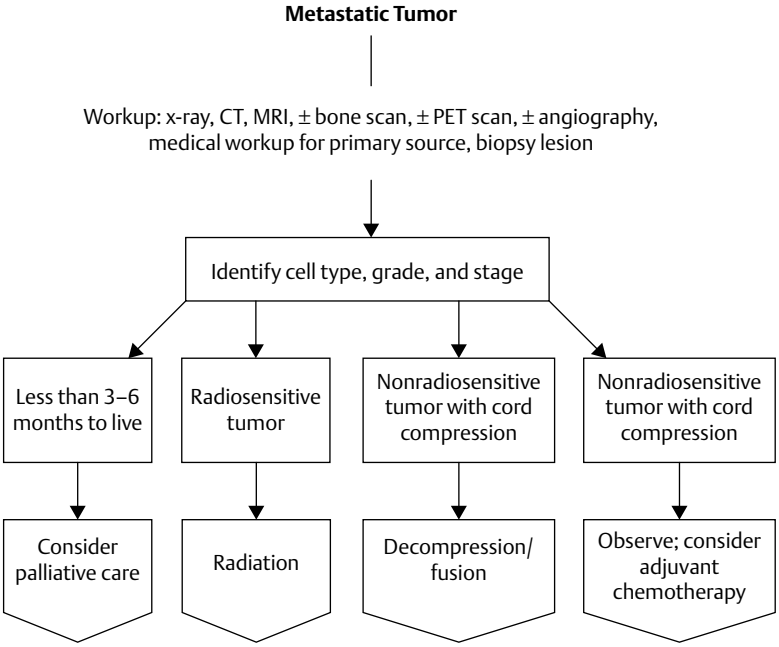

AU: Change one "Nonradiosensitive tumor with cord compression" to "... with no cord compression"? If so, please indicate which.

49

Metastatic Spinal Tumors

Thomas J. Puschak and Rick C. Sasso

The spine is the most common site of skeletal metastatic disease. Spinal metastases account for the majority of spinal tumors encountered by spine surgeons. Although metastasis can occur with any type of malignant tumor, more than 50% of spinal metastases are due to carcinoma, lymphoma and myeloma. Breast carcinoma is the most common primary in women (**Fig. 49–1**), whereas lung and prostate carcinoma are the most common primary sources in men. Renal, thyroid, and gastrointestinal tumors are also commonly seen, but in lesser frequency than the former mentioned tumors. Breast, prostate, and renal metastases are more likely to be seen by spine surgeons due to the longer relative survival compared with lung and gastrointestinal carcinoma.

◆ Workup

History

The most common first symptom of spinal metastasis is local pain, often insidious in onset and severe enough to disturb sleep. Patients may also present with various neurologic symptoms ranging from mild sensory or motor radiculopathy to complete paralysis or quadriplegia due to neurologic compression resulting from excessive tumor load or instability from pathologic fracture. The history should also address constitutional symptoms such as fever, chills, malaise, weight loss, as well as malignancy in the past history and family history.

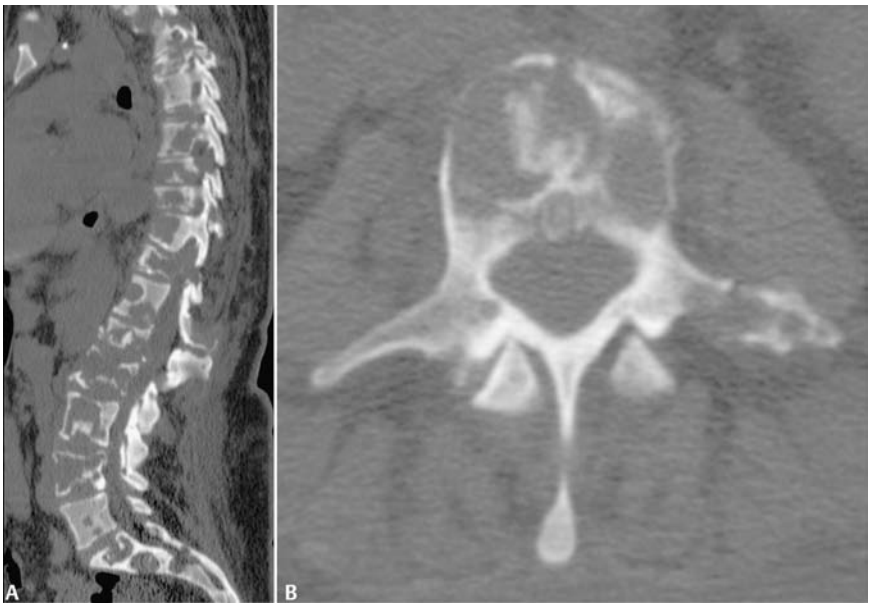

Figure 49–1 Sagittal **(A)** and axial **(B)** CT of metastatic breast carcinoma of the vertebral column.

Spinal Imaging

Radiographic evaluation begins with plain films looking for tumor location, bony destruction, soft tissue extension, and pathologic fracture. Classic radiographic signs such as a "missing pedicle" or vertebra plana are only present after significant bony destruction. Magnetic resonance imaging (MRI) allows excellent evaluation of the neurologic elements and soft tissue tumor involvement. Key tumor characteristics such as density and vascularity are also readily seen on MRI. Computed tomography (CT) scans are helpful in evaluating bony lesions and help in preoperative planning. Other radiographic staging studies include chest radiograph, chest/abdominal/pelvic CT scan, and whole body bone scan. Pathologic diagnosis should be obtained by biopsy—either CT guided or open. Bone scans can help identify other metastatic sites that are easier and safer to biopsy than the spine.

◆ Treatment

Radiation has historically been the treatment of choice for bony spinal metastasis. If the tumor is radiosensitive and neurologic progression is gradual, radiation therapy is the initial treatment of choice. Surgeons must weigh the advantages of starting radiation therapy versus primary surgical decompression when significant neurologic deficits exist. Patients with impaired ambulation from neurologic compression have a 60% chance of improvement after radiation, whereas those with loss of sphincter

function have less than a 40% chance of return with radiation. If surgical intervention is contemplated, there is also the concern of healing potential and complications of operating in an irradiated surgical bed.

External bracing such as cervical collars, Minerva braces, and thoracolumbosacral orthosis (TLSO) can be adjuncts in stabilizing cervical and thoracolumbar lesions. Bracing is generally considered an adjunct to other treatments except in the most terminal of cases.

Vertebroplasty and kyphoplasty have some promise in the palliative treatment of spinal metastasis. Indications for use are refractory pain without neurologic deficit. The posterior vertebral body wall must be intact to prevent extravasation of cement into the spinal canal.

Indications for surgical management include an isolated spinal lesion, pathologic fracture or deformity causing a neurologic deficit, or refractory pain and radioresistant tumors. The mainstay of treatment tends to be debulking tumor load, intralesional excision, and spinal reconstruction. Anterior, posterior and anteroposterior approaches are used depending on the tumor location. Goals of surgical intervention are improved quality of life via palliation of pain and prevention of neurologic worsening. The patient's overall health and prognosis must be taken into account when considering surgery. Surgery should not be considered in patients who are hopelessly bedridden with an expected survival of less than 6 weeks.

◆ Outcome

Outcomes and prognosis for spinal metastasis vary based on several interrelated factors: primary tumor site, general health of the patient, number of extraspinal metastases, number of spinal metastases, metastatic involvement of internal organs and severity of neurologic deficit on presentation. In general, patients with lung carcinoma have a very poor prognosis.

◆ Complications

Wound healing in cancer patients is often challenging. If surgical intervention is definitely planned, serious consideration should be given to deferring radiotherapy until after surgery to minimize the troubles of operating in an irradiated bed. Patients with diffuse metastatic disease are very systemically ill, cachectic, and malnourished. Aggressive nutritional support, often in the form of parenteral supplementation, can help avoid or limit wound-healing problems.

Suggested Readings

Abe E, Koboyashi T, Murai H, et al. Total spondylectomy for primary malignant, aggressive benign and solitary metastatic bone tumors of the thoracolumbar spine. J Spinal Disord 2001;14:237–246

Total spondylectomy was used to treat 14 patients with malignant or aggressive benign vertebral tumors. All patients had good pain relief and there were no serious complications. There were three local recurrences at 3.2 years.

Dudeney S, Lieberman IH, Reinhardt MK, Hussein M. Kyphoplasty in the treatment of osteolytic vertebral compression fractures as a result of multiple myeloma. J Clin Oncol 2002;20:2382–2387

Prospective evaluation of 55 kyphoplasties in 18 patients. Mean follow up was 7.4 months. Short Form 36 (SF-36) scores for bodily pain, physical function, vitality, and social function all significantly improved.

Fourney DR, Schomer DF, Nader R, et al. Percutaneous vertebroplasty and kyphoplasty for painful vertebral body fractures in cancer patients. J Neurosurg 2003;98:21–30

The authors report on 65 vertebroplasties and 32 kyphoplasties that were done in 56 patients with myeloma and primary malignant tumors. Median follow-up of 4.5 months yielded 84% complete pain relief.

Ryu S, Fang YF, Rock J, et al. Image-guided and intensity-modulated radiosurgery for patients with spinal metastasis. Cancer 2003;97:2013–2018

Evaluation of 10 patients, most of whom had significant pain relief within 2 to 4 weeks after treatment.

Sundaresan N, Rothman A, Manhart K, Kelliher K. Surgery for solitary metastases of the spine, rationale and results of treatment. Spine 2002;27:1802–1806

Retrospective review of 80 patients with solitary spinal metastasis from solid tumors. Median survival after surgery was 30 months. Surgical excision recommended before radiotherapy to increase the chances of palliation and cure.

Wai EK, Finkelstein JA, Tangente RP, et al. Quality of life in surgical treatment of metastatic spine disease. Spine 2003;28:508–512

Prospective evaluation of 25 patients undergoing surgery for spinal metastasis. The greatest improvement was with pain; however, improvements in constitutional symptoms were also seen.

Whyne CM, Hu SS, Lotz JC. Burst fracture in the metastatically involved spine: development, validation, and parametric analysis of a three-dimensional poroelastic finite-element model. Spine 2003;28: 652–660

A finite-element study to investigate features that contribute to burst fracture risk. The primary factors affecting fracture initiation were tumor size, magnitude of spinal loading, and bone density.