Cancer of the Spine

How Big Is the Problem?

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1. US CANCER STATISTICS

For the second consecutive year, the Centers for Disease Control and Prevention (CDC) and the National Cancer Institute have released an annual US Cancer Statistics report (1). Published in collaboration with the North American Association of Central Cancer Registries, this report provides detailed information on cancer incidence, surveillance, epidemiology, and end results for 66 selected primary cancer sites and subsites for males (Table 1), 70 selected primary cancer sites and subsites for females (Table 2), and for all cancer sites combined (Figs. 1 and 2). In addition, these data have been analyzed with regard to geographic area, race, sex, and age (Table 3). According to the CDC and National Cancer Institute, 84% of the US population is covered in the 2000 surveillance report (1).

2. FREQUENCY OF SPINAL TUMORS

As indicated by the 2000 CDC US Cancer Statistics (1), the most common primary malignancies for men include prostate, lung, and colon with the incidence ranging from 160.4 to 65.0 cases per 100,000. For women, the leading primary malignancy is breast cancer followed by lung and colon cancer with the incidence ranging from 128.9 to 47.0 cases per 100,000. By comparison, spinal tumors are very rare. A review of data obtained from the Leeds Tumor Registry revealed that only 2.8% of the 1950 cases had tumors in the spine, which can arise from bone, cartilage, and rarely from other tissues (as is the case with lipomas, meningiomas, and neurofibromas) (2). Primary bone tumors in the spine are extremely rare as well. Of the 2000 sarcomas arising in bone each year in the United States, only 10% are found in the spine (3). In fact, the incidence of primary tumors of the spine per 100,000 persons per year is estimated as between 2.5 and 8.5 (3).

In comparison, the vast majority (95%) of the clinically relevant spinal tumors are metastases (4). More than 60% of these metastases arise from myelomas, lymphomas, or adenocarcinomas of the breast, lung, and prostate (Table 4) (5). Metastases in the axial and appendicular skeleton are extremely common and may be present in up to 70% of the patients with advanced adenocarcinoma before death (4). With respect to breast cancer, this rate may be as high as 85% (5). These clinical observations are corroborated by autopsy studies, which showed that metastases are present in nearly 80% of advanced-stage cancer patients (6).

3. METASTATIC SPINE TUMORS: AGE AND GENDER

Visceral or bony metastases should be expected in the majority of patients with advanced-stage disease at some point during the course of their illness (7). This becomes particularly apparent in patients older than 40 yr. As shown in Table 3, the incidence of carcinomas, myelomas, and lymphoma is sharply increased (8). In general, spinal metastases are considered a preterminal event, which indicates that a cancer may no longer be curable. In other words, regional disease has become a systemic illness. Of the 18,000 patients in the United States diagnosed annually with vertebral metastases, men are disproportionately more affected, with a male to female ratio of 3:2 (9).

4. LOCATION OF SPINAL METASTASES

The spinal column is the most common site of skeletal or osseous metastases (10). Rates of metastatic spread to the spine...
vary widely according to the primary tumor of origin (Table 5). However, autopsy studies indicated that vertebral metastases increase in frequency in a caudal direction along the vertebral column (11–14). This distribution appears to correlate with the increasing volume of bone marrow within the vertebral bodies from the cervical to the lumbar regions of the spine. For example, breast cancer metastases account for nearly 54% of all spine metastases among women (15). The most frequent locations of tumors, in descending order, are the vertebrae (85%), the paravertebral spaces (10–15%), the epidural space (<5%), and intradural/intramedullary (16). As demonstrated in a large series of 1585 patients with symptomatic epidural deposits, the vast majority (70.3%) of lesions are located in the thoracic and thoracolumbar spine, 21.6% in the lumbosacral spine, and 8.1% in the cervical spine (17). More recently, it has been suggested that as many as 20% of spinal metastases arise in the cervical segments (16–18). Because 10 to 38% of patients have metastases in multiple noncontiguous spine sites (7,18), skip lesions in other areas of the spine should be suspected particularly in patients with advanced-stage disease.

5. MAGNITUDE OF THE PROBLEM

Of the one million new cases of cancer diagnosed annually, metastases will develop in two-thirds of the patients (11,20).