AMSER Case of the Month February 2026

20 m.o. female without PMH presents with 1 month of worsening back pain

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Patient Presentation

- 20 m.o. female without PMHx presents with regression to crawling and crying with moving the legs. Pt fell from a bar stool one month prior, and was brought to urgent care, the ED, and her pediatrician. Pt was referred to orthopedics, where a radiograph of the spine was obtained and found to be normal. Over the next 2 weeks, the pt's symptoms persisted including refusal to bend over, crying in pain upon waking daily, and screaming with bicycling of the legs. Repeat imaging at the orthopedist revealed concern for osteomyelitis and the pt’s parents were instructed to bring the pt to the ED.

Pertinent Labs

- CBC – normal WBC
- Inflammatory markers (ESR, CRP) – negative
- BMP – normal
- Blood Culture – No growth at 5 days

What Imaging Should We Order?

ACR Appropriateness Criteria for Initial Imaging

Scenario	Scenario ID	Procedure	Adult RRL	Peds RRL	Appropriateness Category
		Radiography lumbar spine	1-10 mSv ☢☢☢	0.03-0.3 mSv [ped] ☢☢	Usually appropriate
		Radiography complete spine		0.3-3 mSv [ped] ☢☢☢	May be appropriate
		MRI complete spine without and with IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate
		MRI complete spine without IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate (Disagreement)
		MRI lumbar spine without and with IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate
		MRI lumbar spine without IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate
		CT lumbar spine with IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		CT lumbar spine without IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		US lumbar spine	0 mSv O	0 mSv [ped] O	Usually not appropriate
Lumbar spine pain, gait abnormality, initial imaging	3198890	MRI complete spine with IV contrast	0 mSv O	0 mSv [ped] O	Usually not appropriate
		MRI lumbar spine with IV contrast	0 mSv	0 mSv [ped]	Usually not appropriate

This imaging modality was ordered by the orthopedic physician

ACR Appropriateness Criteria for Repeat Imaging

Scenario	Scenario ID	Procedure	Adult RRL	Peds RRL	Appropriateness Category
Lumbar spine pain, gait abnormality, radiography negative, next imaging study	3198927	MRI lumbar spine without and with IV contrast	0 mSv O	0 mSv [ped] O	Usually appropriate
		MRI lumbar spine without IV contrast	0 mSv O	0 mSv [ped] O	Usually appropriate
		MRI complete spine with IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate (Disagreement)
		MRI complete spine without and with IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate (Disagreement)
		MRI complete spine without IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate (Disagreement)
		MRI lumbar spine with IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate
		CT lumbar spine with IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		CT lumbar spine without IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		CT complete spine with IV contrast	10-30 mSv ☢☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		CT complete spine without IV contrast	10-30 mSv ☢☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate

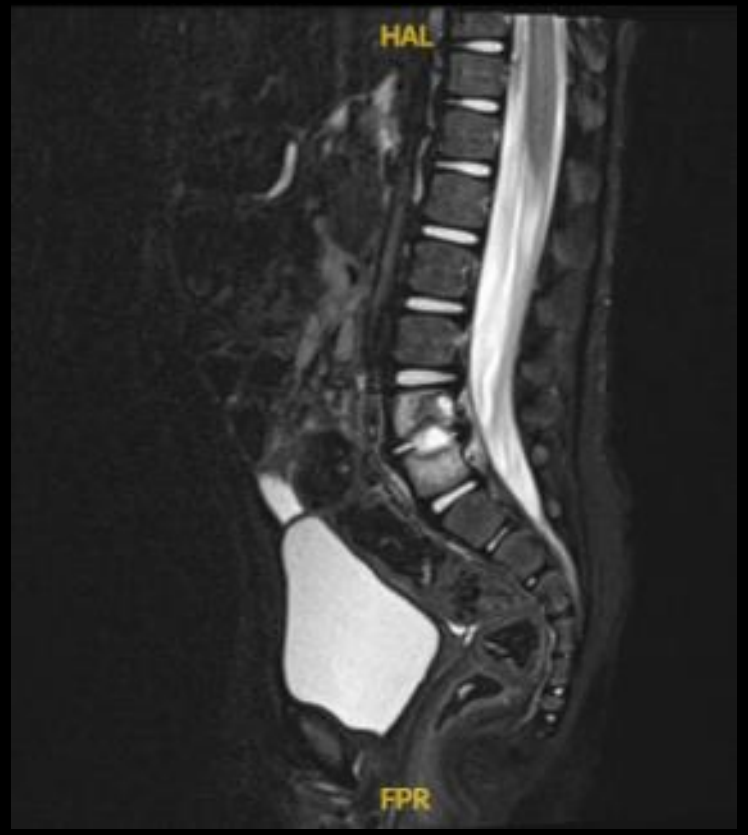
None of the modalities were chosen here; orthopedics opted for a repeat radiograph of the lumbar spine

Select the applicable ACR Appropriateness Criteria

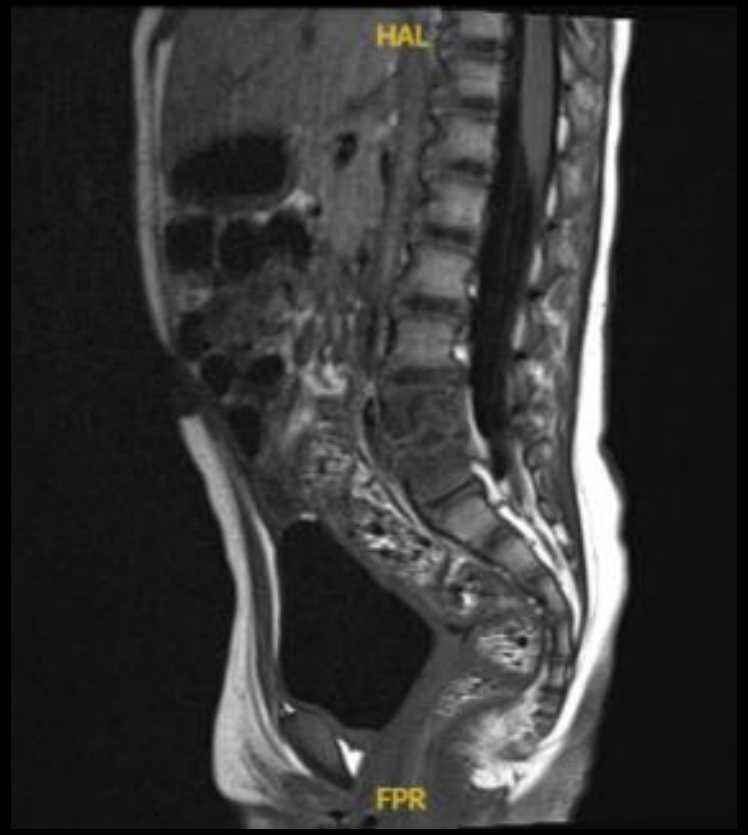
Scenario	Scenario ID	Procedure	Adult RRL	Peds RRL	Appropriateness Category
Lumbar spine pain, gait abnormality, suspected infection on radiography, next imaging study	3199061	MRI complete spine without and with IV contrast	0 mSv O	0 mSv [ped] O	Usually appropriate
		MRI lumbar spine without and with IV contrast	0 mSv O	0 mSv [ped] O	Usually appropriate
		MRI complete spine without IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate (Disagreement)
		MRI lumbar spine with IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate
		MRI lumbar spine without IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate
		Bone scan whole body with SPECT or SPECT/CT complete spine	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate (Disagreement)
		Bone scan whole body with SPECT or SPECT/CT lumbar spine	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		CT lumbar spine with IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		CT lumbar spine without IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		CT complete spine with IV contrast	10-30 mSv ☢☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate (Disagreement)

This imaging modality was ordered by the ER physician

MRI Findings (unlabeled)



Sag T2 STIR

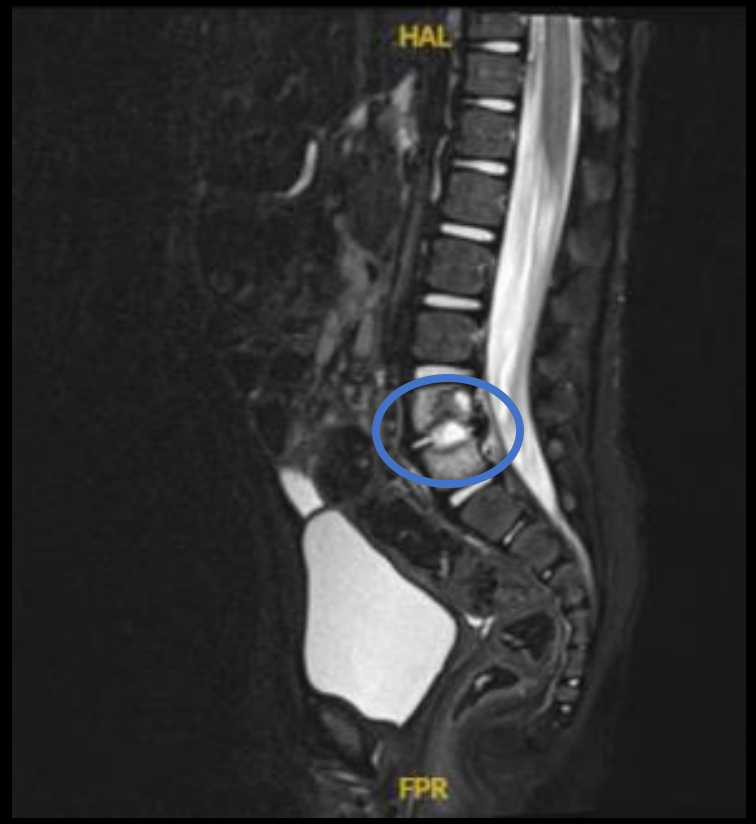


Sag T1 Pre-Contrast

MRI Findings (unlabeled)

Sag T1 Post-Contrast

MRI Findings (labeled)



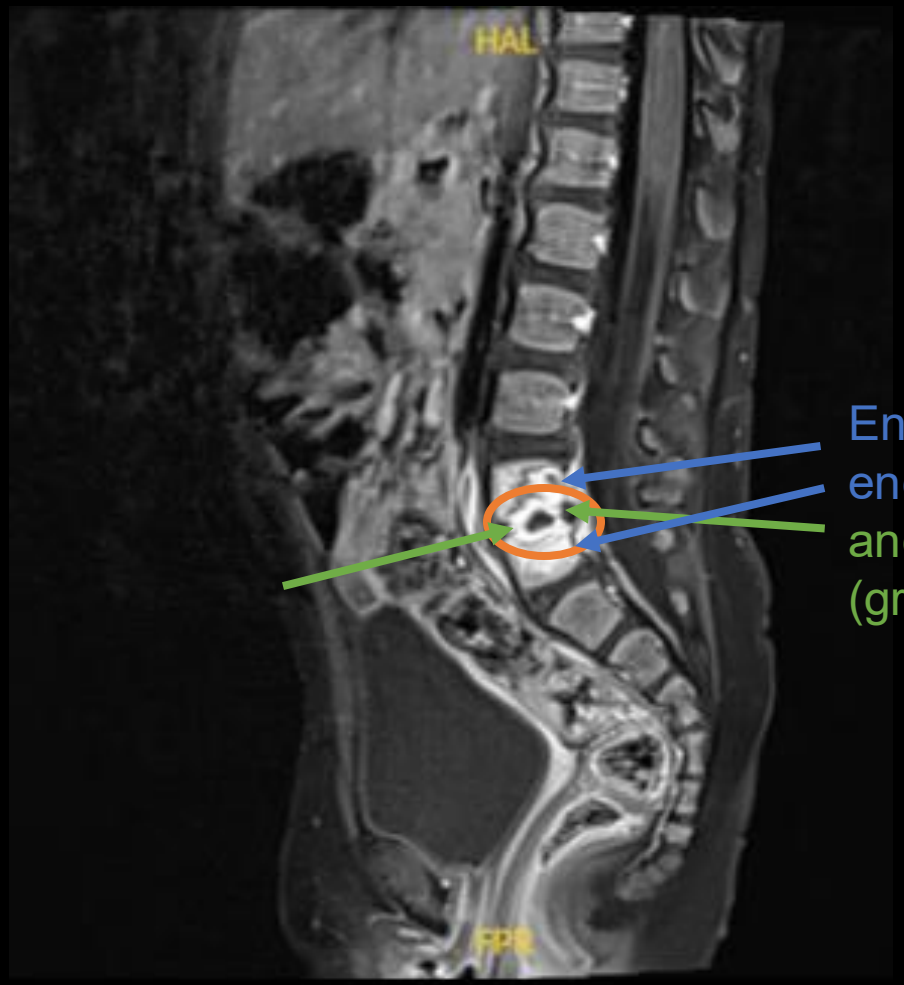
Sag STIR

T2 Hyperintense signal at L4-L5 (blue circle), consistent with edema

Sag T1 Pre-Contrast

T1 Hypointense signal at L4-L5 (orange circle), consistent with marrow replacing process (possibly edema, malignancy, infection, etc.)

MRI Findings (labeled)



Enhancement of L4-L5 endplates (blue arrows), and intervertebral disc (green arrows)

Sag T1 Post-Contrast

Loss of L4-L5 intervertebral disc height (orange circle)

Additional Work-up

- IR was consulted for a percutaneous CT-guided coaxial core needle biopsy from the L5 vertebral body
- Tissue culture w/ gram stain from needle biopsy – No growth, WBCs, or organisms seen

Final Dx:

L4-L5 Osteomyelitis discitis (Spondylodiscitis) with no evidence of soft tissue abscess, epidural phlegmon/abscess, vertebral body height collapse, retropulsion, or focal kyphosis

Osteomyelitis discitis (Spondylodiscitis)

- Spondylodiscitis is rare among pediatric patients [3]
- Most commonly, pathogens travel via hematogenous spread to the vertebral body or disc from a primary infection site [4]
- Pathogens can also be directly introduced to the site following trauma or diagnostic/surgical procedure [4]
- In younger children, infection can first involve the disc, subsequently involving the vertebral body and adjacent vertebral endplate [5,6]
- In older children and adolescents, infection originates in the endplate, subsequently involving the disc [5,6]
- MRI is the imaging modality of choice due to high specificity and sensitivity, and can help to differentiate pyogenic, tuberculous, fungal, and neoplastic subtypes [7]

Differential Diagnosis [7]

- Tuberculous spondylitis
- Schmorl's nodes
- Rheumatic spondylodiscitis (ankylosing spondylitis)
- Langerhans cell histiocytosis

Clinical Presentation

- The lumbar region of the spine is the most common location, but can also occur in the cervicothoracic segments [4]
- A common initial symptom includes back pain (over 90% of patients) [7]
  - A common presentation for younger children and adolescents with vertebral osteomyelitis and discitis begins with refusing to walk or limp [9]
  - Fever is less common (under 20% of patients) [7]
  - Other symptoms include inability to flex lower back and loss of lumbar lordosis [10]
- Early clinical manifestations are nonspecific, which frequently leads to delay of diagnosis by 4-6 months after initial disease presentation [3]
- Can have elevated ESR and CRP

Treatment Options

- Blood and culture studies often fail to identify the causative pathogen, increasing difficulty in selecting the most appropriate antibiotic therapy [11]
- No specific guidelines for pediatric patients, but targeted antibiotic therapy is the standard treatment [7]
- Surgical debridement is indicated in case of neurological deficits, spinal instability, or incomplete response to antibiotics [7]
- Prognosis varies case by case

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