AMSER Rad-Path Case of the Month January 2019

Intradural Spinal Tumor

Ashley Graziano OMS IV, Lake Erie College of Osteopathic Medicine
Dr. Matthew Hartman M.D., Allegheny Health Network
Dr. David Oliver-Smith M.D., Dr. Kossivi Dantey M.D., Dr. Charles Li M.D.

Patient Presentation

- 66 year old man seen in neurosurgical consultation from his PCP for chronic low back pain and intermittent Left > Right leg pain, numbness, and weakness. The patient stated sitting and walking aggravated his symptoms, while frequent position changes relieved them. The patient's wife reported shuffling when walking. Patient denied any bowel or bladder incontinence.

Patient Presentation

Past Medical History: Asthma, Depression, Hearing Loss, Macular Degeneration, Sleep Apnea, GERD, HLD

Surgical History: Shoulder surgery in 2001 and 2005, no previous spine surgery

Family History: Cancer (Mother, Brother, Sister), Heart Disease (Father), HTN (Father), Diabetes (Brother)

Social History: Married and lives with wife

-Former smoker (quit 1982), 30+ pack years

-Drank 6-8 beers/day in teens/20's; Currently admits to one drink nightly

-Negative Drug Use

Medications: Amlodipine, Breo Ellipta, Voltaren, Prozac, HCTZ, Lyrica, Singulair, Prilosec, Sildenafil, Zocor, Trelegy Ellipta

Physical Exam and Pertinent Labs

Vitals: 97.7°F, HR 80, BP 147/76, 16 RR

General: No acute distress, normal body habitus

Psych: Normal mood and affect

Extremities: No clubbing, cyanosis, or edema

Peripheral Pulses: Dorsalis Pedis present bilaterally

CV: Regular rate and rhythm, Normal S1 and S2

Lungs: Clear to auscultation bilaterally

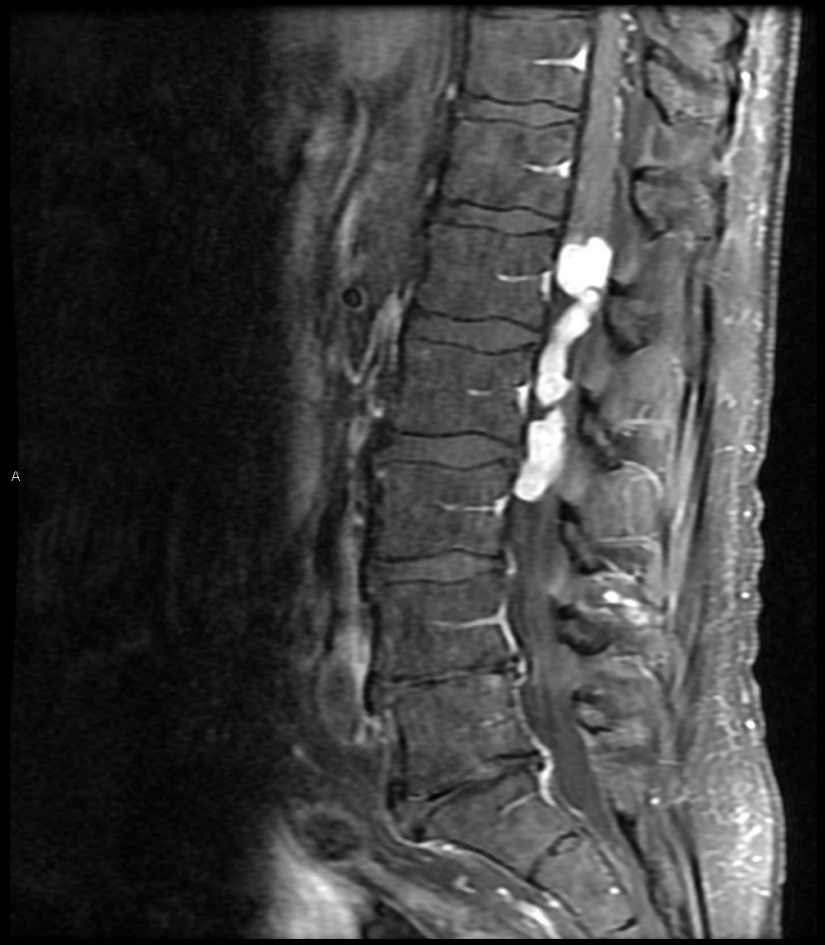
Neuro:

- Mental Status: A&O x3, normal speech without aphasia or dysarthria, normal concentration
- CNs: PERRLA, extraocular movements intact, visual fields full, face symmetric and sensation intact, normal hearing, palate elevates bilaterally, tongue midline, shoulder shrug normal bilaterally
- Motor: 5/5 bilaterally in UE and LE; Reflexes 3+ throughout, negative Hoffman/Babinski
- Sensory: Intact to light touch in all 4 extremities
- Coordination/Gait: Normal

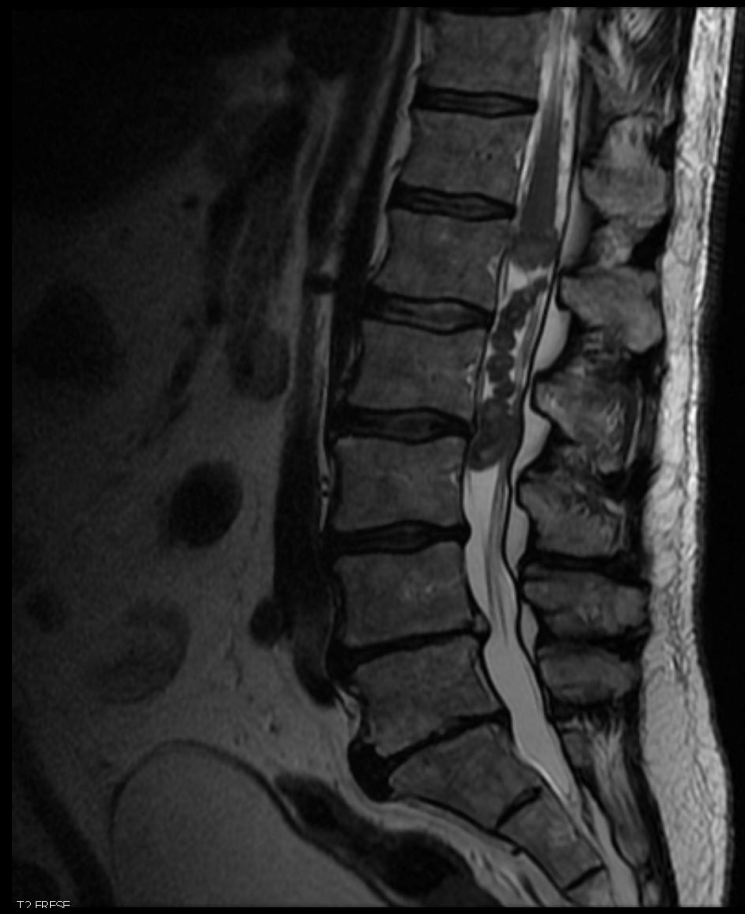
Pre-Operative labs were unremarkable

MRI was ordered by his PCP due to the chronicity of the lower back pain.

MRI of Lumbar Spine with Contrast

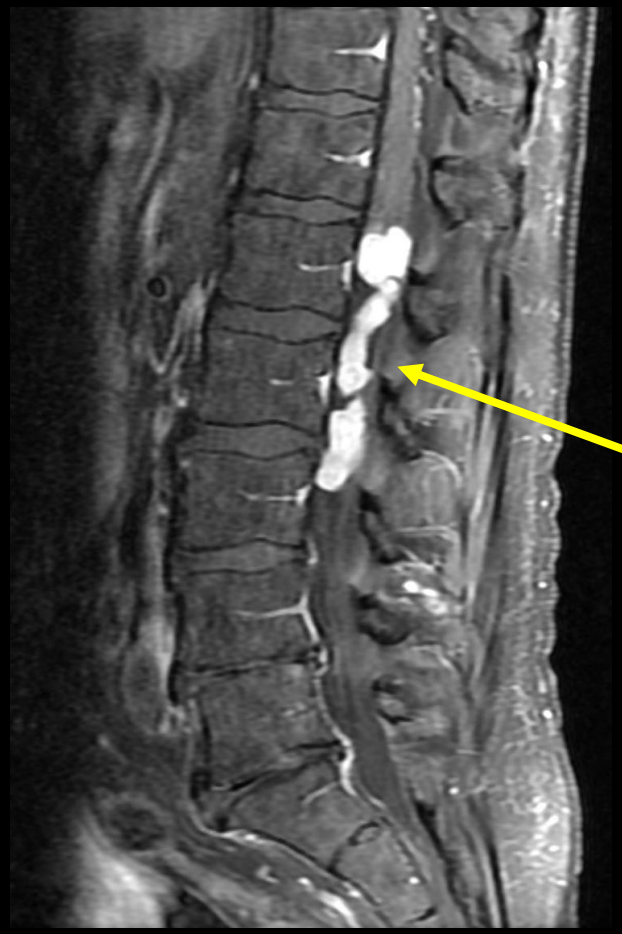


Sagittal T1+C fat sat

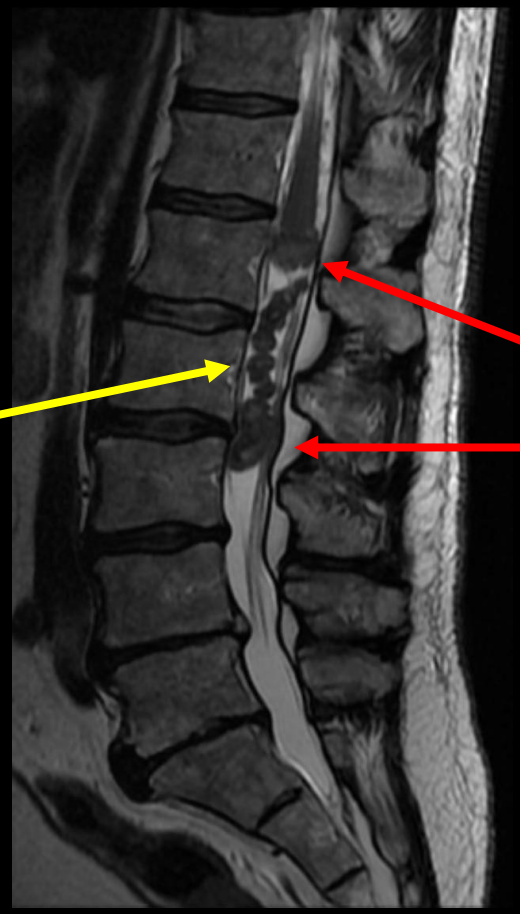


Sagittal T2

MRI of Lumbar Spine with Contrast



Heterogeneously T2 hyperintense, multilobulated, homogeneously enhancing intradural extramedullary mass

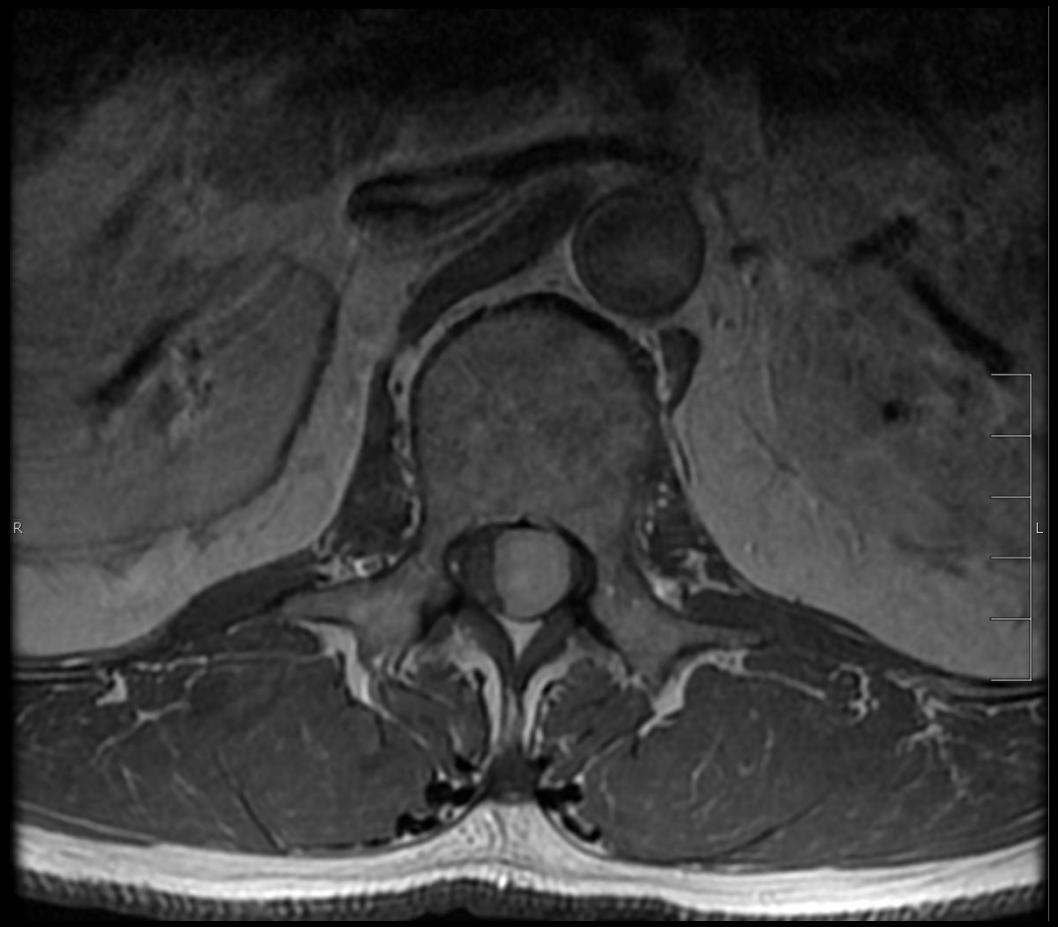


Superior margin of the mass is near the conus medullaris, while the inferior margin is at the cauda equina nerve roots.

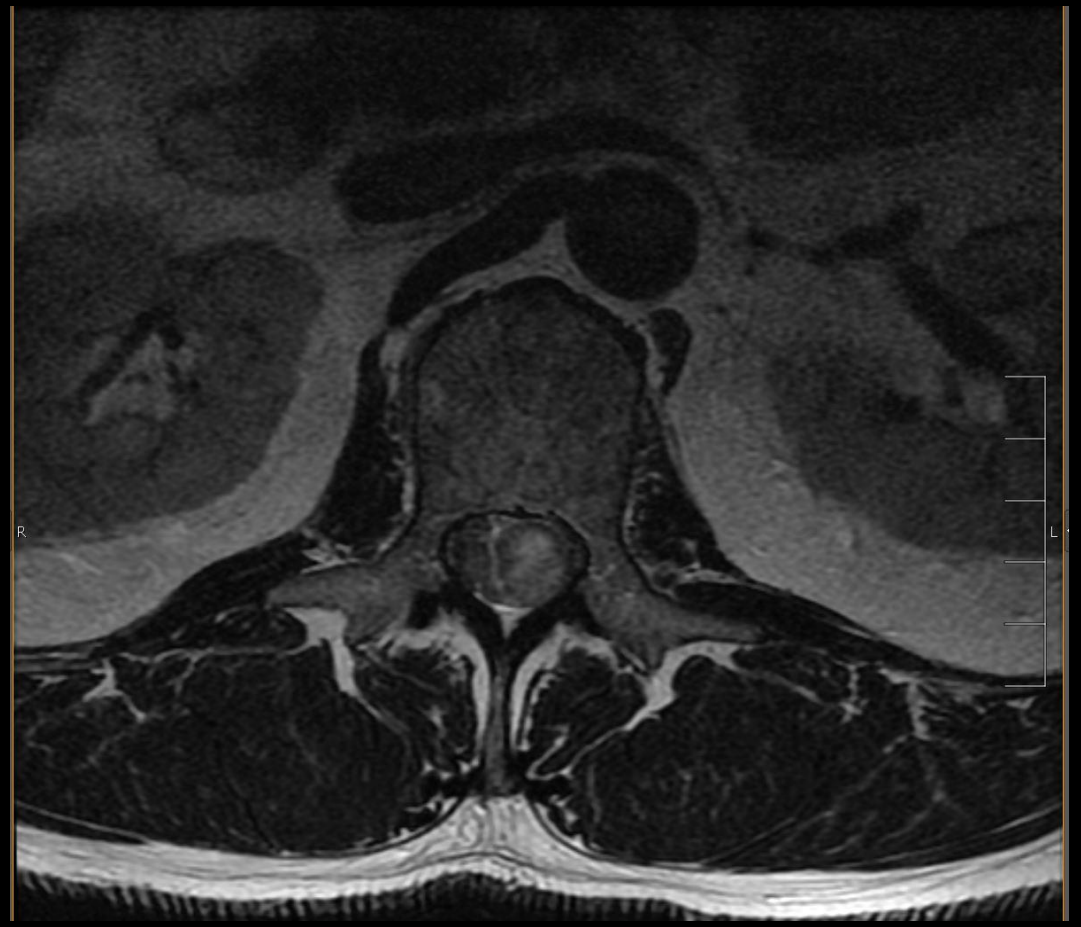
Sagittal T1+C fat sat

Sagittal T2

MRI of Lumbar Spine with Contrast

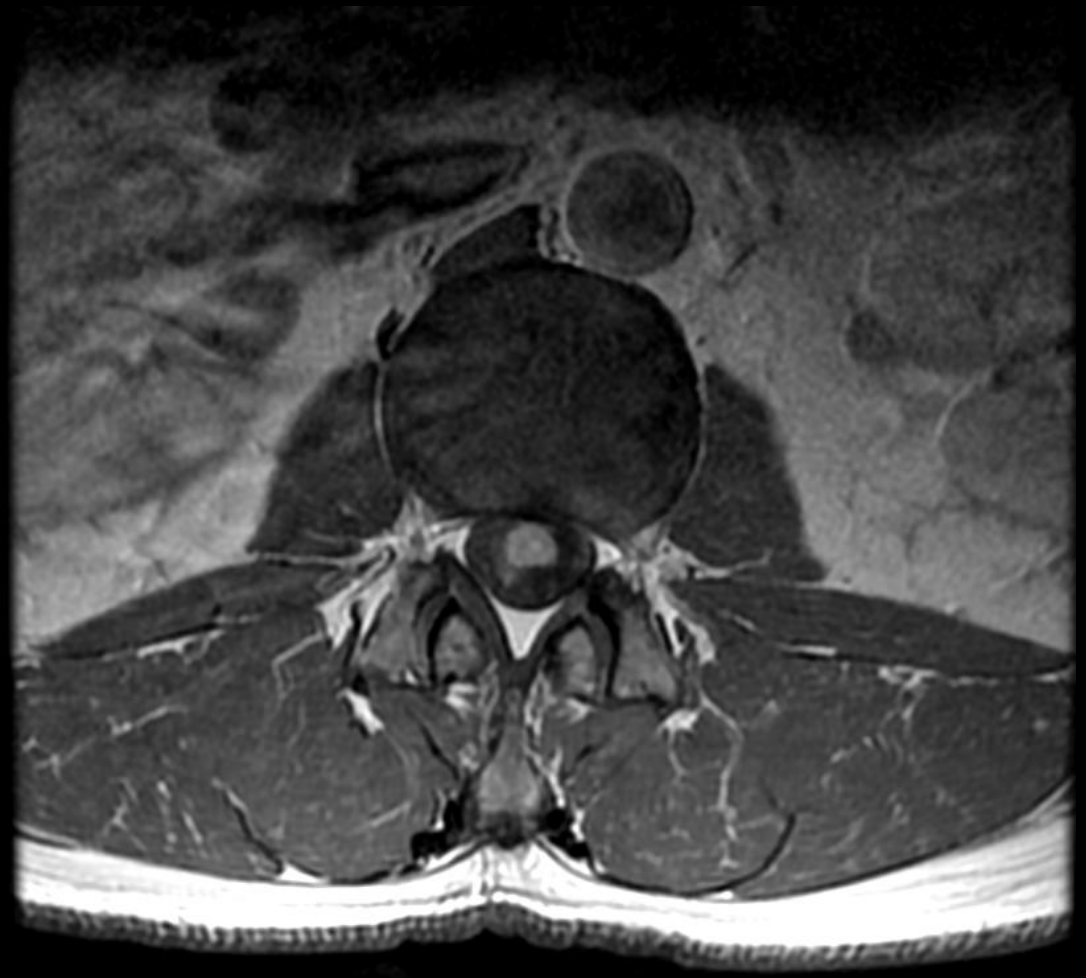


Axial T1+C

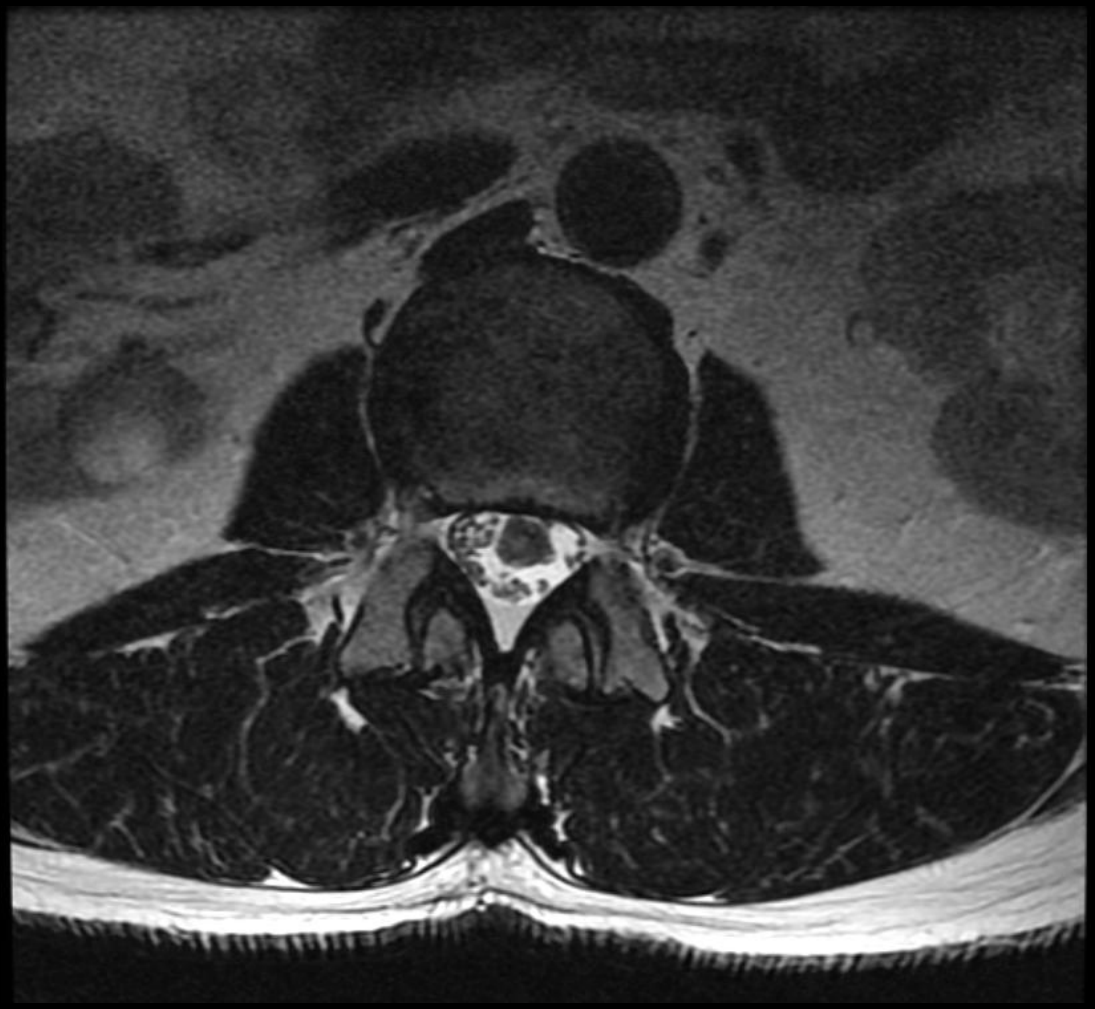


Axial T2

MRI of Lumbar Spine with Contrast

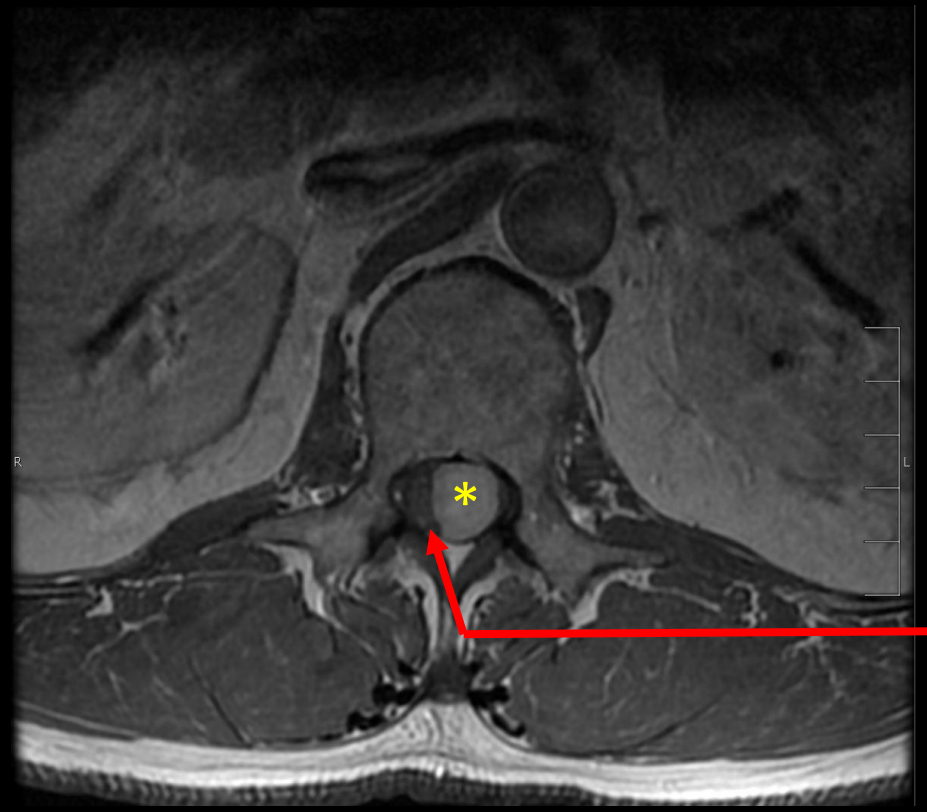


Axial T1+C



Axial T2

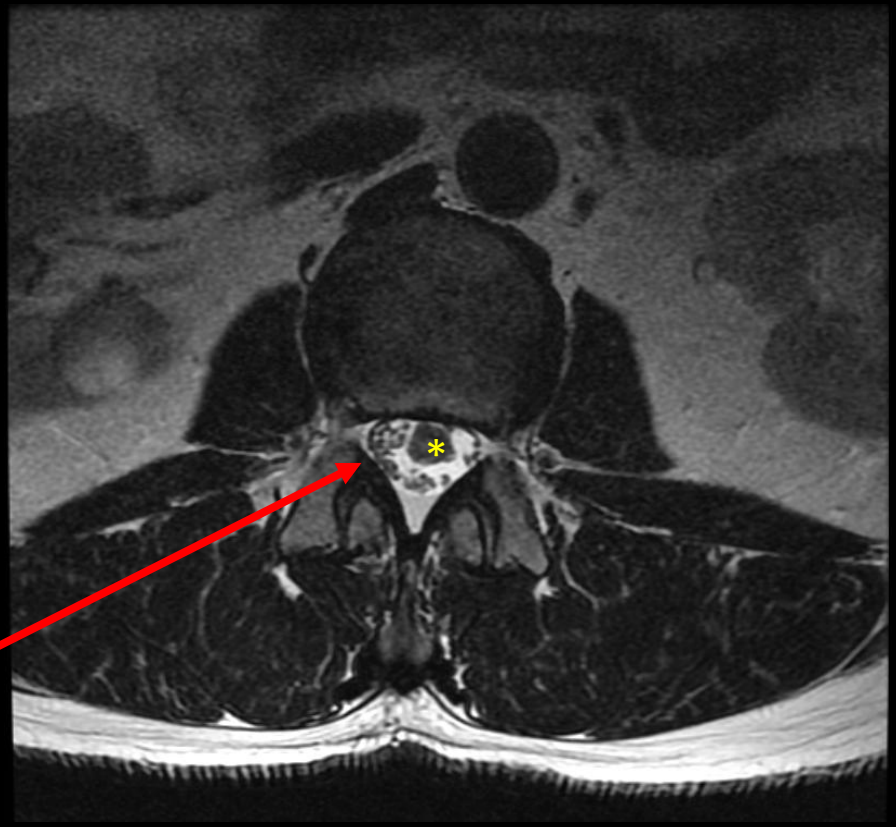
MRI of Lumbar Spine with Contrast



Axial T1+C

The tumor can be seen in the center of the spinal canal (yellow asterisks).

The tumor displaces the conus medullaris and proximal cauda equina to the right.



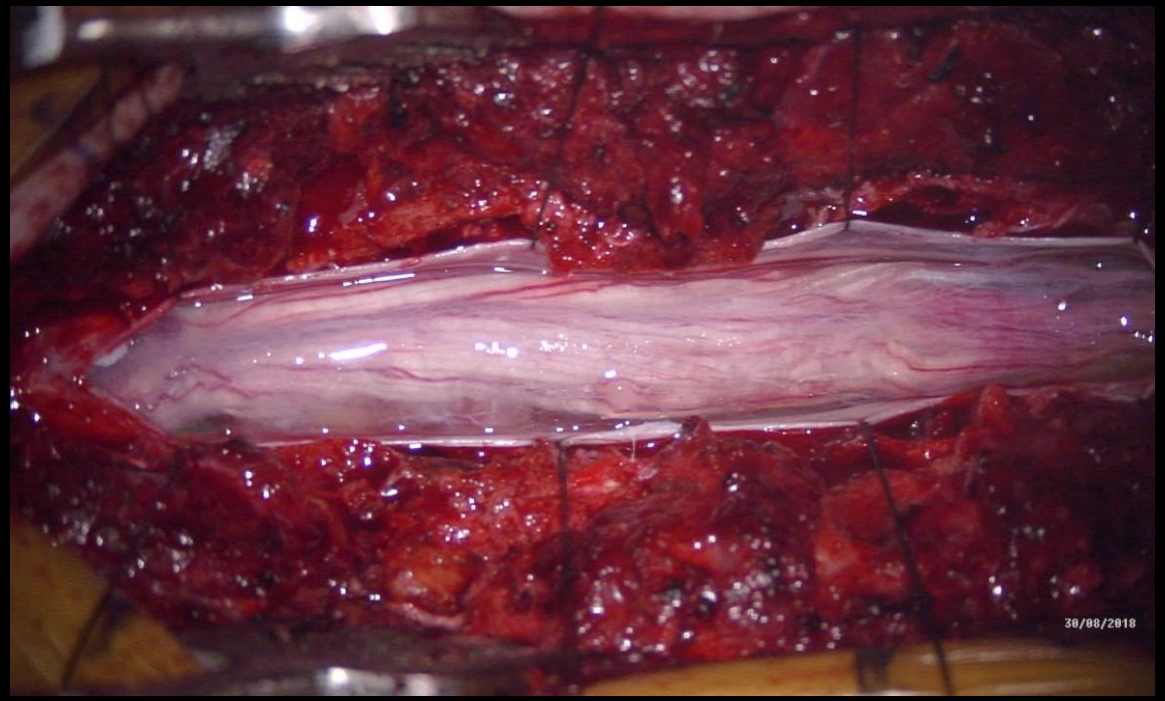
Axial T2

Differential Diagnosis Based on Imaging:

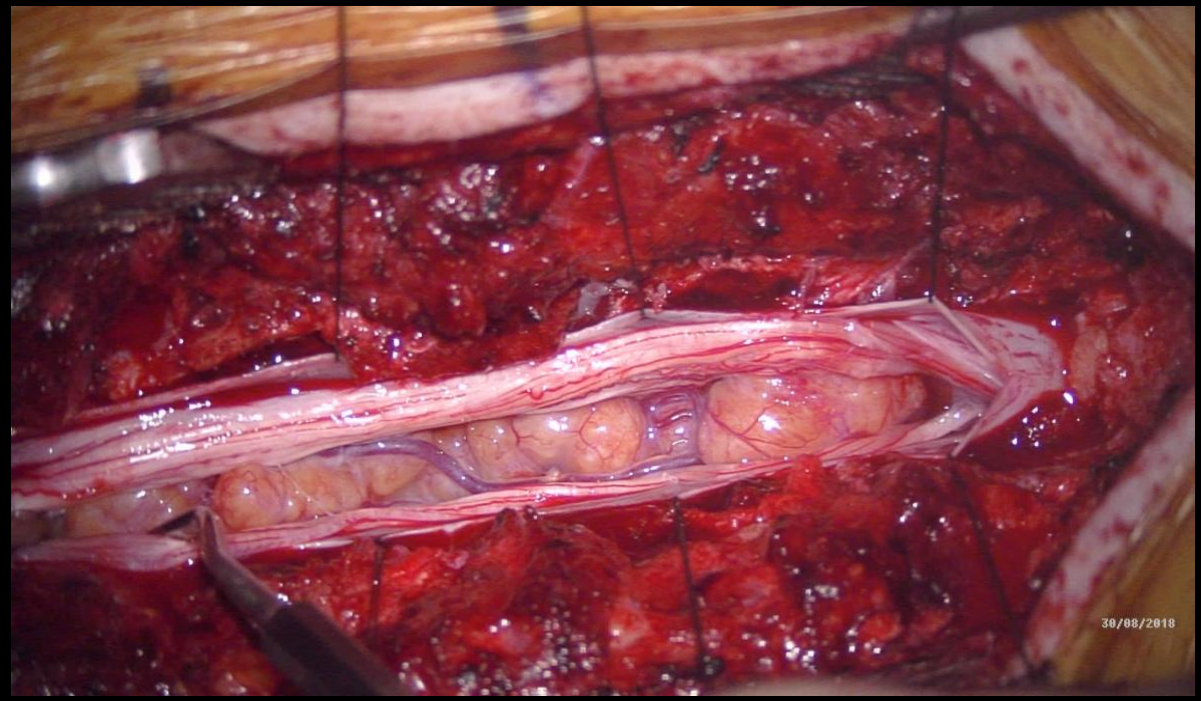
- Nerve Sheath Tumor (Neurofibroma or Schwannoma)
- Ependymoma (specifically myxopapillary)
- Meningioma
- Metastasis
- Lymphoma
- Arteriovenous Malformation
- Paraganglioma

Gross Specimen

- The patient underwent a partial T_{12} and complete L_1-L_3 Laminectomy with resection of intradural spinal tumor.

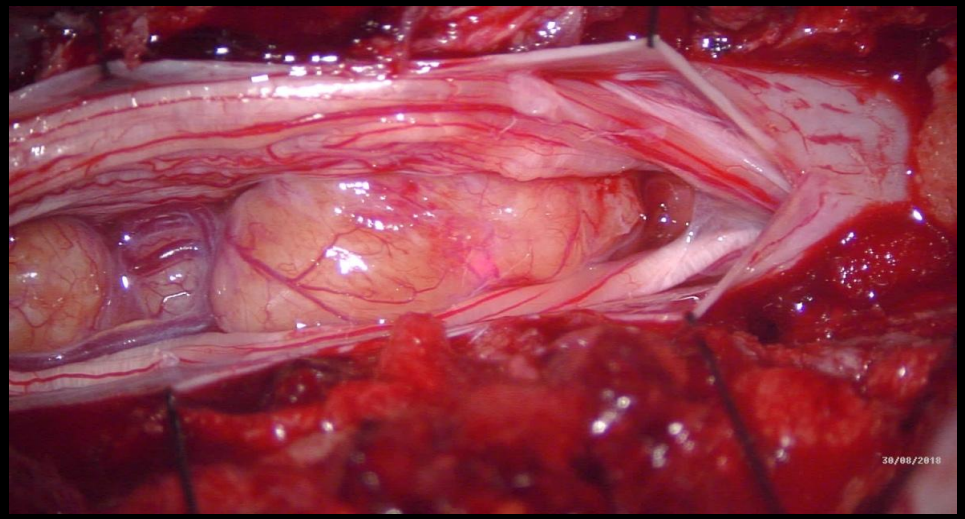


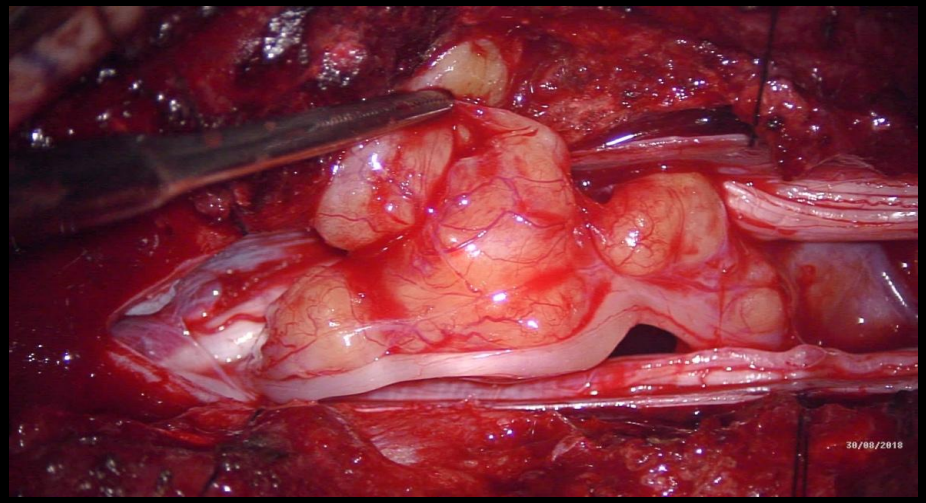
Dural layer exposed.

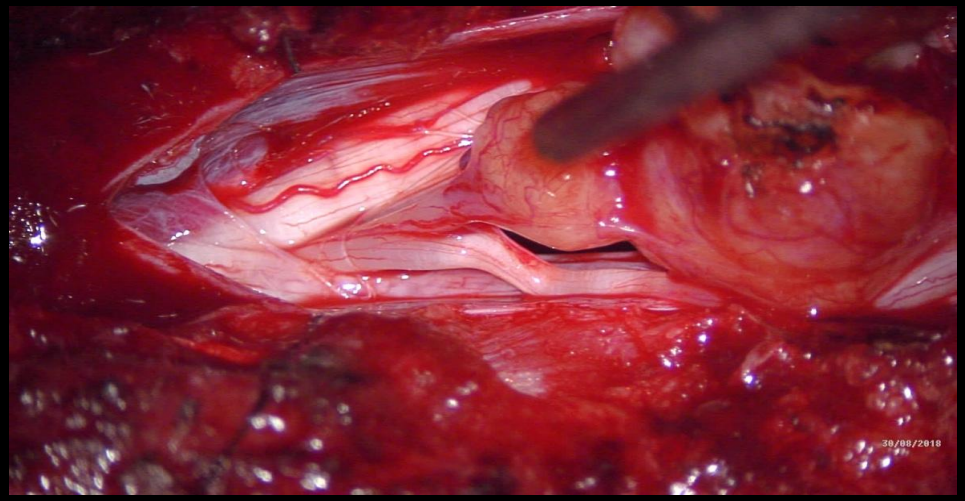


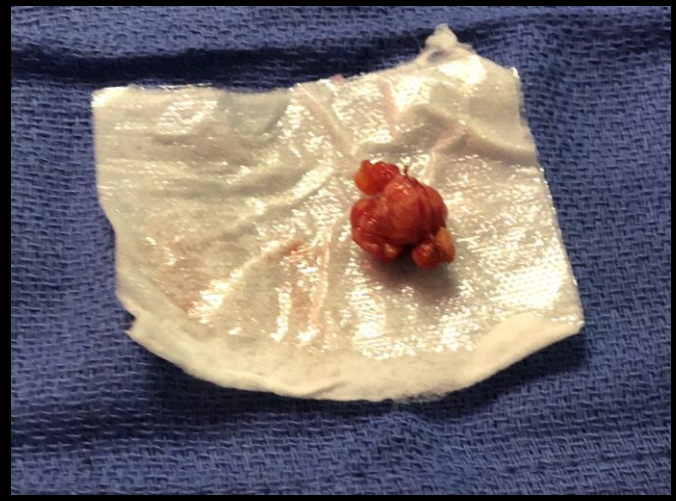
Dural layer opened, revealing the tumor.

Gross Specimen

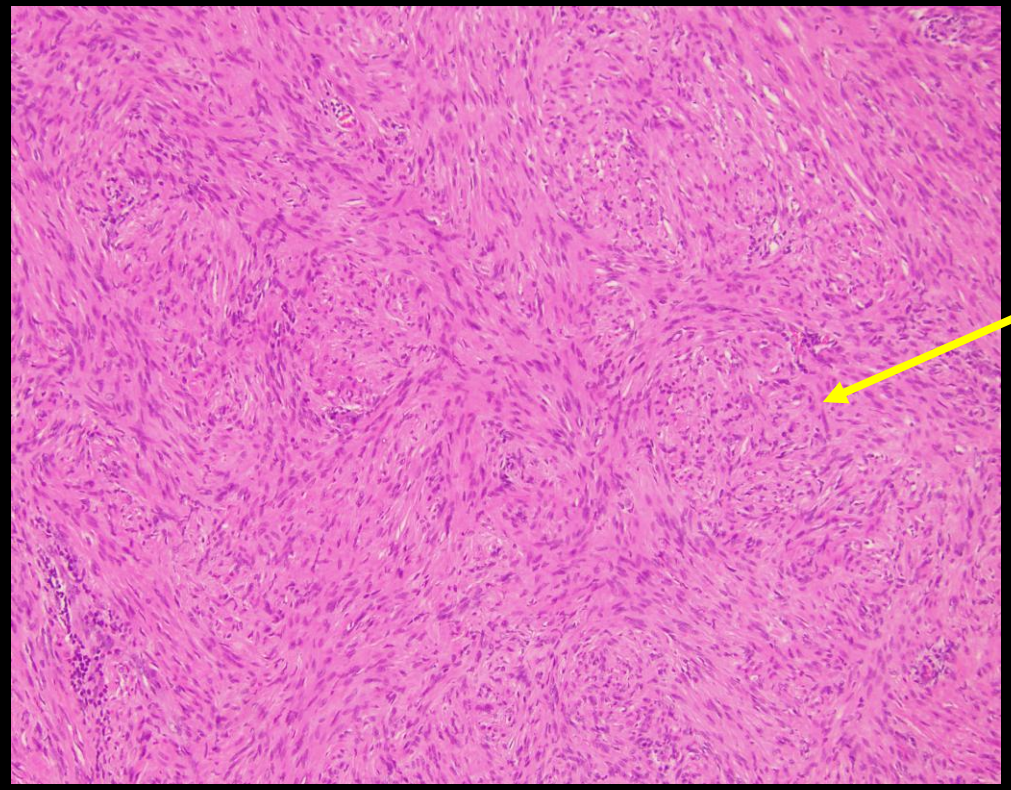








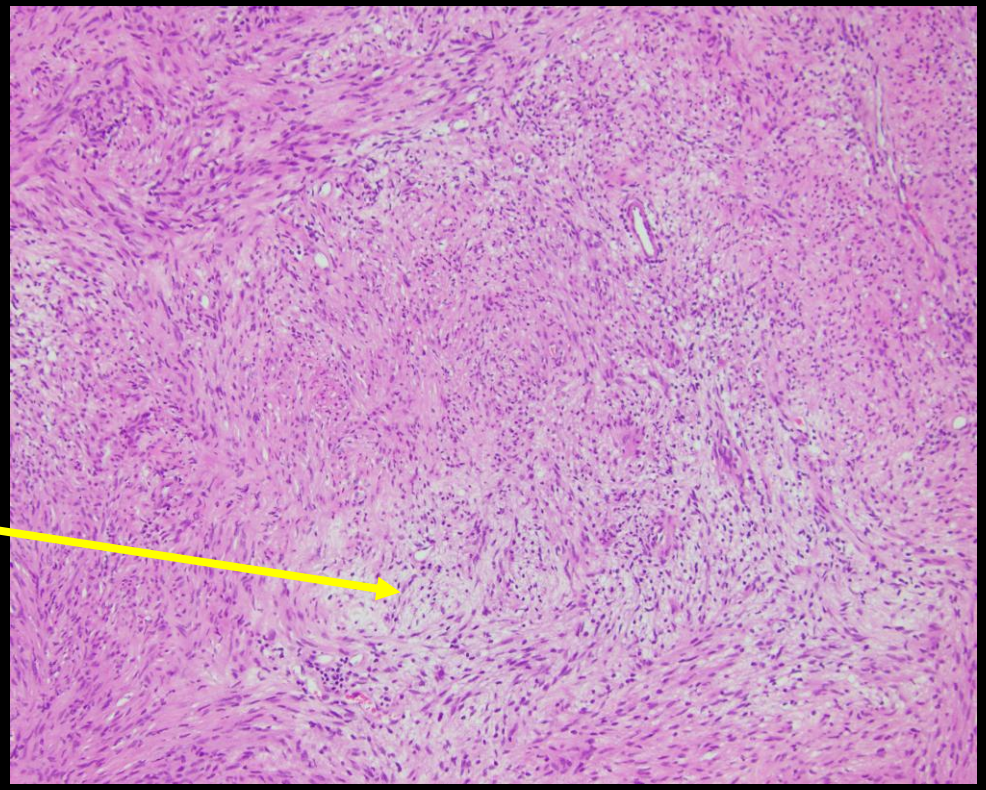
Pathology/Histology



H&E Stain, Low Power

Antoni A

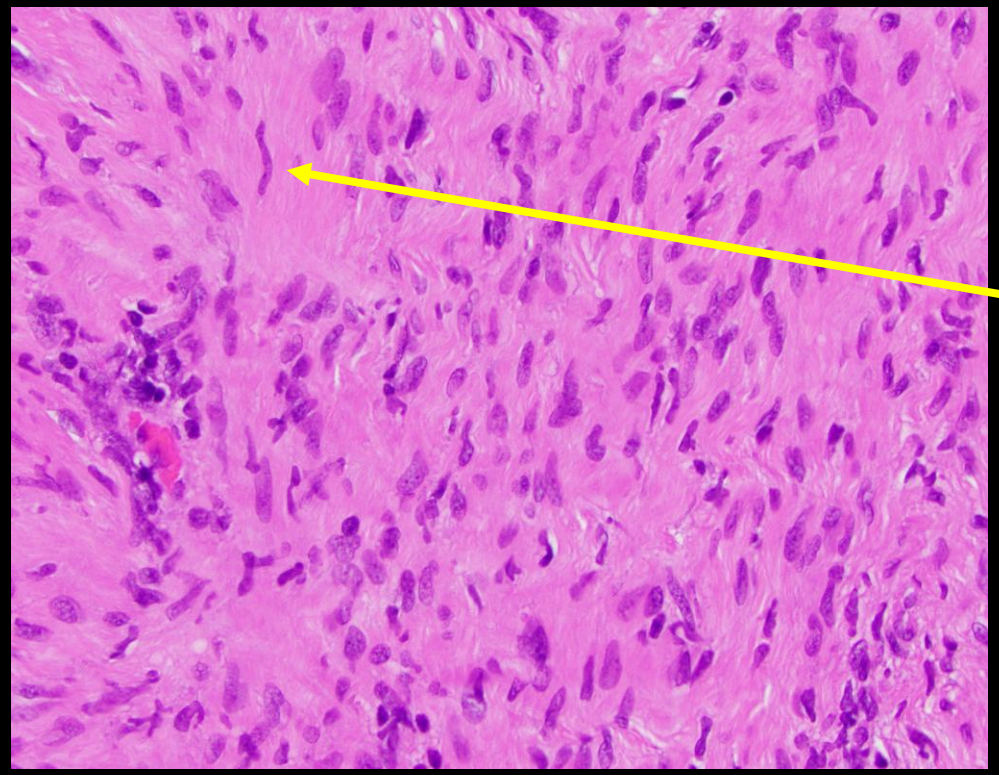
Antoni B



H&E Stain, Low Power

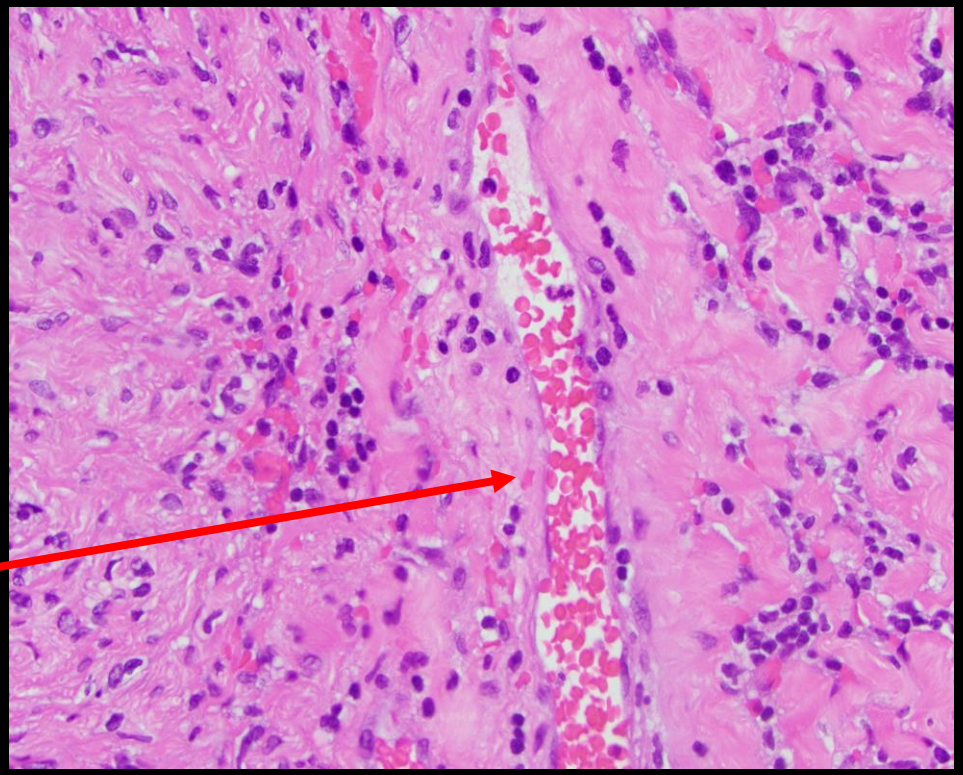
Antoni A areas are hypercellular with nuclear palisading, while Antoni B are loosely organized, hypocellular areas. The presence of these areas is suggestive of schwannoma.

Pathology/Histology



H&E Stain, High Power

The tumor is noted to have wavy, spindle shaped cells (yellow arrow) and hyalinized blood vessels (red arrow).



H&E Stain, High Power

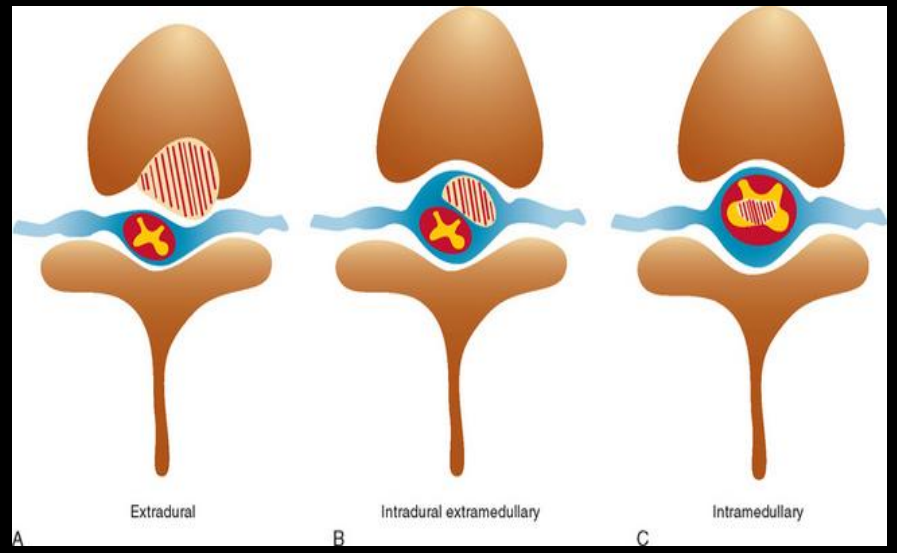
Notably, mitotic figures, nuclear atypia and necrosis are absent.

Final Diagnosis:

Schwannoma

Case Discussion

- Spinal tumors are classified as extradural, intradural extramedullary, or intradural intramedullary based upon their anatomic location.
  - Intramedullary tumors involve the spinal cord, while extramedullary tumors arise outside of the spinal cord.
  - 50-55% of spinal tumors are extradural, while 40-45% are intradural.



- The presenting symptoms are not lesion specific and do not differ between intramedullary and extramedullary tumors.
  - The most common presenting symptoms include back or neck pain, radicular pain, weakness, paresthesia, gait disturbance, and bowel and bladder dysfunction.

Case Discussion

- The mean age of patients with extramedullary, intradural spinal tumors (EISTs) is 46 years and 54-57% of these are males.
- The most common tumors within the EISTs group are meningiomas, nerve sheath tumors, and filum terminale ependymomas, which combine for 85% of this group.
- The primary diagnostic modality for these tumors is MRI with and without contrast enhancement.
- Preferred treatment is microsurgical tumor resection.

Case Discussion

- Intradural Extramedullary Spinal Tumor Differential:
  - Schwannomas (30%)
  - Meningioma (25%)
  - Neurofibroma
  - Paraganglioma
  - Leptomeningeal Metastasis

Case Discussion

- A Schwannoma is a (generally) benign, peripheral nerve sheath tumor composed of Schwann Cells and fibrous tissue.
  - Schwann cells produce the myelin sheath surrounding axons in the PNS.
  - 90% of these tumors are benign.
  - They are the most common tumor of the peripheral nerves and are typically found on the dorsal sensory roots that they encase.
- The most common location is in the cervical and lumbar regions.
- A majority of schwannomas occur sporadically and singly.
  - However, they can be seen as multiple schwannomas as part of NF2.
- On imaging, schwannomas are often indistinguishable from neurofibromas.
  - Schwannomas are more frequently associated with hemorrhage, cyst formation and fatty degeneration.
- If large enough, schwannomas can remodel intravertebral foramen or cause scalloping of the posterior aspect of the vertebral body.
- Surgery is the treatment of choice and is usually curative.
  - Patients with NF2 have a high incidence of new tumor formation.

References

- Fitzsimmons, A.L., & Wen, P.Y. (2015). TUMORS OF THE SPINAL CORD. In *Neurology and Clinical Neuroscience E-Book*. Retrieved September 05, 2018, from https://clinicalgate.com/tumors-of-the-spinal-cord/.
- Joshi, R. (2012). Learning from eponyms: Jose Verocay and Verocay bodies, Antoni A and B areas, Nils Antoni and Schwannomas. *Indian Dermatology Online Journal*, *3*(3), 215–219. http://doi.org/10.4103/2229-5178.101826
- Arnautovic, K., & Arnautovic, A. (2009). EXTRAMEDULLARY INTRADURAL SPINAL TUMORS: A REVIEW OF MODERN DIAGNOSTIC AND TREATMENT OPTIONS AND A REPORT OF A SERIES. *Bosnian Journal of Basic Medical Sciences*, *9*(Suppl 1), S40–S45.
- Wein S, Gaillard F. Intradural spinal tumours and their mimics: a review of radiographic features.*Postgraduate Medical Journal* 2013;89:457-469.
- Zong, S., Zeng, G., Xiong, C., & Wei, B. (2013). Treatment Results in the Differential Surgery of Intradural Extramedullary Schwannoma of 110 Cases. *PLoS ONE*, *8*(5), e63867. http://doi.org/10.1371/journal.pone.0063867