Sacral and Presacral Lesions

Rad-Path Conference

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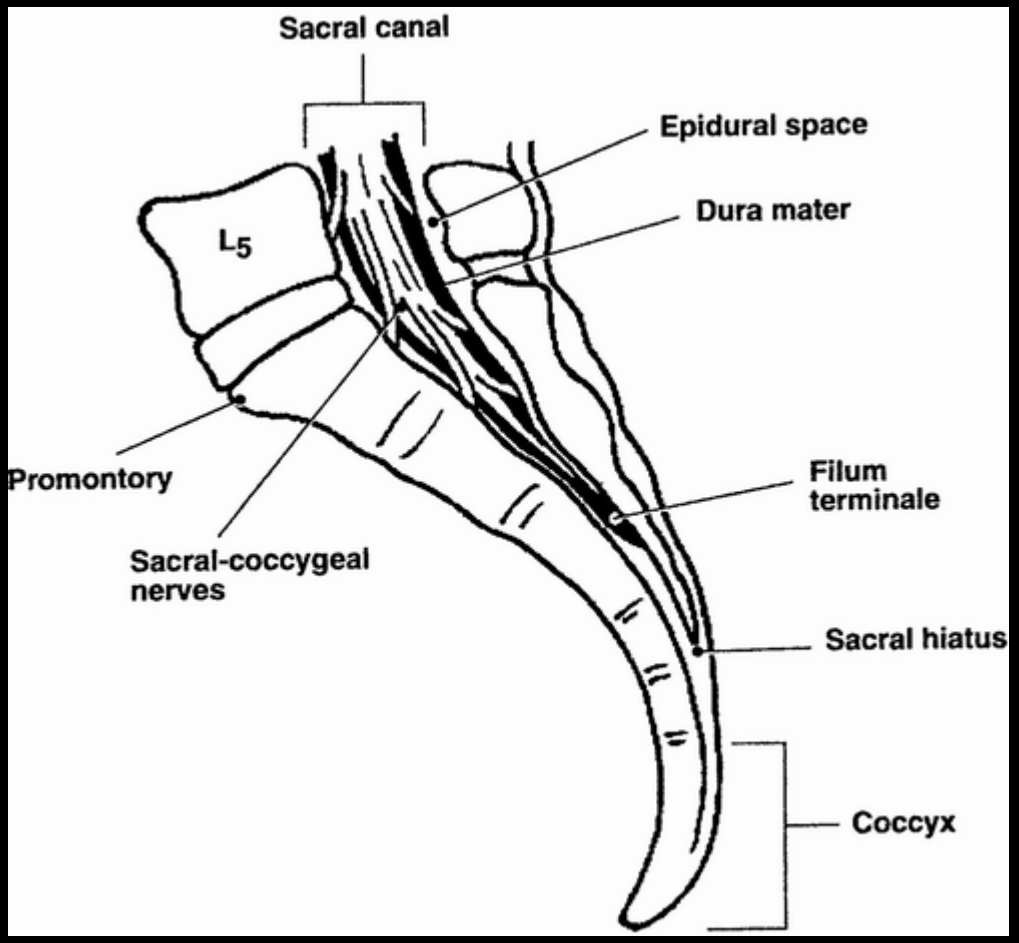
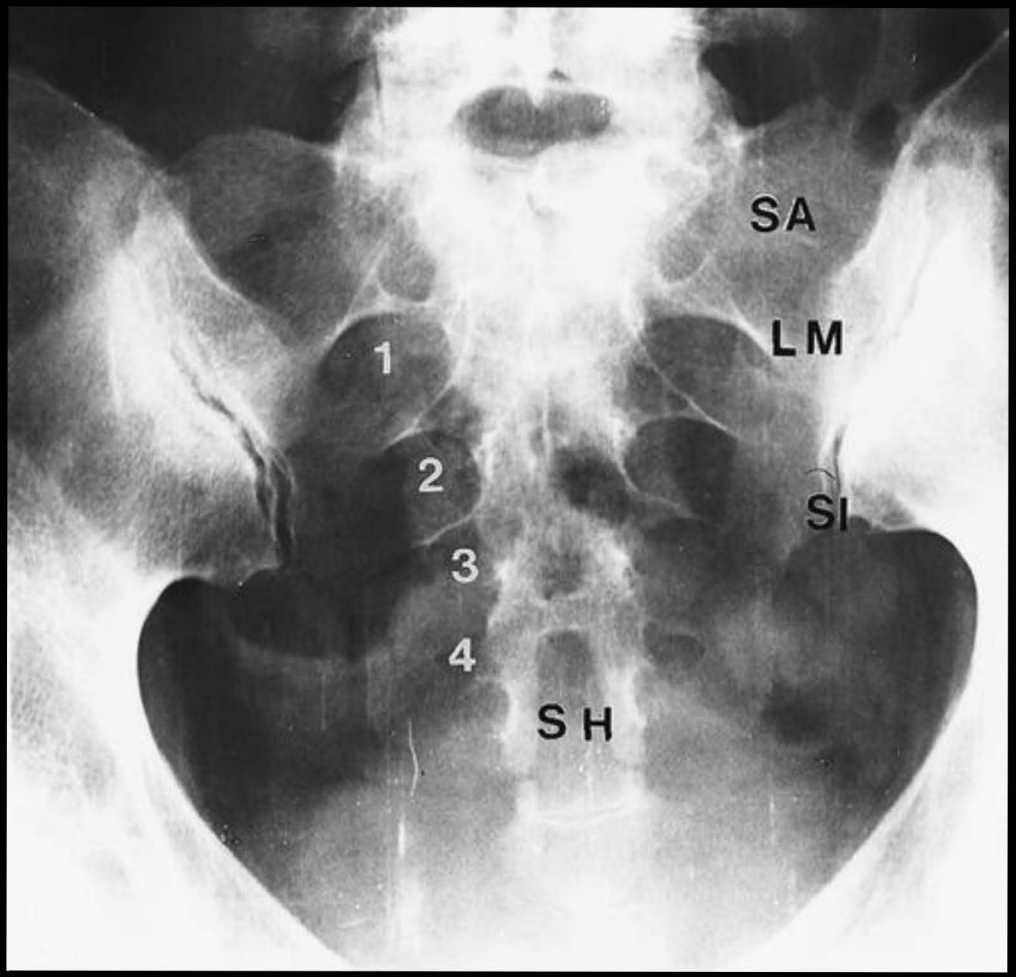
Objectives

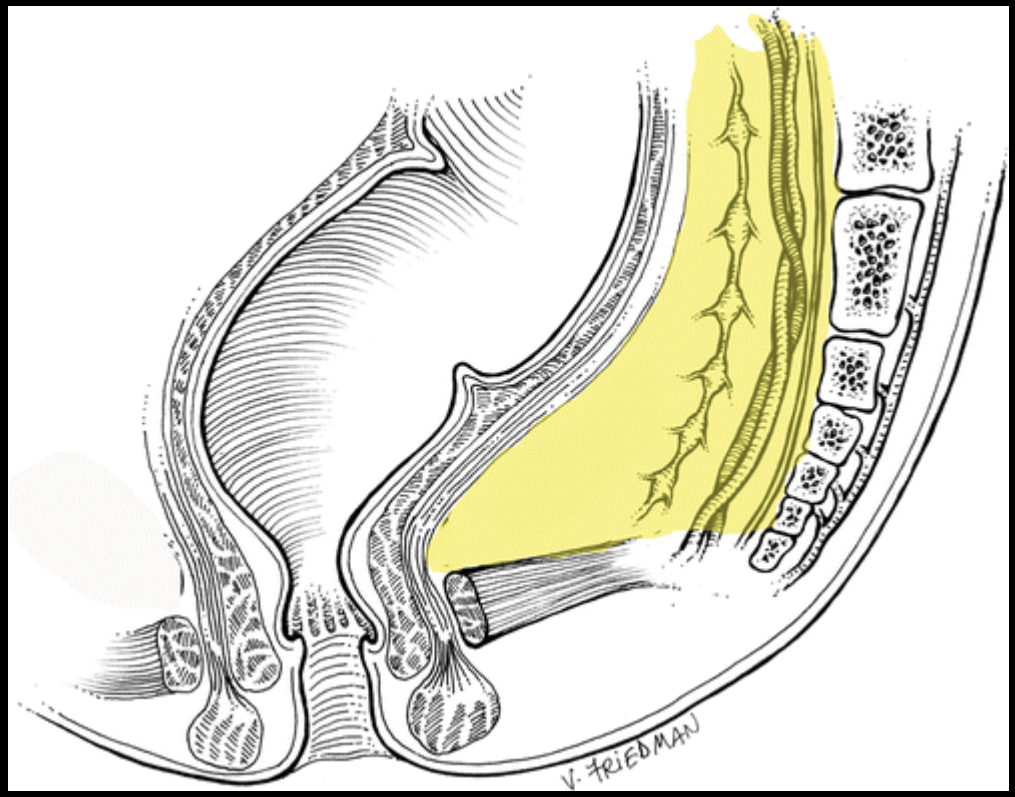
- Review Sacral Anatomy
- Review Differential Diagnoses of Sacral and Presacral lesions
- 4 Unknown Cases
- Clinical and Imaging features

Sacrum


Sacral canal
Epidural space
Dura mater
L5
Promontory
Sacral-coccygeal nerves
Filum terminale
Sacral hiatus
Coccyx


SA
LM
1
2
SI
3
4
SH

Presacral space



Differential by Cell Origin

Osteochondral

Benign: Osteoma, Simple Bone Cyst, Aneurysmal Bone Cyst, Giant Cell Tumor

Malignant: Osteosarcoma, Chondroscaroma, Ewings

Neurogenic

Benign: Neurofibroma, Ependymoma, neuroblastoma, schwannoma, dural ectasia, meningocele

Malignant: Neurofibrosarcoma, chordoma, malignant schwannoma

Mesenchymal

Benign: Hemangioma, fibroma, myelolipoma, solitary fibrous tumor

Malignant: Soft Tissue sarcoma, lymphoma, GIST

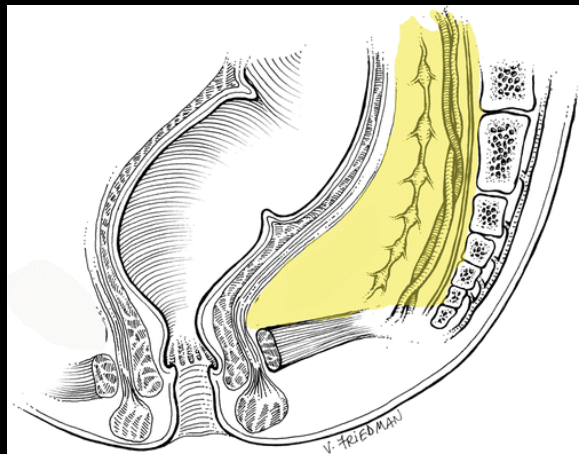
Congenital or Developmental

Benign: Rectal duplication cyst, epidermoid or dermoid cyst

Malignant: Teratocarcinoma, teratoma, yolk sac tumor

Other

Infectious, Inflammatory Post Traumatic, Metastatic

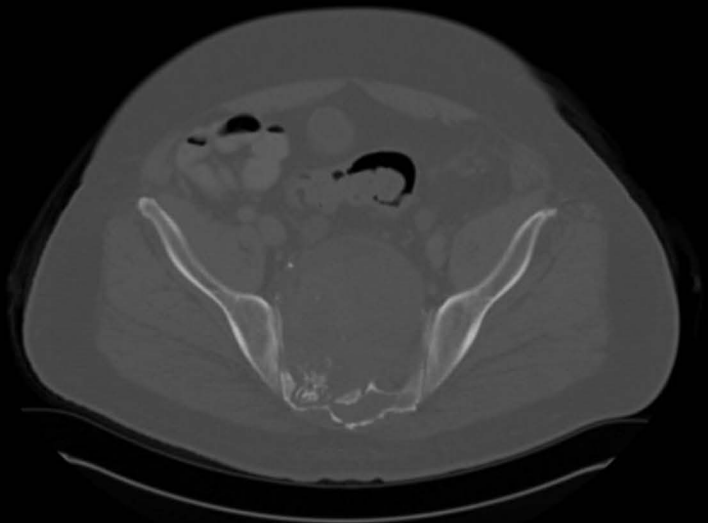


Rad Path Case # 1

70-year-old male with 5 years of right groin and scrotal pain. Underwent right inguinal hernia repair with no symptomatic relief.

Subsequently underwent ultrasound, barium enema, colonoscopy that were within normal limits. Has had worsening constipation and more recently developed overflow incontinence and right sided leg pain.

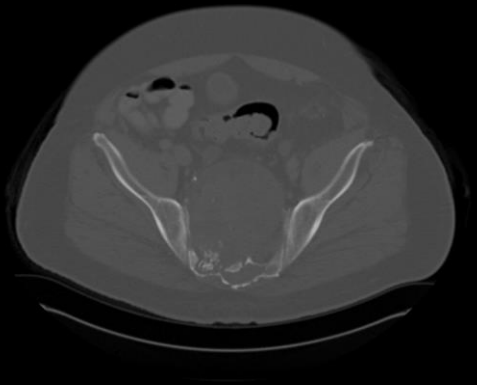

R




STOP

Pathology

Case 1 Discussion
Chondrosarcoma

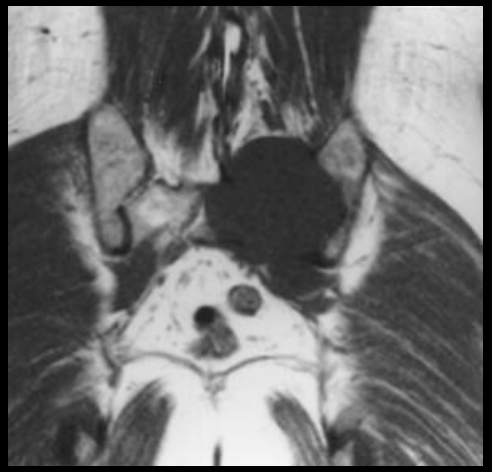


Chondrosarcoma: Clinical Features

- Mean age 45 years old (Peak 40 – 60 years)
- Neurologic symptoms in 45% of vertebral chondrosarcomas
  - Weakness, paresthesias, paralysis
- Spine: Chondrosarcomas are more common than osteosarcomas
- Approximately 10 % of all chondrosarcomas are found in the spine. Thoracic spine is most common location.

Chondrosarcoma: Imaging Features

- Bony destruction with chondroid matrix appearance (ring and arc)
- CT attenuation of non mineralized portion
- MRI characteristics



Coronal
T1

Post
Contrast

Question 1

All of the following factors may contribute to delayed diagnosis of a sacral mass EXCEPT:

A. The sacrum can accommodate a large mass before symptoms arise.
B. Patients present with nonspecific symptoms such as back pain.
C. The sacrum is the site of early red marrow conversion.
D. Radiography has low sensitivity for sacral masses.

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Question 2

Among the following, which is the most common site for chordomas?

A. Skull base.
B. Thoracic spine.
C. Thoracolumbar junction.
D. Sacrum.

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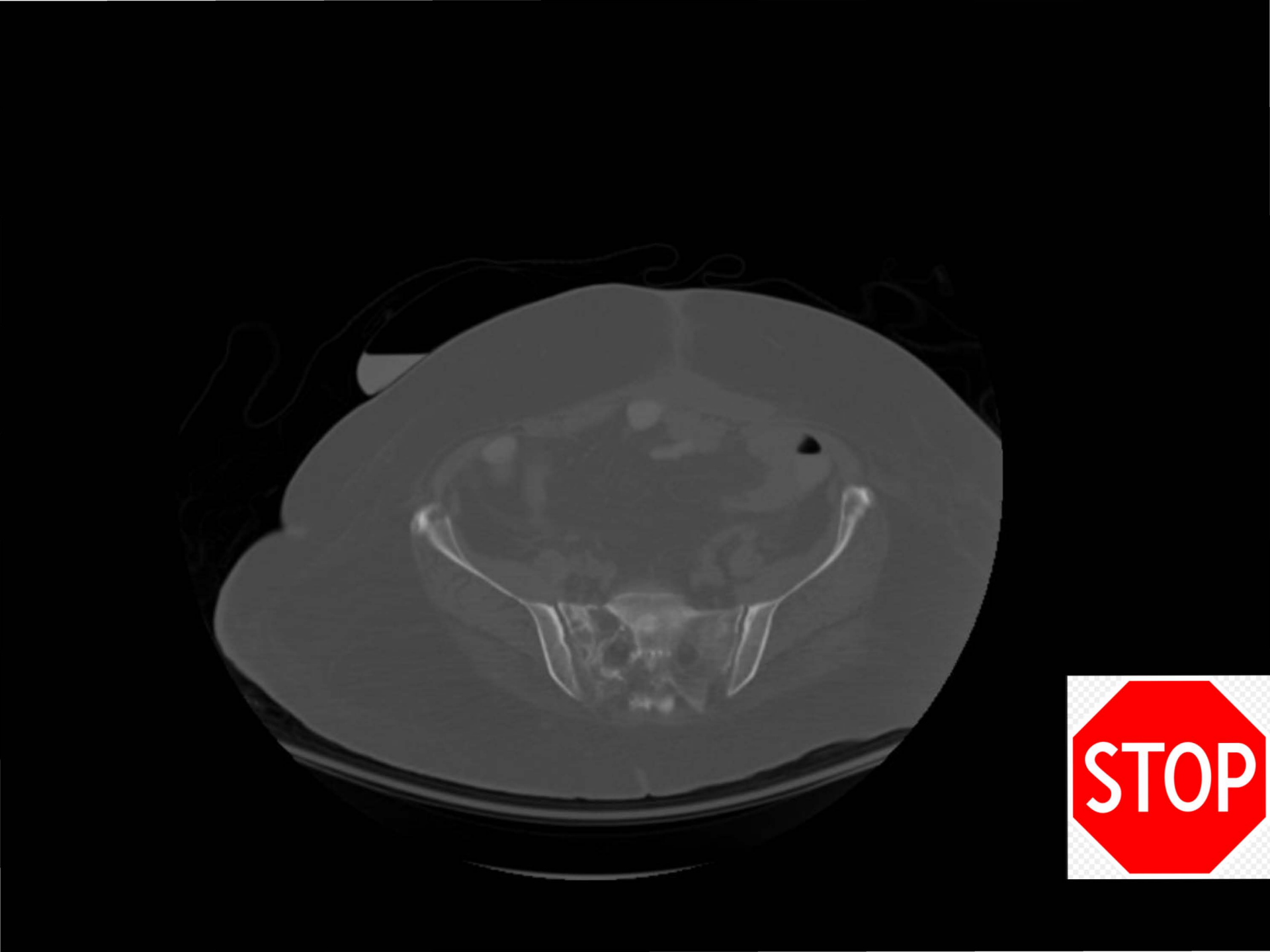
Rad Path Case # 2

63 year old woman with a 6 cm right breast mass on physical examination presenting with back pain and lower extremity weakness


Shift Overlay from 60xx to 7FE0

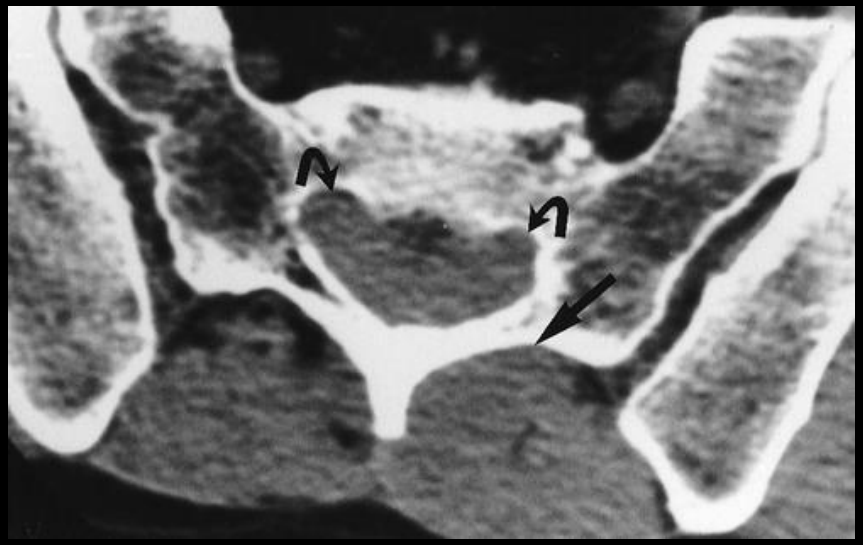

STOP

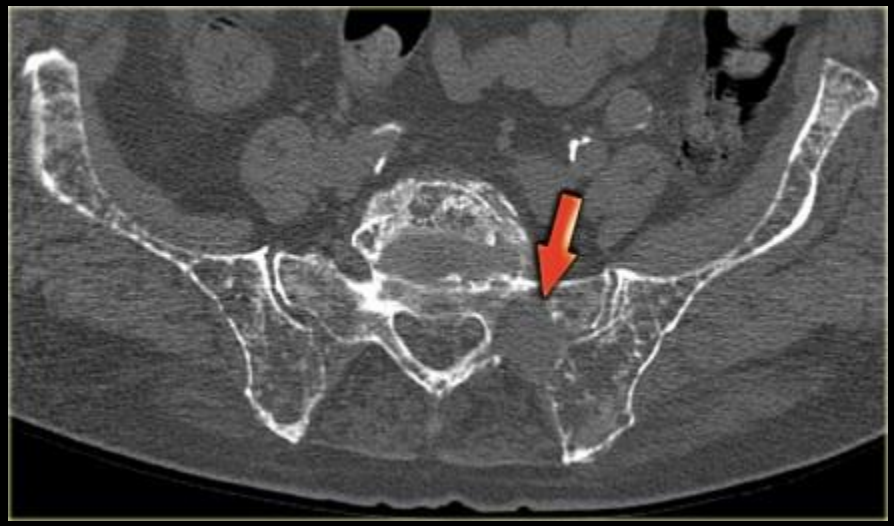
Pathology

Metastatic Lesions: Clinical Discussion

- Skeletal system is 3rd most common site involved by metastatic tumor, following lung and liver
- Treatment of painful or unstable bone lesions required in these patients
- Treatment of lesions requires imaging or metabolic measures of response
- Predictors of response to treatment of breast metastases
  - Increasing sclerosis of lesions, decrease in SUV by 8.5% on PET predicts long response duration

Metastatic Sacral Lesions: Imaging Features





Breast Cancer Bone Met Imaging features: 34% lytic, 23% sclerotic, 43% mixed at baseline

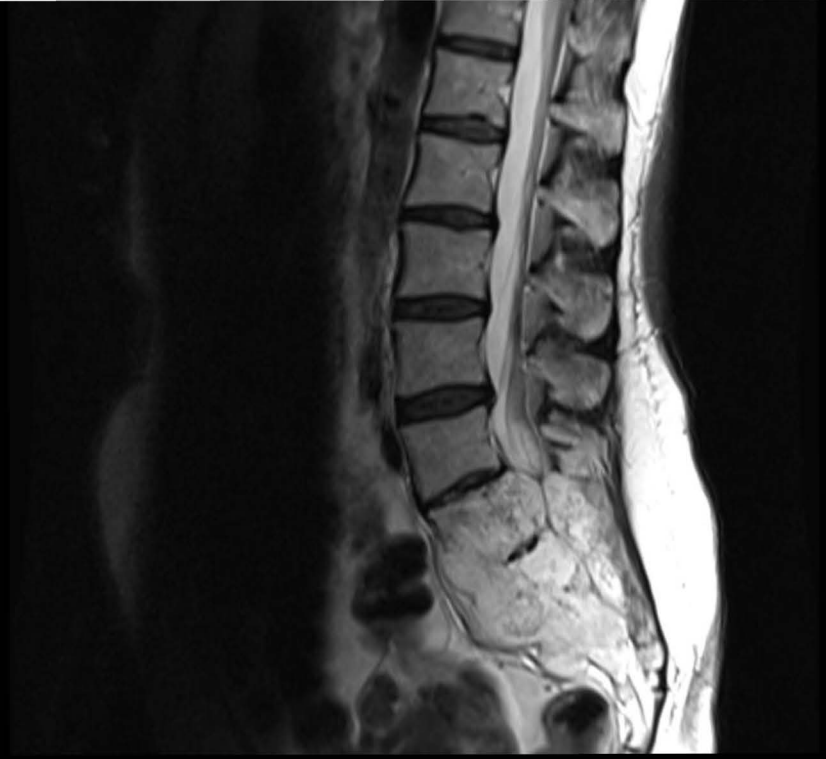
Prostate: Usually sclerotic, but may be lytic or mixed

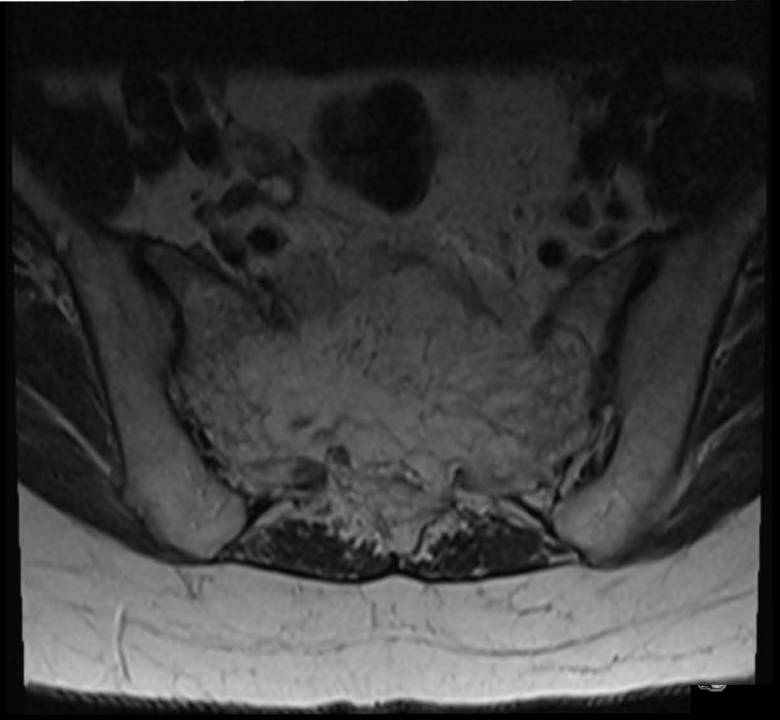
Lung: Usually lytic; uncommonly sclerotic

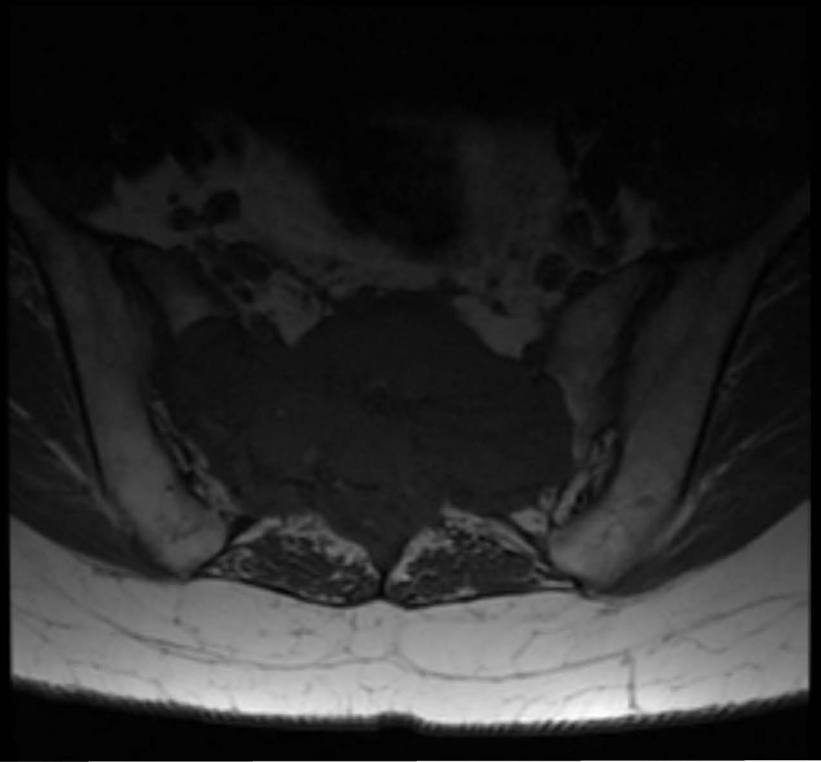
Thyroid and renal cell: Lytic, often solitary, bubbly

Rad Path Case # 3

59-year-old female with 4 month history of pain in her right buttocks and groin and some pain radiating down the right leg.







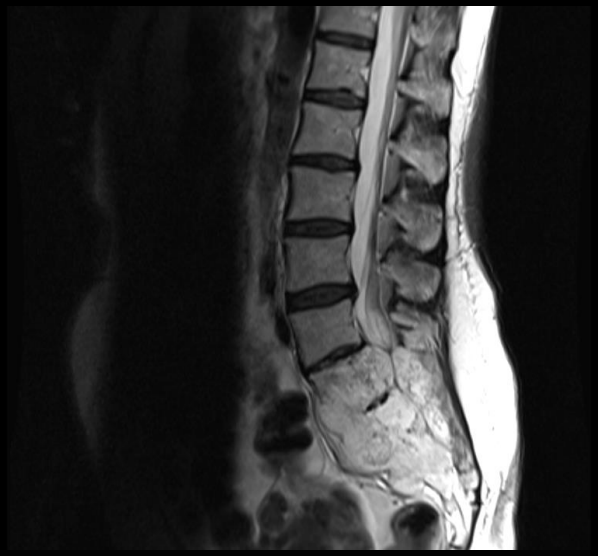

STOP

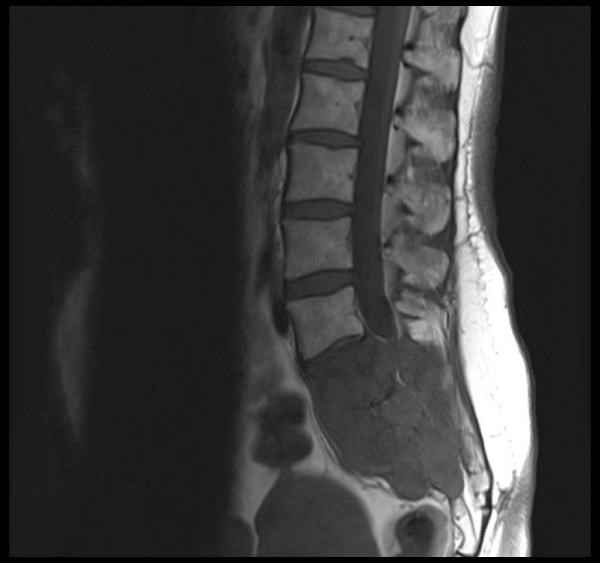
Pathology

Discussion: Hemangioma Clinical Features

- Age: Peak incidence 4th to 6th decades
- Gender: Up to 2x as frequent in females
- Epidemiology
  - 25-30% multiple, particularly in thoracic spine
- Natural History & Prognosis
  - Benign (fatty) hemangiomas: Incidental lesions, no clinical sequela
  - Aggressive vascular hemangiomas: Variable depending on size of lesion, degree of epidural extension, and presence/absence of cord compression
- Treatment
  - No follow-up typically necessary with pathognomonic imaging
  - Annual neurological and radiological examinations for patients with hemangiomas associated with pain may be appropriate
  - Aggressive hemangiomas

Imaging Features: Hemangioma





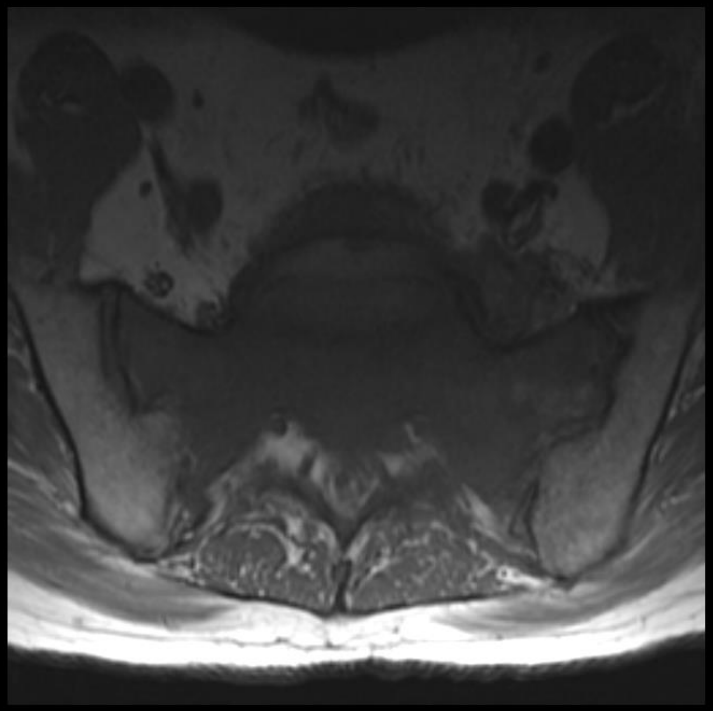
T1: Typical Hemangioma with Fatty Stroma is Hyperintense
Atypical: Mostly vascular Iso or hypointense
T2: Usually hyperintense due to vascular elements

“Aggressive” Hemangioma: T1 isointense to hypointense with avid contrast enhancement and soft tissue extension

Companion Case

53-year-old male with numbness in his genital-rectal area.

Companion Case



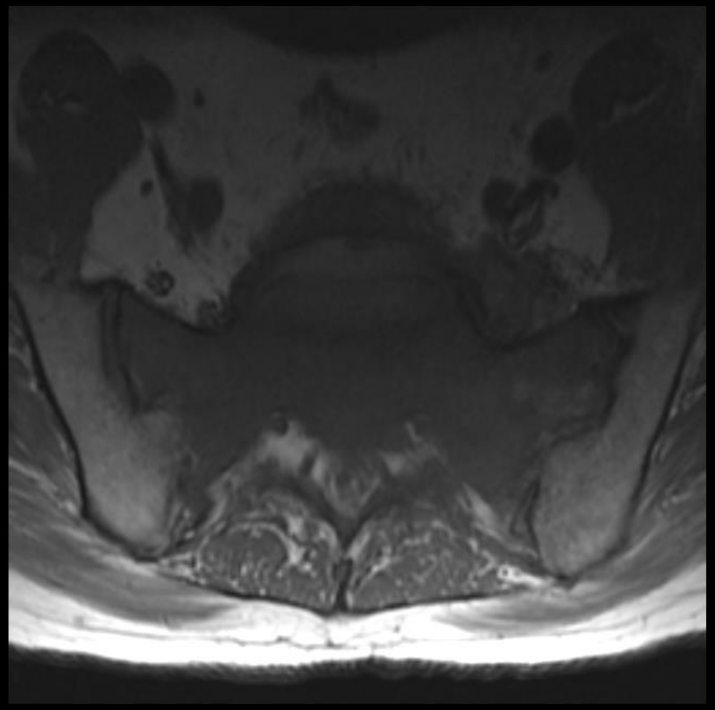
Axial T1

Sagittal T1

Companion Case Continued

Discussion

Sacral Lymphoma with extension and leptomeningeal enhancement



Question 3

In images of primary sacral lymphoma, all of the following are possible appearances EXCEPT:

A. Normal on conventional radiographs.
B. Central sclerotic nidus on CT.
C. Hot on bone scans.
D. Large soft-tissue mass on MRI.

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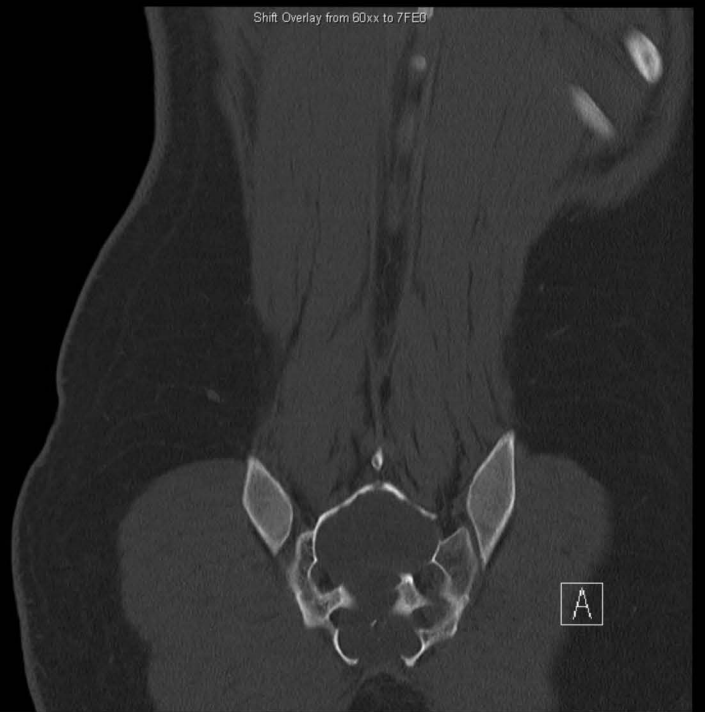
Rad Path Case # 4

18-year-old male no PMH. 2 years ago, noted some increased twitching of the right calf which has progressively worsened and has now become a constant occurrence. He has active fasciculations and notably hypertrophy of the right gastrocnemius muscle compared to the left.


Shift Overlay from 60xx to 7FE0
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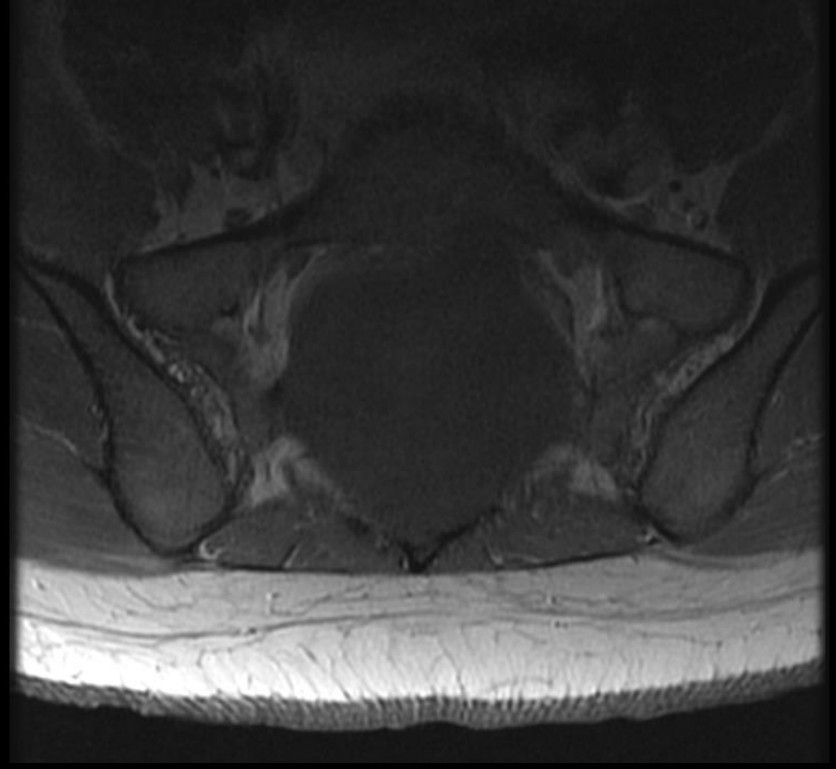
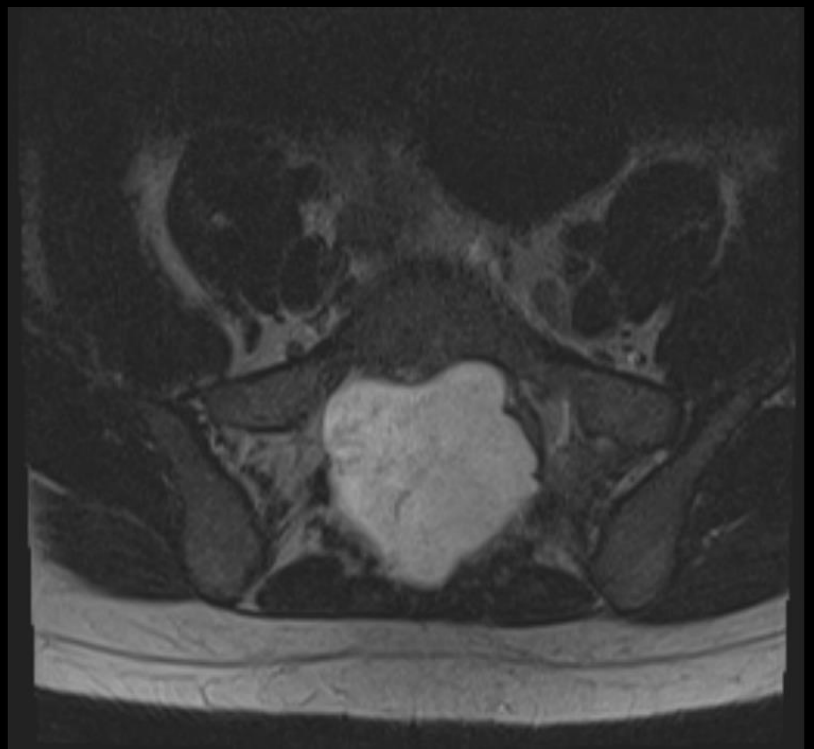


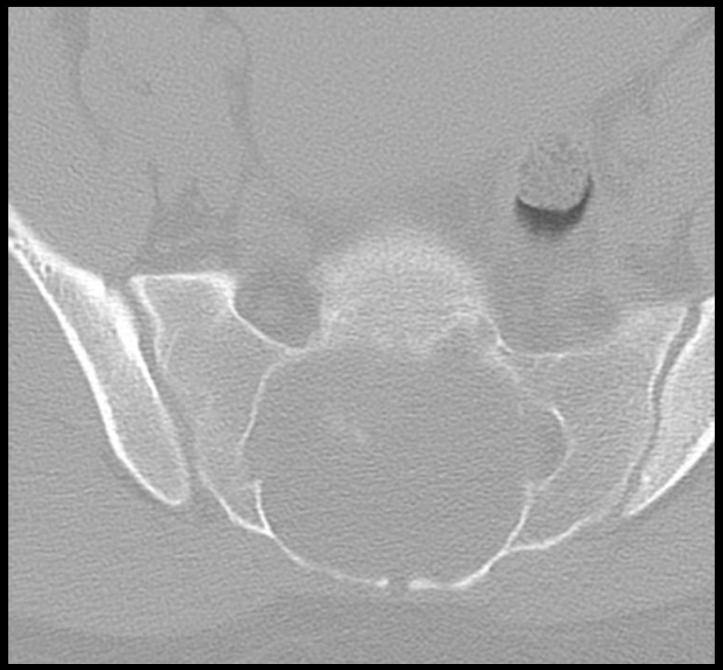
T1 Post

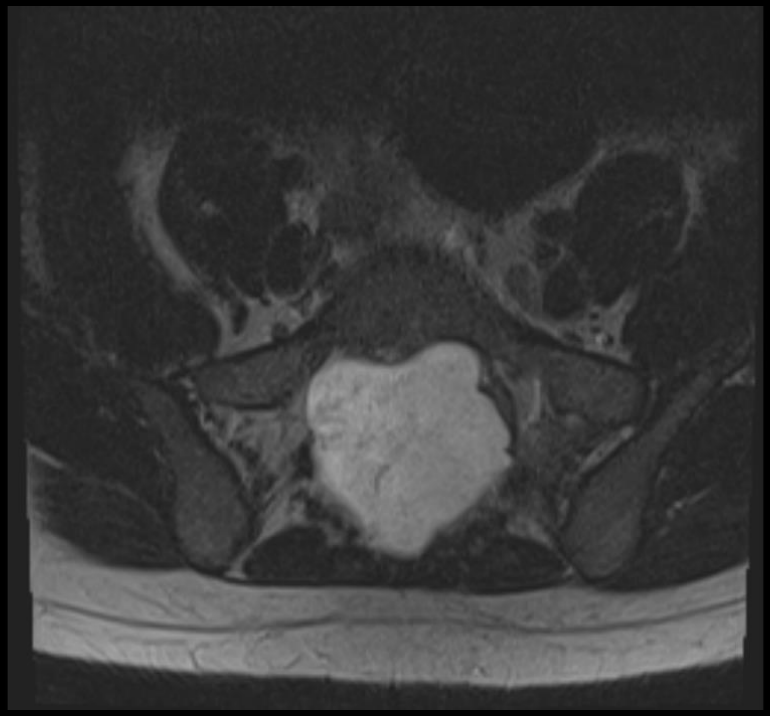
T2



Pathology

Discussion





Clinical Discussion: Dermoid Cysts

- Etiology
  - Congenital
  - Acquired
    - Iatrogenic lesion
- Benign "tumor"
  - Arises from cells that produce skin and its appendages (hair follicles, sweat glands, sebaceous glands)
- Complications
  - 30%–50% of developmental cysts are complicated by chronic infection. Bleeding or mucosal irritation is rare, as is malignant degeneration.

Imaging Discussion: Dermoid Cyst

- CT
  - Focal osseous erosion
  - Spinal canal widening
- MRI

  T1: Hypo- to hyperintense signal intensity mass

  T2: Hyperintense

  T1 Post: +- mild ring enhancement, more avid if infected

References

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