SPINAL CORD TUMORS

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Lecture objectives

• To know the basic surgical anatomy of the spinal cord
• To know the types of spinal tumors
• To know the difference in presentation of these tumors
• To know the basics of investigations and management of these tumors
Lecture outline

• Basic introduction
• Anatomy of the spinal cord
• Epidemiology
• Classification
• Symptoms and signs
• Investigation and workup
• Management
• Take home message
Axial anatomy
CLASSIFICATION

SPINAL CORD TUMOR

Intra Dural

EXTRAMEDULLARY
Meningioma
Schwannoma
Neurofibroma

INTRAMEDULLARY
Ependymoma
Astrocytoma

Extra Dural

Metastatic
Bony tumors
Hemangioma
Lipoma
Multiple myeloma
Clinical presentation
Symptoms vary depending on the cause of the compression, its location, severity, extent and rate of development but can include:

- Back pain at the spinal site of compression.
- Pain or burning in other parts of the body.
- Difficulty breathing.
- Weakness in the arms, legs, or both.
- Numbness or tingling in the neck, shoulder, arms, hands, or legs.
- Loss of coordination or difficulty walking.
- Loss of fine motor skills.
- Loss of bladder or bowel control.
- Paralysis.
Clinical presentation

- Cervical spine disease produce Quadriplegia.
- Thoracic spine disease produce paraplegia.

- **TENDON REFLEXES**
  - Increase; below level of compression
  - Absent; at the level of compression
  - Normal; above the level of compression

- Sphincter disturbances are late feature of cervical and thoracic cord compression.
Clinical presentation

• Cauda equina syndrome;
  is a serious condition caused by compression of the nerves in the lower portion of the spinal canal.
  is considered a surgical emergency because if left untreated it can lead to permanent loss of bowel and bladder control and paralysis of the legs.
spinal cord compression

- Acute cord compression is a 'surgical' emergency.
- In those with malignant disease radiotherapy may be treatment of choice.
- In general, tumor, infection and disc disease produces anterior compression.
- Surgical decompression should be achieved through an anterior approach.
DIAGNOSTIC WORK UP

• GENERAL
  • History
  • Physical examination
  • Complete neurological evaluation

• IMAGING
  • Plain radiography
  • MRI whole spine with contrast
  • MRI brain
  • CT myelography
  • Intraoperative ultrasound

• LABORATORY TESTS
  • CSF chemistry
  • CSF cytology
COMPUTED TOMOGRAPHY

- Better for bony lesions and bony extent detection
- Extradural pathologic processes
- Paraspinal soft tissue masses
- Erosion of bone
- Calcification of meningioma
MRI spine with contrast

- Gd enhanced MRI imaging modality of choice
- CSF, white and gray matter, bone and bone marrow, fat, and flowing blood can be distinguished
- MRI brain should also be done in selective cases
- Preoperative study of choice so as to narrow the differential diagnosis and guide surgical resection.
MRI spine with contrast

- MRI brain should also be done in selective cases
Extradural tumors
Extradural tumors

- The most common spinal tumor – 85%
- Mostly metastatic.
- Arise from osseous element of spinal column.
- Grow rapidly.
- Primary: Lung, Breast, prostate and kidney.
- Compress the spinal cord by
  Growing in epidural space
  Causing collapse of vertebrae, distortion and narrowing
Intradural extramedullary tumors
Intradural extramedullary tumors

• Inside the dura but outside the spinal cord.
• e.g. Meningioma, Neurinoma.
• Arise from the dural sheath around the cord or schwann cell sheath around the spinal root.
• Multiple tumors in Pt. with neurofibromatosis.
Intramedullary tumors
• Inside the spinal cord
  • Examples: Glioma, ependymoma, astrocytoma
• Arise from glial elements of spinal cord or trapped ectodermal elements.
• More common in children.
• Astrocytoma of spinal cord is the most common intramedullary tumor of childhood.
• Ependymoma of spinal cord is the most common intramedullary tumor of adulthood.
• Arise from ependyma of central canal.
  • Well demarcated.
Treatment

- Surgical decompression
- Life expectancy important determinant
- Laminectomy
- Reserved for posterior lesion
- Anterior approach with immediate stabilization for anterior lesion
- Combination of anterior and posterolateral approach
STEREOTACTIC RADIOSURGERY

- Single fraction high dose radiation to the target and reduced dose to normal tissue to reduce toxicity
- Most experiences in metastatic disease
- Intradural benign tumors
- 16-18 Gy in single fraction to 24-30 Gy in 4-5 fractions
- Spinal Cord tolerance
- 13 Gy/1 fx, V10 < 10% (2-3 mm above and below the target)
CRANIOSPINAL IRRADIATION IN SPINAL TUMOR

- Multifocal dissemination
- Leptomeningeal spread
- CSF positive for malignant cells
METASTASIS

- Common complication in advanced malignancy
- Pain is most common presentation (85-95%)
- Motor deficit 60-80%
- Sensory deficit 40-60%
- MRI gold standard investigation modality
RADIOTHERAPY

• Preservation or improvement of neurologic function
• Palliation of pain

• Predictors of outcome:
  • Extent of functional limitation at the beginning
  • Tumor type
  • Rapidity of neurologic deterioration

• Dose/fractionation:
  • Different dose schedules used
  • 30Gy/10fx/2wk
  • 16Gy/2fx/2d
  • 8Gy/1fx/1d
SRS (STEREOTACTIC RADIO SURGERY)

- Accurate delivery of high dose of radiation to the target
- Use of multiple highly targeted radiation
- Reduced dose to surrounding normal tissue
- Most spine SRS used in metastatic disease
- Limited data in intradural tumor
SRS IN INTRADURAL TUMOR

Stereotactic radiosurgery for an L1 hemangioblastoma
Take home message

• Classification is based on location of the tumor
• Symptoms are based on location of the tumor
• IDEM: Meningioma, Neurofibroma and Schwannoma.
• Intramedullary tumor mainly astrocytoma and ependymoma
• Contrast enhanced MRI investigation of choice
• Biopsy for histopathology confirmation
• Surgery mainstay of treatment
• Completely resected low grade intramedullary astrocytoma/ependymoma do not require adjuvant treatment
• High grade tumors require adjuvant radiation
• Chemotherapy role still not defined
• Postoperative rehab is critical to the management.
Thank you