Spinal tumor epidemiology

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- Inpatient neurosurgical mortality in germany: a comprehensive analysis of 2023 in-hospital data
- Level IIb Metastases in cN0 Oral Squamous Cell Carcinoma: Multicenter Retrospective Study
- Karyomegalic interstitial nephritis: A case series and review of the literature on genetic insights and clinical challenges
- Cancer in persons diagnosed with facial nerve paresis: A hospital-based cohort study in Denmark
- Journal Club: Cancer Risk Among Patients With Multiple Sclerosis: A 10-Year Nationwide Retrospective Cohort Study
- Impact of restrictive versus liberal transfusion strategy on outcomes in patients undergoing surgery for spinal metastasis: a propensity score-matched analysis
- Intrathecal pemetrexed efficacy and cerebrospinal fluid tumor marker response in refractory leptomeningeal metastasis of non-small-cell lung cancer: a single-arm phase II trial

Spinal tumors constitute 10-32% of all primary central nervous system tumors. Accurate radiologic and histopathology diagnosis is crucial in the spinal tumor treatment and spinal tumor prognosis.

The commonest site to be involved was the thoracic spine and schwannoma was the commonest tumor [1)].

15% of primary CNS tumors are intraspinal (the intracranial:spinal ratio for astrocytomas is 10:1; for ependymomas it is 3–20:1). There is disagreement over the prevalence, prognosis, and optimal treatment. Most primary CNS spinal tumors are benign (unlike the case with intracranial tumors). Most present by compression rather than invasion.

Spinal tumors are a diverse group of tumors that can occur in the spinal cord, nerve roots, meninges, or the vertebrae. Their epidemiology encompasses various aspects, including their incidence, prevalence, types, and demographic factors. Here’s a detailed overview:

Types of Spinal Tumors

1. **Primary Spinal Tumors**:

1. **Intramedullary Tumors**: These tumors arise within the spinal cord itself. Common types include:
    1. **Astrocytomas**
    2. **Ependymomas**
2. **Intradural-Extramedullary Tumors**: Located within the dura mater but outside the spinal cord. Common types include:
    1. **Spinal Meningiomas**

1. **Schwannomas (e.g., acoustic neuromas)**
2. **Neurofibromas**
3. **Extradural Tumors**: These occur outside the dura mater, often originating from the vertebrae or soft tissues. Common types include:
4. **Chordomas**

5. **Osteosarcomas**
6. **Ewing Sarcomas**
7. **Metastatic tumors (secondary tumors)**

2. **Secondary (Metastatic) Spinal Tumors**:

1. These tumors originate from cancer that has spread from other parts of the body to the spine. They are more common than primary spinal tumors and can involve the spinal cord, nerve roots, or vertebrae.

Incidence and Prevalence

- **Primary Spinal Tumors**:

1. **Overall Incidence**: Primary spinal tumors are rare. The annual incidence is approximately 0.5 to 2.5 per 100,000 people. They account for about 10-15% of all spinal tumors.
2. **Intramedullary Tumors**: These are relatively rare, with an estimated incidence of 0.3 to 0.5 per 100,000 people.
3. **Intradural-Extramedullary Tumors**: These tumors, like meningiomas and schwannomas, are more common than intramedullary tumors but still relatively rare, with meningiomas being the most common type in this category.
4. **Extradural Tumors**: Primary bony tumors are less common, but they can be aggressive and may present as metastatic tumors.

- **Secondary (Metastatic) Spinal Tumors**:

1. **Overall Incidence**: Secondary spinal tumors are significantly more common than primary tumors, occurring in 30-70% of cancer patients, depending on the type and stage of the primary cancer.
2. **Metastatic Spread**: The thoracic spine is the most common site for spinal metastases, followed by the lumbar and cervical regions. This distribution is due to the rich blood supply and venous drainage in the thoracic spine, which facilitates the spread of cancer cells.

Demographic Factors

- **Age**:

1. **Primary Tumors**:
    1. **Intramedullary Tumors**: More commonly diagnosed in children and young adults, although they can occur at any age.
    2. **Intradural-Extramedullary Tumors**: Typically diagnosed in adults, usually between the ages of 30 and 70.
    3. **Extradural Tumors**: Often diagnosed in older adults, particularly for aggressive bony tumors and metastatic diseases.
2. **Secondary Tumors**: More common in older adults due to the higher incidence of primary cancers with age.

- **Gender**:

1. **Primary Tumors**:
    1. **Meningiomas**: Exhibit a female predominance, with about 70-90% of cases occurring in women.
    2. **Schwannomas and Neurofibromas**: Do not show a strong gender bias.

2. **Secondary Tumors**: Gender distribution reflects the prevalence of the primary cancer. For instance, breast cancer metastases are more common in women, while prostate cancer metastases are more common in men.

Risk Factors

- **Genetic Factors**: Certain genetic disorders increase the risk of primary spinal tumors:

1. **Neurofibromatosis Type 1 (NF1)**: Associated with neurofibromas and other tumors.
2. **Neurofibromatosis Type 2 (NF2)**: Associated with meningiomas, schwannomas, and ependymomas.
3. **Von Hippel-Lindau Syndrome**: Associated with hemangioblastomas, which can occur in the spinal cord.

- **Radiation Exposure**: Previous radiation therapy for other cancers, especially in childhood, is a known risk factor for developing both primary spinal tumors (e.g., meningiomas) and secondary tumors.

- **Underlying Cancer**: For metastatic spinal tumors, having a primary malignancy is the primary risk factor. Common sources include lung, breast, prostate, and kidney cancers.

Clinical Presentation

- **Symptoms**: Symptoms vary depending on the tumor type, size, and location, but common symptoms include:

1. **Back Pain**: Often the first symptom and can be localized or radicular.
2. **Neurological Deficits**: Weakness, sensory changes, or loss of bowel and bladder function.
3. **Gait Disturbances**: Difficulty walking or coordination problems if the tumor compresses the spinal cord.

- **Diagnosis**: Typically involves imaging studies such as MRI, which provides detailed views of the spinal cord and surrounding structures. CT scans and biopsies may also be used for further evaluation.

Prognosis

- **Primary Tumors**: The prognosis varies based on tumor type, location, and extent of surgical resection. Benign tumors like meningiomas and schwannomas often have a good prognosis if completely resected, while malignant tumors such as chordomas or sarcomas may have a more guarded outlook.

- **Secondary Tumors**: The prognosis depends on the primary cancer’s type and stage, the extent of spinal involvement, and the response to systemic treatment. Treatment is often palliative, aiming to relieve symptoms and improve quality of life.

Summary

Spinal tumors, both primary and secondary, have varying epidemiological profiles. Primary spinal tumors are rare and include a variety of types with different demographic patterns, while secondary spinal tumors are more common and usually result from metastases of primary cancers. Understanding the incidence, demographic factors, and risk factors associated with spinal tumors is crucial for diagnosis, treatment, and patient management.

1)
Bezu MT, Nour AS, Tefera TG, Shumbash KZ, Woldemariam MA. Preliminary Review of Spine Tumor Radiologic, Intra-Operative and Histopathology Findings, Addis Ababa, Ethiopia. Ethiop J Health Sci. 2022 Oct;32(Spec Iss 1):41-46. doi: 10.4314/ejhs.v32i1.7S. PMID: 36339955; PMCID: PMC9624094.