AMSER Case of the Month February 2026

5 y/o male with lower extremity deficits following high speed MVC

Winston Fu, MS3, Cooper Medical School at Rowan University

Erica Poletto, MD, Cooper University Healthcare

Cooper University Hospital

AMSER

Patient Presentation

- HPI: A 5 year old male is directly admitted following a trauma alert with lower extremity deficits with associated loss of sensation following a head on motor vehicle collision (MVC). Unsure if there was loss of consciousness (LOC) per the paramedics. Was wearing seatbelt in the backseat but was not in a carseat. Complains of abdominal pain following the crash.
- PMHx and Surgical History: No pertinent history
- ROS: Negative in all systems prior to the MVC

Patient Presentation

- Initial Vitals: BP 88/54, Pulse 78, Temp 98.0, Resp 20, SPO2 100%
- Physical Exam:
  - Constitutional: Arrived in cervical collar, Abrasions on abdomen and hips bilaterally, No deformities or swelling
  - Eyes: Pupils equal, round, reactive to light, and accommodation bilaterally 3 to 2mm
  - Cardiovascular: Normal rate and regular rhythm. Radial, femoral, and posterior tibial pulses palpable bilaterally
  - Neurological: Glasgow Coma Scale (GCS) 11 and lethargic on arrival, improved within 30 minutes to GCS 15 with Alert and Oriented x4
    - Upper extremity: strength 5+, Normal reflexes and responds to pain, normal sensation and muscle tone
    - Lower extremity: Strength 0+, Absent cremasteric reflex, absent retraction to pain, no sensation in lower extremities bilaterally

Pertinent Labs

- BMP: Within normal Limits
- CBC
  - Hemoglobin: 9.9
  - RBC: 3.99

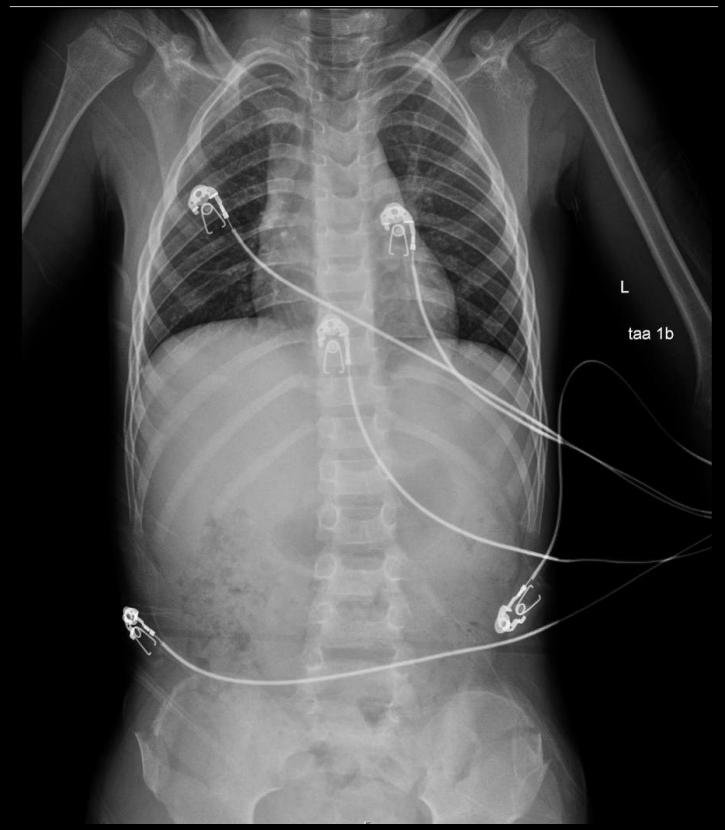
What Imaging Should We Order?

Select ACR Appropriateness Criteria

Scenario	Scenario ID	Procedure	Adult RRL	Peds RRL	Appropriateness Category
Polytrauma, blunt, hemodynamically unstable, initial imaging	3164890	US FAST scan chest abdomen and pelvis	0 mSv O	0 mSv [ped] O	Usually appropriate
		Radiography trauma series	1-10 mSv ☢☢☢		Usually appropriate
		CT whole body with IV contrast	10-30 mSv ☢☢☢☢		May be appropriate
		CT whole body without IV contrast	10-30 mSv ☢☢☢☢		May be appropriate
		MRI abdomen and pelvis without and with IV contrast	0 mSv O	0 mSv [ped] O	Usually not appropriate
		MRI abdomen and pelvis without IV contrast	0 mSv O	0 mSv [ped] O	Usually not appropriate

This imaging modality was ordered by the Trauma physicians

Findings (Unlabeled)



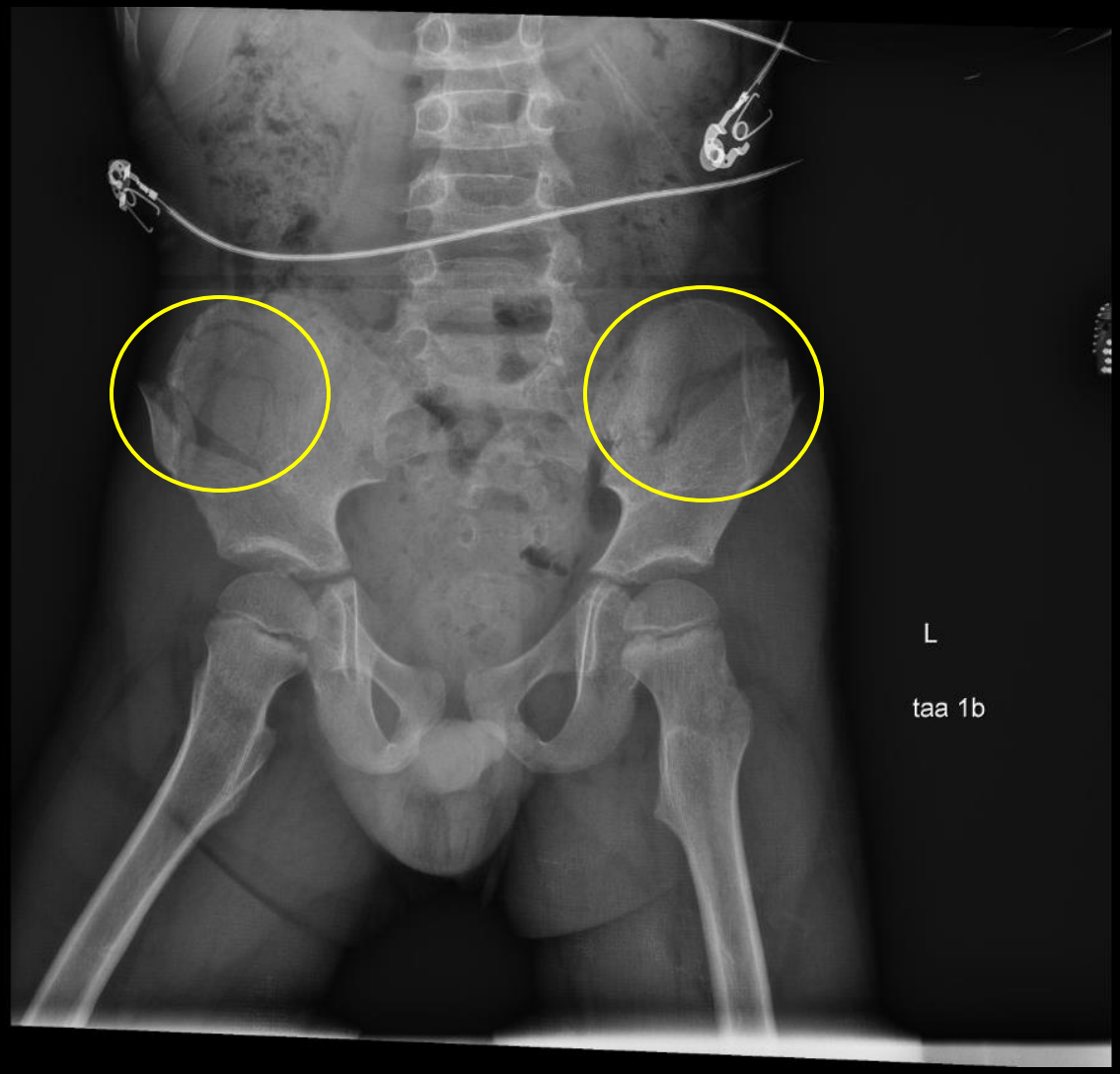
AP Chest

AP Pelvis

Lateral C-Spine

AMSER

Findings (Labeled)



Circled: Acute bilateral iliac bone fractures

Once Hemodynamically stabilized and moved to PICU, the patient continued to have lower extremity neurological deficits.

What other imaging should we consider?

Select ACR Appropriateness Criteria

Scenario	Scenario ID	Procedure	Adult RRL	Peds RRL	Appropriateness Category
Myelopathy, acute, thoracic and lumbar spine, initial imaging	3193979	MRI thoracic and lumbar spine without and with IV contrast	0 mSv O	0 mSv [ped] O	Usually appropriate
		MRI thoracic and lumbar spine without IV contrast	0 mSv O	0 mSv [ped] O	Usually appropriate
		CT thoracic and lumbar spine with IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		CT thoracic and lumbar spine without IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		CT myelography thoracic and lumbar spine	10-30 mSv ☢☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate
		Radiography thoracic and lumbar spine	1-10 mSv ☢☢☢	0.3-3 mSv [ped] ☢☢☢	Usually not appropriate
		Arteriography thoracic and lumbar spine	10-30 mSv ☢☢☢☢	3-10 mSv [ped] ☢☢☢☢	Usually not appropriate
		MRA thoracic and lumbar spine with IV contrast	0 mSv O	0 mSv [ped] O	Usually not appropriate
		MRA thoracic and lumbar spine without and with IV contra	0 mSv O	0 mSv [ped] O	Usually not appropriate
		MRA thoracic and lumbar spine without IV contrast	0 mSv O	0 mSv [ped] O	Usually not appropriate
		MRI thoracic and lumbar spine with IV contrast	0 mSv O	0 mSv [ped] O	Usually not appropriate
		CT thoracic and lumbar spine without and with IV contrast	10-30 mSv ☢☢☢☢	3-10 mSv [ped] ☢☢☢☢	Usually not appropriate
		CTA thoracic and lumbar spine with IV contrast	10-30 mSv ☢☢☢☢	10-30 mSv [ped] ☢☢☢☢☢	Usually not appropriate

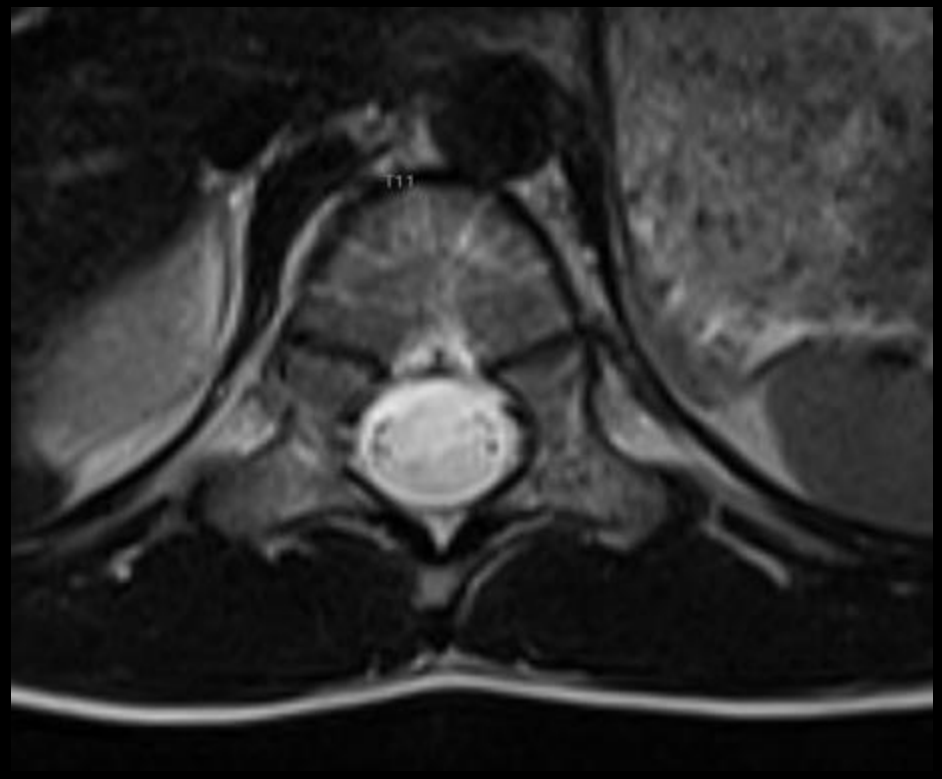
These imaging modalities were ordered by the PICU

Findings (Unlabeled)

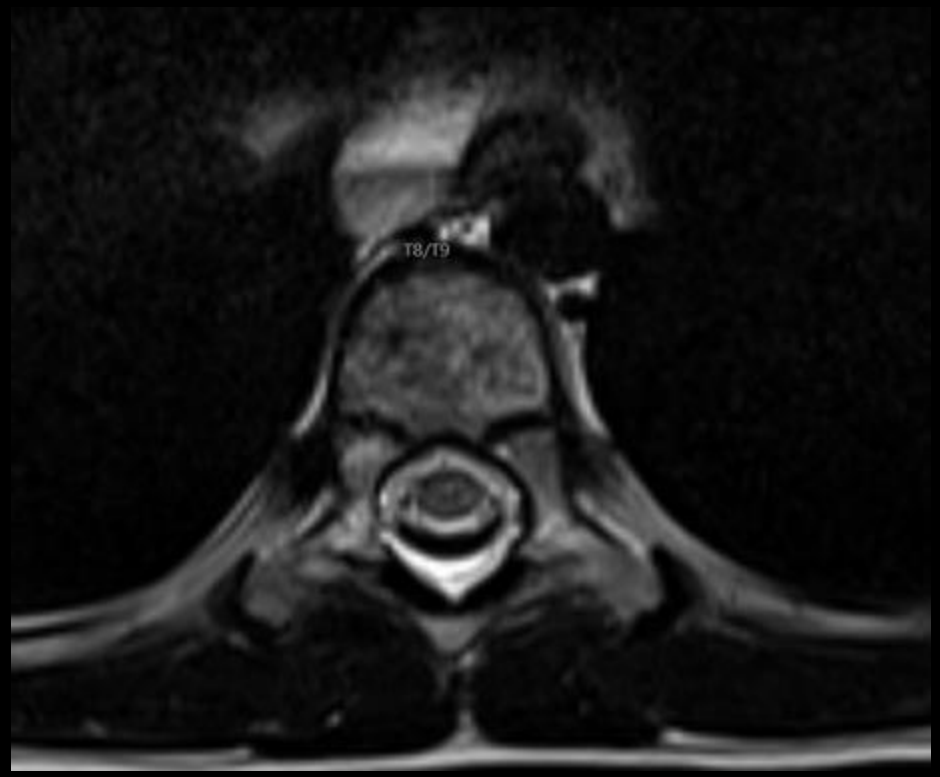
Sagittal MRI T1 Weighted

Sagittal MRI T2 Weighted

Findings (Unlabeled)



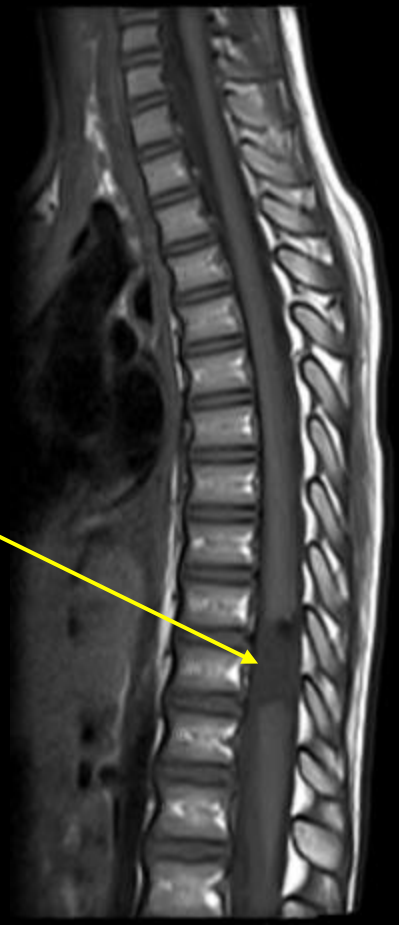
Axial MRI T2 Weighted at T11



Axial MRI T2 Weighted at T8-T9

Findings (Labeled)

Hypointense defect with CSF filling the gap



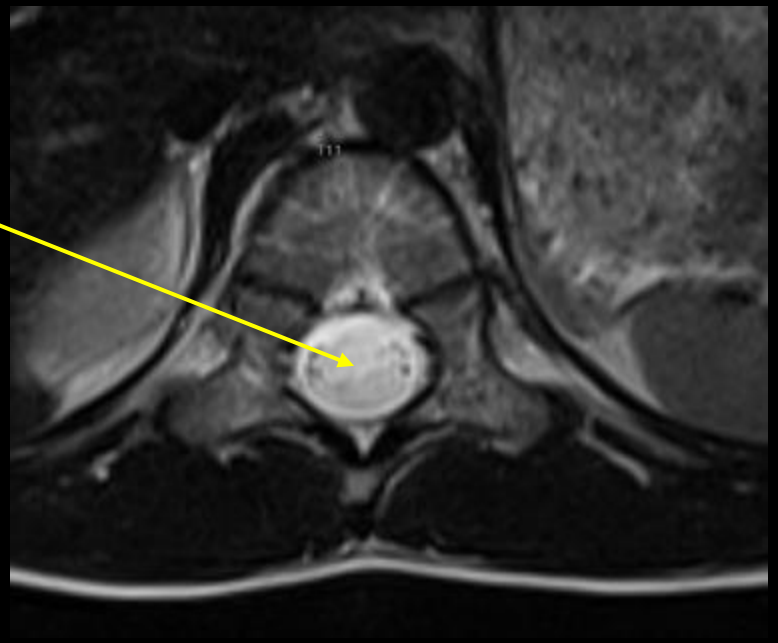
Sagittal MRI T1 Weighted

Sagittal MRI T2 Weighted

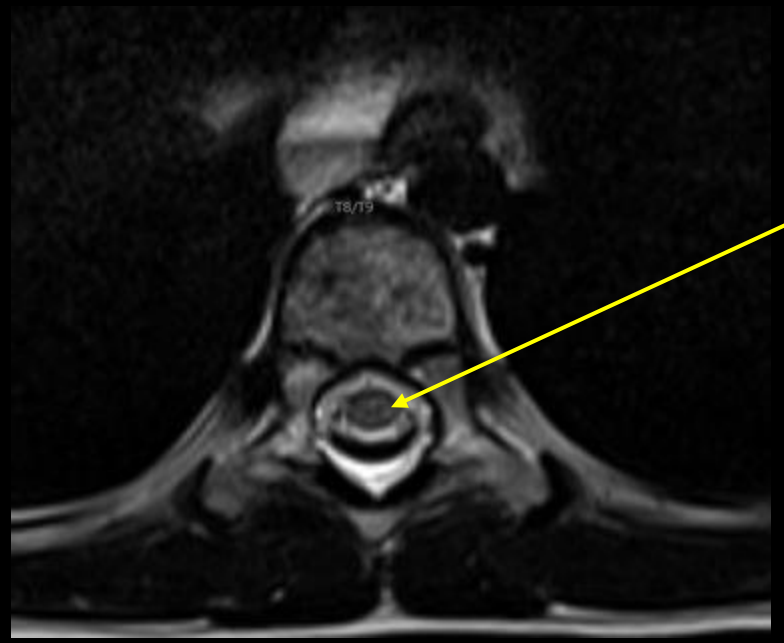
Complete spinal cord transection at the level of T10-T11

Findings (Labeled)

Area of hyperintensity at the level of T11 with missing spinal cord



Axial MRI T2 Weighted at T11



Axial MRI T2 Weighted at T8-T9

Normal anatomy at the level of T8-T9 showing area of normal spinal cord

Final Dx:

Complete Traumatic Spinal Cord Transection at the level of T10-T11

Case Discussion

- The patient was seen by neurosurgery and orthopedic surgery after stabilization and was deemed not a good surgical candidate due to the complete transection of his spinal cord.
- He would be a paralyzed from the umbilicus down and thus orthopedics deemed that they would manage his bilateral iliac fractures non-operatively.
- His voluntary bowel and bladder function continued to be minimal throughout the admission.
- He was discharged to rehab a week after being admitted.

Case Discussion
Spinal Cord Transection

- **Presentation[1]:** Traumatic total bilateral loss of motor function and pain, temperature, proprioceptive, vibratory, and tactile perception below the injury level
- **Pathophysiology[1]:**
    1. Impact plus persistent compression: The vertebrae burst fractures with retained bone fragments transecting the spinal cord
    2. Impact alone with transient compression: Usually due to hyperextension injuries from deceleration
    3. Distraction: Two adjacent vertebrae are pulled apart which causes the spinal cord to tear in the axial plane
    4. Laceration/transection: Due to missile injuries such as bullets, severe dislocations, or other penetrating injuries
- **Classification of Injury:** Classify using the ASIA Impairment Scale[2]
    - AIS A: No sensory or motor function is preserved in the sacral segments S4-5
    - AIS B: Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-5 (light touch or pin prick at S4-5 or deep anal pressure) AND no motor function is preserved more than three levels below the motor level on either side of the body.
    - AIS C: Motor function is preserved at the most caudal sacral segments for voluntary anal contraction and has some sparing of motor function more than three levels below the ipsilateral motor level on either side of the body. Less than half of key muscle functions below the lesion have a muscle grade ≥ 3
    - AIS D: Motor function the same as defined in the AIS C classification. However, more than half of key muscle functions below the lesion have a muscle grade ≥ 3
    - AIS E: Normal sensation and motor function throughout the spinal cord

Case Discussion Continued

- **Imaging[3]:**
  - Initial imaging in Trauma Bay: X-ray and CT scan Trauma series
    - On X-ray: Note any limb, pelvic, or vertebral fractures
    - On CT: Assess for any areas of bleeding along with bony fractures, compare with plain X-rays
  - Second Line Imaging: MRI[4]
    - Assess for any spinal cord damage, edema, ligamentous injury, or intervertebral disk injury
    - Much higher contrast resolution compared to CT
    - Can be used to guide surgical decisions and future management

Case Discussion Continued

- Management[3]:
  - Acute stage:
    - Monitor signs for spinal or neurogenic shock based on location of lesion
    - Continue to monitor BP and signs of bleeding from fractures, transfuse or use pressor support as needed to achieve a MAP of 85-90
    - Monitor respiratory rate for adequate depth and tidal volume
      - Temporary mechanical ventilation might be necessary
    - Consult Neurosurgery and Orthopedics for surgical intervention.
      - Surgery is done for those with declining neurological exams or those that need spinal cord decompression as indicated from radiologic studies
  - Long Term:
    - Involve a nutritionist to develop a personalized plan for the patient for daily calories and their capabilities to swallow
    - Add stool softeners, laxatives, suppositories, and enemas to achieve at least 1 BM per day
    - DVT prophylaxis is indicated for most adult patients for 8 weeks
    - Assessing baseline urinary voiding ability and adding assistance from alpha inhibitors and acetylcholine antagonists if output is low
    - Engagement with PT at a rehabilitation facility for aerobic conditioning and muscle retention

- Overall, spinal cord transection injuries require a multifaceted team approach to help the patient achieve functional capability and minimize disability

References

1. Alizadeh A, Dyck SM, Karimi-Abdolrezaee S. Traumatic Spinal Cord Injury: An Overview of Pathophysiology, Models and Acute Injury Mechanisms. Review. *Frontiers in Neurology*. 2019;Volume 10 - 2019
2. Margetis K, Das JM, Emmady PD. Spinal Cord Injuries. *StatPearls*. StatPearls Publishing. Copyright © 2025, StatPearls Publishing LLC.; 2025.
3. Wang TY, Park C, Zhang H, et al. Management of Acute Traumatic Spinal Cord Injury: A Review of the Literature. *Front Surg*. 2021;8:698736. doi:10.3389/fsurg.2021.698736
4. Sheikh Z, Thibodeau R, Knipe H, et al. Spinal cord transection. Reference article, Radiopaedia.org (Accessed on 17 Aug 2025) https://doi.org/10.53347/rID-40412