Diagnostic imaging (Tumors)

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Outline

- X-ray
- CT Scan
- MRI
- PET Scan
- Angiography

Findings of spinal tumors
Imaging Modalities of Spinal Tumors

- Malign: Metastatic disease, Myeloma, Lymphoma
- Benign: Hemangioma

- X-ray
- CT Scan
- MRI
- Scintigraphy
- Angiography
Xray:
- Lytic cancellous lesions need 30-50% destruction for xray imaging.
- Important for the evaluation of instability and deformity.
- Lytic cortical lesions can be detected earlier.
- Disc space generally protected in tumors.
- “Winking owl” sign for asymmetric pedicular involvement.
Metastatic Lesions

- Lytic
  - Lung
  - Kidney
  - Breast
  - Melanoma
- Blastic
  - Prostate
  - Bladder
  - Stomach
- Mixed
  - Breast
  - Lung
  - GI
CT Scan

Allows visualization of

- Detailed bony anatomy (useful for surgical planning)
- Extent of soft tissue mass
- Extent and direction of spinal cord impingement by bone debris
- Special lesions (osteoid osteoma, osteoblastoma..)
**MRI**

Superior in evaluating

- Soft tissue mass
- Neural elements
- Multilevel involvement

Findings:

- Hypointense T1
- Hyperintense T2
- Gd-DTPA enhanced T1
Benign Lesions

- Geographic bone destruction
- Sclerotic margins
- No soft tissue extension

Except:
Aggressive hemangioma
Eosinophilic granuloma
ABC
Giant-cell tumor
11 yo, M
Scintigraphy

- High Sensitivity
- Low specificity
  - False Positive:
    - Degenerative conditions
    - Trauma
    - Metabolic bone disease
  - False Negative:
    - Plasmocytoma
    - Myeloma

Useful for the staging!!
PET Scan

- Important for staging
- Differentiate osteoporotic fracture from pathologic fracture
  - SUV less than 3: osteoporotic
**Angiography**

- CT or MR angiogram for relationship bw tumor and spinal vessels
- But angiography remains gold standard
- Some vascular tumors may require preop embolization: ABC, Medullary thyroid CA, giant cell tumor, hemangioma
Topography

Multiple?
- metastasis
- myeloma
- lymphoma
- enostosis
- hemangioma
- eosinophilic granuloma

Common distribution of tumors of the spine

Involvement of adjacent vertebral levels?
- osteosarcoma
- chondrosarcoma
- myeloma,† plasmocytoma †
- lymphoma
- Ewing sarcoma
- chordoma
- ABC †
- giant cell tumor †
† may extend through the intervertebral disk

Location in vertebra?

Malignant
- metastasis
- myeloma ≠
- plasmocytoma ≠
- lymphoma
- chordoma

Benign
- osteoid osteoma
- osteoblastoma ≠
- osteochondroma
- ABC ≠

Exceptions (sarcomas)
- chondrosarcoma ≠
- osteosarcoma ≠
- Ewing sarcoma ≠

≠ common extension in the neural arch
≠ common extension in the vertebral body
49 yo, M  Chordoma
55yo, F        Atypic Hemangioma
41 yo F, Chondrosarcoma
Thank you