

Metastatic Spinal Cord Compression

**Matthew Harkenrider MSIV, B.S.
St. Vincent Hospital and Health Services**

General

Spinal cord compression results from spread of malignant (cancer) cells to the vertebrae of the spine with subsequent expansion into the space surrounding the spinal cord. Metastatic spread occurs most commonly in the low back and least often in the neck. Seventy percent of symptomatic spinal cord compressions however are located in the thoracic spine¹. Breast, prostate, renal, and lung cancer in addition to lymphoma and multiple myeloma are common malignancies which metastasize to the spine. Compression occurs as the metastatic lesion expands through the opening for the nerves.²

History

Initial symptoms can be nonspecific including local pain and stiffness. Worsening back pain usually occurs for 2-4 months prior to spinal cord compression. Pain often radiates down the arms or legs and is unrelieved by rest and worse when lying flat. Immediate concern for spinal cord compression is suspected with the onset of leg weakness and numbness and/or bowel or bladder dysfunction. Pain is usually a slowly progressive symptom, but once other symptoms arise, progression may be rapid. History of, or risk for, fractures caused by the growing tumor is another indication of progressive disease requiring radiation therapy to the area involved.²

Physical Exam

Spasm of the muscles, brisk and exaggerated reflexes, loss of pinprick, temperature, position and vibratory sensation may occur early. Point tenderness over the malignant vertebral body may also be present. Pain upon raising an outstretched leg, and increasing pain with holding your breath and bearing down indicate compression of nerves leaving the spinal column. Late signs of compression include lower extremity weakness, sensory loss, decreased anal sphincter tone and bladder incontinence².

Imaging

MRI best identifies spinal lesions and is the procedure of choice. MRI is able to differentiate spinal cord compression due to a fractured vertebra from malignant disease. MRI enables earlier diagnosis of spinal cord metastases than do other imaging techniques. Due to the optimal visualization provided by MRI, radioisotope bone scan is useful only as a screening test or follow up to assess bone disease¹. Plain X-rays may reveal bone buildup or bone destructive lesions and vertebral compression fractures, though about half of the bone must be destroyed to visualize the lesion on plain films. Conventional X-rays do not provide information about spinal cord structure or compression².

Treatment

Timely diagnosis critically impacts the patient's quality of life, since pain relief and restoration of strength rather than cure is the objective in the scenario of metastatic spinal cord compression. The goal of irradiation therapy (XRT) in this setting is to shrink the tumor enough to relieve symptoms and restore function for the duration of the patient's life. Hypofractionated irradiation is the treatment schedule most often utilized with large daily dosages. This schedule delivers a smaller total dose of radiation but in large fractions for quicker relief of symptoms and with less of a time commitment².

The usage of steroids such as dexamethasone is effective in patients with spinal cord compression and nerve-type pain which may prevent the necessity of narcotic pain medications. The potential side effects of steroids must be evaluated, and a rapid taper (less than three weeks) should be attempted to avoid toxicity, though 25% of patients will remain on chronic therapy⁴. A Sorensen study looked at 57 patients and divided them into either high dose steroid group or no steroid group. High dose steroid were given as 96mg bolus followed by 96mg for three days and a 10 day taper. They found a significant improvement in post XRT ease of walking in the steroid group (81% vs. 63% and 6 month rate of 59% vs. 33%). They also found increased steroid related toxicities including psychosis and ulcers⁵ Prognosis

A study by Rades et al demonstrated that patients who had a quicker onset of muscle deficits were able to walk easier post XRT. Patients were divided into three groups based on time to onset of motor deficits before XRT: 1-7 days, 8-14 days, and >14 days. The post XRT ambulatory rates were 35%, 55%, and 86% respectively⁶.

Maranzano and Latini grouped into the following pre-XRT groups of independent ambulation, assisted ambulation, paraparetic, and paraplegic. They found post-RT ambulatory rates of 100%, 94%, 60%, and 11%, respectively⁷.

A recent study by Patchell et al investigated whether surgery followed by XRT is superior to XRT alone using the ability to walk post-treatment as its endpoint. This study discovered that 84% in the surgery group compared to 52% in the XRT group were ambulatory after treatment⁸.

Summary

Spinal cord compression due to spinal metastases causes patients a significant amount of pain and potentially progressive neurological deficits. MRI is the gold standard for diagnostic imaging in patients with suspected spinal cord compression. Treatment for these patients consists of irradiation therapy with high-dose dexamethasone. Patient prognosis can be predicted based on the duration of time for symptom progression and ambulation status before initiation of therapy. Though the treatment for spinal cord compression is not curative, it must be managed properly to optimize quality of life.

Bibliography

1. Jacobs WB, Perrin RG. Evaluation and treatment of spinal metastases: an overview. *Neurosurgical focus [electronic resource]*. Dec 15 2001;11(6):e10.
2. Huff JS. Spinal Cord Neoplasms. 6 April 2005. Available at: <http://www.emedicine.com/emerg/topic337.htm>.

3. Byrne TN, Borges LF, Loeffler JS. Metastatic epidural spinal cord compression: update on management. *Seminars in oncology*. Jun 2006;33(3):307-311.
4. Chamberlain MC, Sloan A, Vrionis F. Systematic review of the diagnosis and management of malignant extradural spine cord compression: The Cancer Care Ontario Practice Guidelines Initiative's Neuro-Oncology Disease Site Group. *J Clin Oncol*. Oct 20 2005;23(30):7750-7751; author reply 7751-7752.
5. Sorensen S, Helweg-Larsen S, Mouridsen H, et al. Effect of high-dose dexamethasone in carcinomatous metastatic spinal cord compression treated with radiotherapy: a randomised trial. *Eur J Cancer*. 1994;30A(1):22-27.
6. Rades D, Heidenreich F, Karstens JH. Final results of a prospective study of the prognostic value of the time to develop motor deficits before irradiation in metastatic spinal cord compression. *International journal of radiation oncology, biology, physics*. Jul 15 2002;53(4):975-979.
7. Maranzano E, Bellavita R, Rossi R, et al. Short-course versus split-course radiotherapy in metastatic spinal cord compression: results of a phase III, randomized, multicenter trial. *J Clin Oncol*. May 20 2005;23(15):3358-3365.
8. Patchell RA, Tibbs PA, Regine WF, et al. Direct decompressive surgical resection in the treatment of spinal cord compression caused by metastatic cancer: a randomised trial. *Lancet*. Aug 20-26 2005;366(9486):643-648.
9. Loblaw DA, Perry J, Chambers A, et al. Systematic review of the diagnosis and management of malignant extradural spinal cord compression: the Cancer Care Ontario Practice Guidelines Initiative's Neuro-Oncology Disease Site Group. *J Clin Oncol*. Mar 20 2005;23(9):2028-2037.