Chapter 5

Tumors in the Adolescent Spine

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Tumors in the adolescent spine are fortunately almost always benign. Malignant tumors in the adolescent spine are rare, and when they occur, they are usually due to metastatic conditions arising from long bones.

In this chapter the main bony tumors that can involve the adolescent spine are outlined, and some neural tumors—both extradural and intradural—that can also cause severe spinal problems are discussed.

The cells of the muscles and skeleton all share a common "mesodermal" origin but have differentiated to become osteoblasts, osteoclasts, chondroblasts, fibroblasts, and myeloblasts. Although no classification of bone tumors can be totally complete, the most up-to-date classification seems to be that of Aegerter and Kirkpatrick. In their classification, primary lesions are classified as osteogenic, chondrogenic, collagenic, and myelogenic. They described reactive lesions (which are not true neoplasms), hamartomas (which may be considered benign neoplasms), and true neoplasms (some of which are potentially and others which are frankly malignant).

Classification of Bone Tumors (Aegerter and Kirkpatrick, 1968)

I. Reactive bone lesions
   A. Osteogenic
      1. Osteoid osteoma
      2. Benign osteoblastoma
   B. Collagenic
      1. Nonosteogenic fibroma
      2. Subperiosteal cortical defect

II. Hamartomas affecting bone
   A. Osteogenic
      1. Osteoma
      2. Osteochondroma
   B. Chondrogenic
      1. Enchondroma
   C. Collagenic
      1. Angioma (hemangioma)
      2. Aneurysmal bone cyst

III. True neoplasms of bone
   A. Osteogenic
      1. Osteosarcoma
      2. Parosteal sarcoma
      3. Osteoclastoma
   B. Chondrogenic
      1. Benign chondroblastoma
      2. Chondromyxoid fibroma
      3. Chondrosarcoma
   C. Collagenic
      1. Fibrosarcoma
      2. Angiosarcoma
   D. Myelogenic
      1. Plasma cell myeloma
      2. Ewing's tumor
      3. Reticulum cell sarcoma
      4. Hodgkin's disease

The classification listed above is fortunately limited in the adolescent skeleton. A few of the major conditions that can involve the adolescent age group will be described.
General Principles

As stated earlier, the majority of adolescent spinal tumors are benign. However, they are noted to cause potential growth and encroachment on spinal roots or spinal cord areas. Their local bony destruction may also cause instability and secondary spinal cord injury as a result of the skeletal damage. Good basic x-rays of the area are obviously a prerequisite for diagnosis and evaluation. Standard tomography is of great benefit to further outline the tumor and its damage to the normal skeleton. Computerized axial tomography has been the single greatest asset to a three-dimensional view of the spinal lesion and a very effective “road map” for treatment.

Clinical neurological deficit usually demands consideration of spinal myelography, CT scanning, and possible arteriography to demonstrate soft tissue tumor mass.

Most effective treatment plans require “tissue diagnosis” to better establish a plan of therapy. This is often easily accomplished by Craig needle biopsy, but may require open biopsy for safe procurement of tissue. Neurosurgical assistance is mandatory for the treatment of any paresis of the cord or roots. We believe few lesions are inaccessible enough to require radiotherapy. A careful pre-

Figure 5-1. Osteoid osteoma of the pedicle of the second lumbar vertebra, oblique view. In this “Scottie dog” shadow “cataract” can be seen in the dog’s eye. The posterior elements of spinal column are most commonly involved in osteoid osteomas of the spine.