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# Early recognition of spinal cord compression in cancer patients

## ■ ABSTRACT

Spinal cord compression is a relatively common complication of a number of malignant diseases. Back pain is the presenting symptom in more than 90% of cases. Early recognition and prompt treatment, while the patient can still walk, are the most important factors in preventing permanent and debilitating neurologic dysfunction.

## ■ KEY POINTS

In a patient with cancer or other malignant disease, the physician should always suspect that back pain may be the initial symptom of spinal cord compression.

A plain radiograph is useful as an initial test: more than 60% of cancer patients with back pain and an abnormal radiograph likely have spinal cord compression, as do 90% of patients with an abnormal radiograph and radiculopathy.

For most patients with epidural spinal cord compression, radiation therapy produces results equivalent to surgery but without the potentially serious postoperative complications.

**T**HE ONLY WAY to preserve ambulatory function and prevent debilitating neurologic damage in patients with tumor-associated spinal cord compression is to recognize and treat it early, when back pain is the only symptom. Epidural spinal cord compression can quickly make a highly functional person bed-bound and totally dependent on others for normal daily activities.

With timely diagnosis and treatment, 90% of patients can retain the ability to walk. However, once a serious neurologic defect develops, fewer than 10% of patients regain significant neurologic function despite treatment.

## ■ INCIDENCE OF SPINAL CORD COMPRESSION IN MALIGNANCY

As many as 5% of patients with metastatic cancer develop evidence of epidural metastasis at some point during the disease. In autopsy series, as many as 10% of patients with advanced cancer have evidence of epidural spinal cord compression.

## Malignancies commonly associated with spinal cord compression

Cancers of the lung, breast, and prostate are particularly likely to metastasize to the vertebral bodies and account for as many as 60% of all cases of spinal cord compression. Other cancers associated with spinal cord compression are melanoma, sarcoma, myeloma, lymphoma, renal cell carcinoma, and thyroid carcinoma.

## ■ ANATOMIC CONSIDERATIONS

Symptoms of epidural spinal cord compression result when tumor growth impinges on the lim-

ited space available to the cord within the spinal column. Sixty percent of epidural spinal cord metastases occur in the thoracic spine, with the remaining 40% divided equally between the lumbar and cervical spine and the sacrum.

An important consideration in the differential diagnosis of back pain: approximately 10% of cases of documented spinal cord compression, most often in patients with lymphoma, do not involve a tumor in a vertebral body. Most of these cases are due to tumors in the paravertebral space growing through the intervertebral foramen.

### ■ SYMPTOMS AND SIGNS

**Localized back pain** is the presenting symptom in more than 90% of cases. The pain often becomes radicular as the compression worsens, spreading down into the muscle groups and cutaneous regions supplied by the involved nerves.

**Muscle weakness** occurs in 80% of cases. It usually affects proximal muscles of the lower extremities.

**Sensory loss** or paresthesia may accompany the weakness. Patients may also lose proprioception, resulting in ataxia.

**Loss of autonomic function** is particularly ominous. Constipation and urinary urgency, frequency, and retention are late features.

### ■ DIAGNOSIS

In a cancer patient presenting with back pain, **plain bone radiographs** can help in the differential diagnosis. In a retrospective analysis, 60% of cancer patients who presented with localized back pain and radiographic evidence of metastasis to the vertebral body were ultimately discovered to have myelographic evidence of spinal cord compression. The percentage increased to 90% if, in addition, the patient had radiculopathy.

Several tests help confirm the diagnosis. **Myelography** was long the "gold standard," but it has an important drawback: when a complete spinal cord block is discovered on a lumbar myelogram, a cervical myelogram must also be obtained to demonstrate the upper

extent of the block so that the upper limit of the radiation therapy portal can be set. **Computed tomography** and **magnetic resonance imaging** do not have this disadvantage, and in fact, today MRI is the imaging procedure of choice for making a definitive diagnosis of spinal cord compression.

### ■ THERAPY

No well-designed randomized controlled clinical trials have yet defined the optimal treatment of tumor-associated epidural spinal cord compression. The need to start therapy immediately and the numerous clinical variables that would have to be accounted for in the study design (eg, tumor type, location of obstruction, stable vs unstable spine, duration and severity of symptoms, history of prior treatment, documented cancer, initial presentation of malignancy) represent substantial obstacles to conducting such trials.

#### **Steroids are the cornerstone**

Despite the lack of trial data, experts agree that the cornerstone of management is to rapidly start high-dose steroid therapy, generally with dexamethasone.

The dosage of dexamethasone has varied in several series from as low as 16 mg/day to as high as 100 mg/day. One reasonable approach calls for an initial dose of 100 mg, followed by 4 mg every 6 hours. If subsequent evaluation fails to confirm spinal cord compression, steroid therapy can be tapered rapidly. While somewhat controversial, this high-dose steroid regimen has a major advantage: it offers the most rapid reduction of tumor-induced edema that can contribute to spinal cord dysfunction and injury. Once the patient's condition has improved or at least stabilized, and once radiation therapy has begun or surgery has been performed, the steroids can be tapered fairly rapidly.

#### **Radiation therapy vs surgery**

Although no trials have been conducted to determine the optimal local therapy for spinal cord compression, retrospective reviews strongly suggest that for most patients, local external-beam radiation therapy produces

**Cancers of the lung, breast, and prostate cause 60% of cases of spinal cord compression**

results equivalent to those of surgery but without the potentially serious postoperative complications.

Dosage schedules range from 8 Gy given in a single fraction to 40 Gy given in 20 fractions over 4 weeks. Perhaps the most commonly used schedule is 30 Gy given in 10 fractions over 2 weeks. This approach maximizes the therapeutic outcome while minimizing toxicity and inconvenience.

### Indications for surgery

The oncologic literature supports immediate surgery in the management of spinal cord compression in patients with:

- Previous radiation therapy to the area of documented spinal cord compression
- Rapid neurologic deterioration preceding radiation therapy
- Deterioration in neurologic status that develops during or immediately after radiation therapy
- Tumors resistant to radiation therapy (eg, renal cell carcinoma)
- No documented diagnosis of metastatic cancer
- An unstable spine
- Epidural spinal cord compression radiographically shown to be due to bone in the epidural space.

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### Types of surgical procedures

Whenever surgery is considered, the surgical approach should be individualized to the patient's condition and needs.

**Laminectomy** is the classic surgical procedure for spinal cord compression, but it may result in spinal instability and put the patient at risk for losing ambulatory function.

**Resection of the vertebral body with spinal stabilization** is a more complex and aggressive procedure. It allows for resection of considerable tumor bulk but carries a higher risk of complications. In addition, no randomized trials have been conducted to demonstrate that more aggressive surgery results in a superior clinical outcome.

**Endoscopic anterior decompression** is a new approach that may significantly reduce the potential for postoperative complications usually associated with decompressive surgery.

### Chemotherapy

In children with a malignancy known to be highly chemosensitive (eg, neuroblastoma, Ewing sarcoma, germ cell tumor, and Hodgkin's disease), systemic chemotherapy may be substituted for both radiation and surgery as the optimal treatment. This approach reduces the risk of growth abnormalities or secondary malignancies associated with radiation.

**Steroids are the cornerstone of therapy**

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