

# NR workshop

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@グランドプリンスホテル京都

近畿大学

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# Case

19-year-old male

- C.C. ; Numbness of bilateral upper limb
- P.I. ; A previously healthy 19-year-old man complained of sudden onset numbness of bilateral upper limb.
- P.E. ; Mild sensory loss of bilateral upper limb  
Barre sign (+), Babinski sign (+)
- Labo data; CRP 0.01 mg/dl, PT-INR 0.99, APTT 23.7 sec  
CSF analysis; Cell count 4 / $\mu$ l, Glucose 72 mg/dl,  
Protein 35 mg/dl

T1WI



T2WI



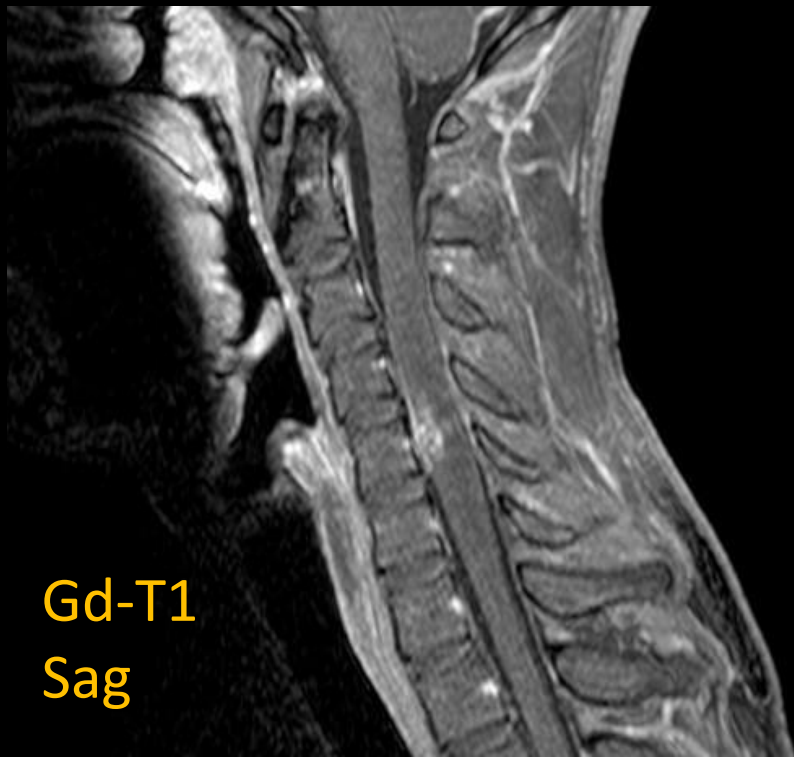
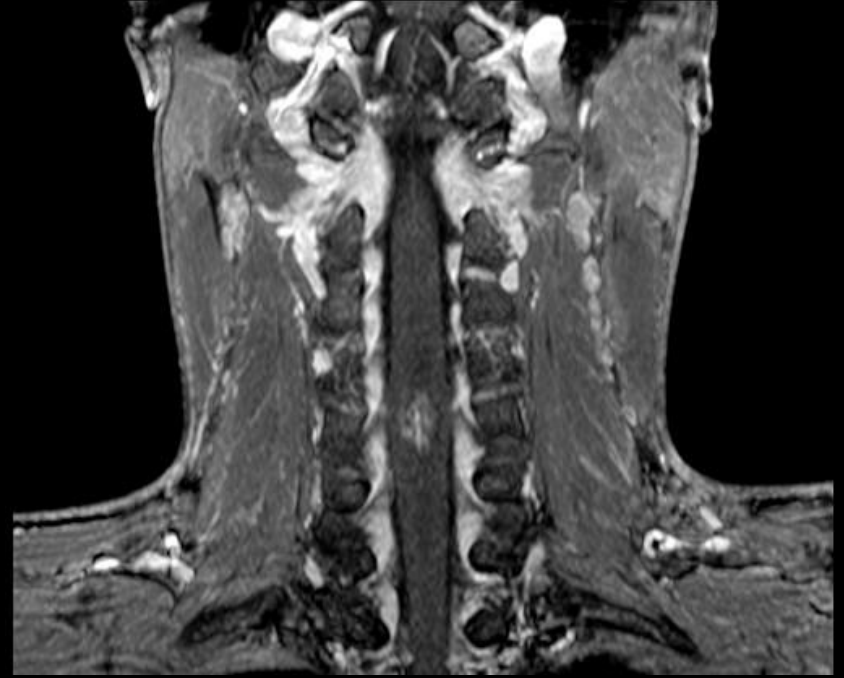
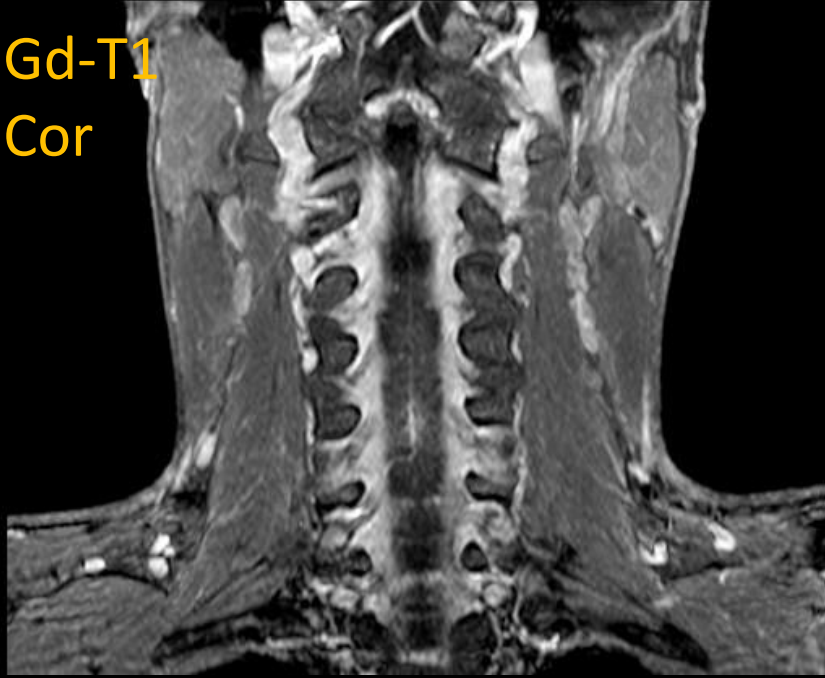
T2\*WI



T2WI



Gd-T1  
Cor



Gd-T1  
Sag



Blank

T1WI



T2WI



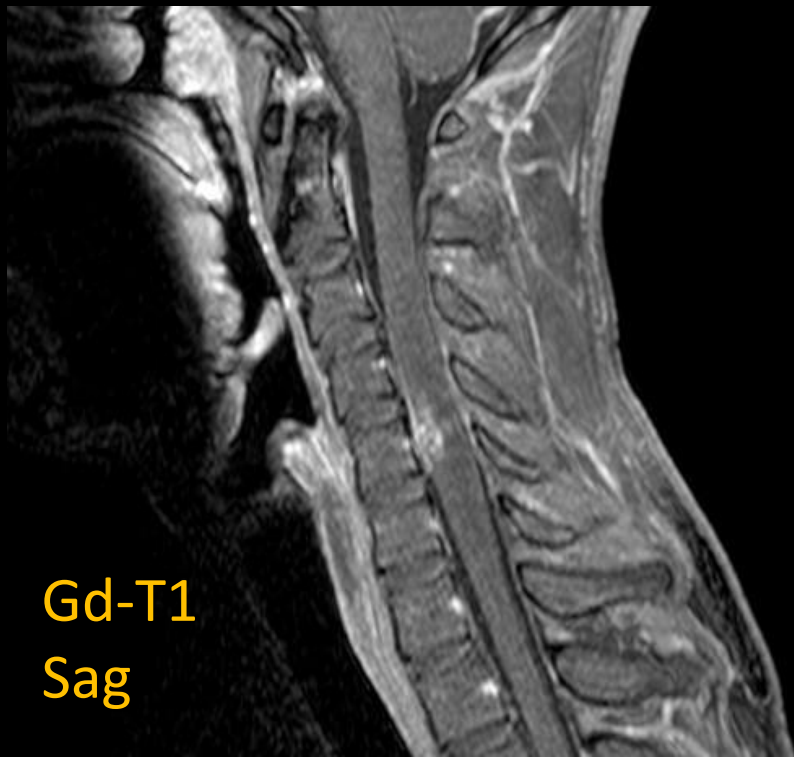
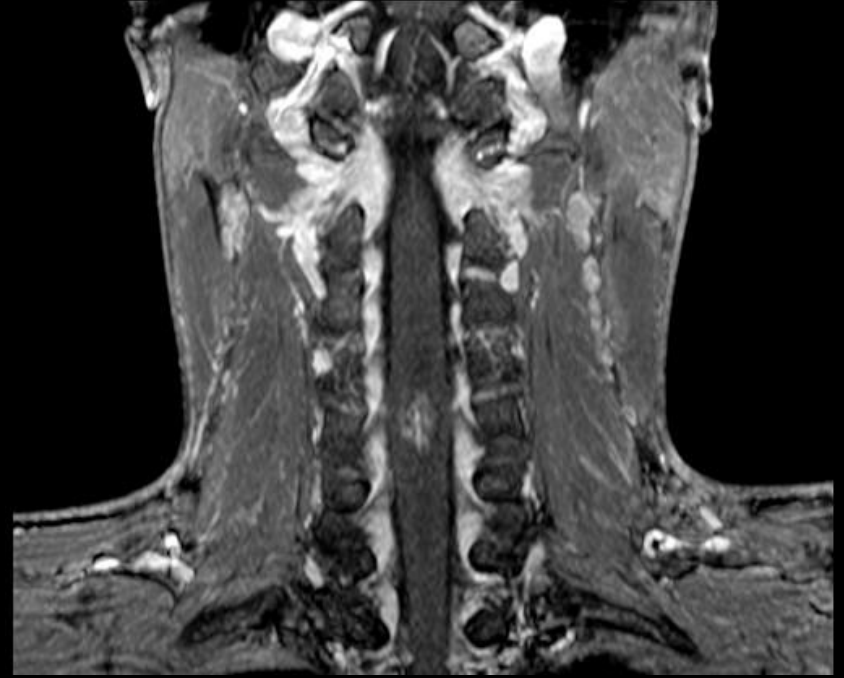
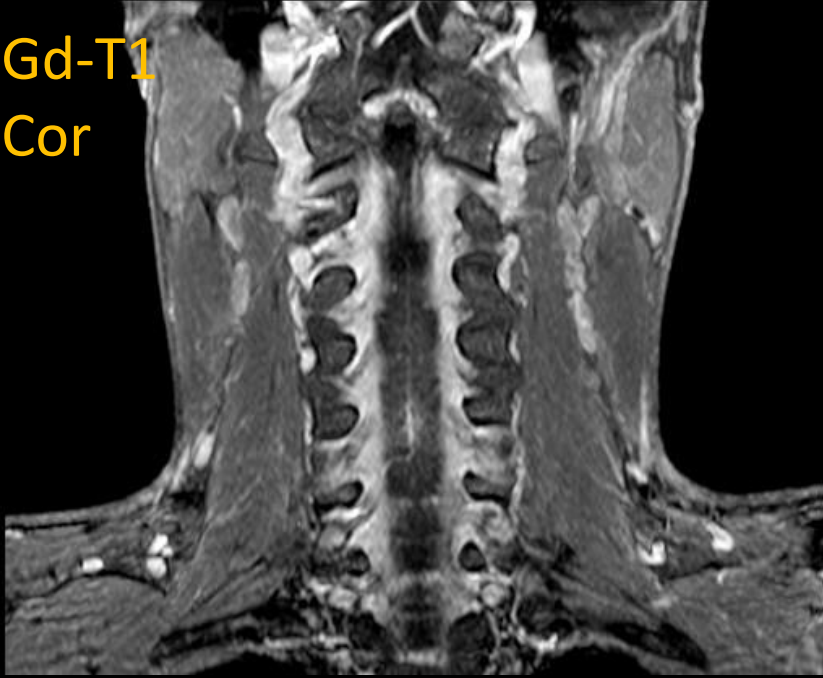
T2\*WI



T2WI



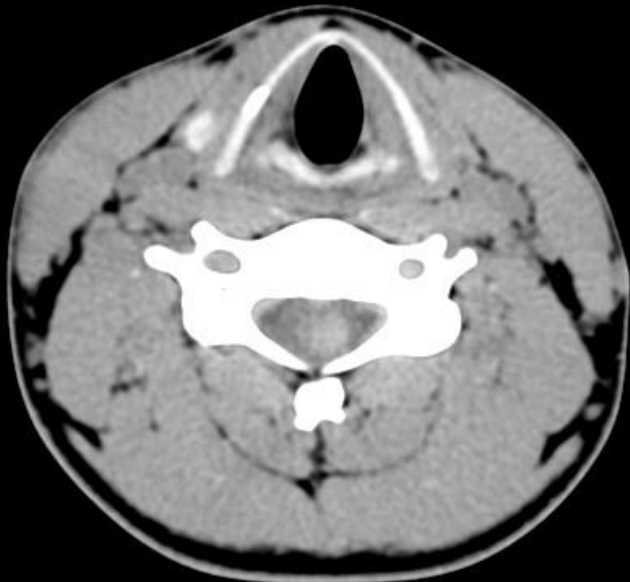
Gd-T1  
Cor



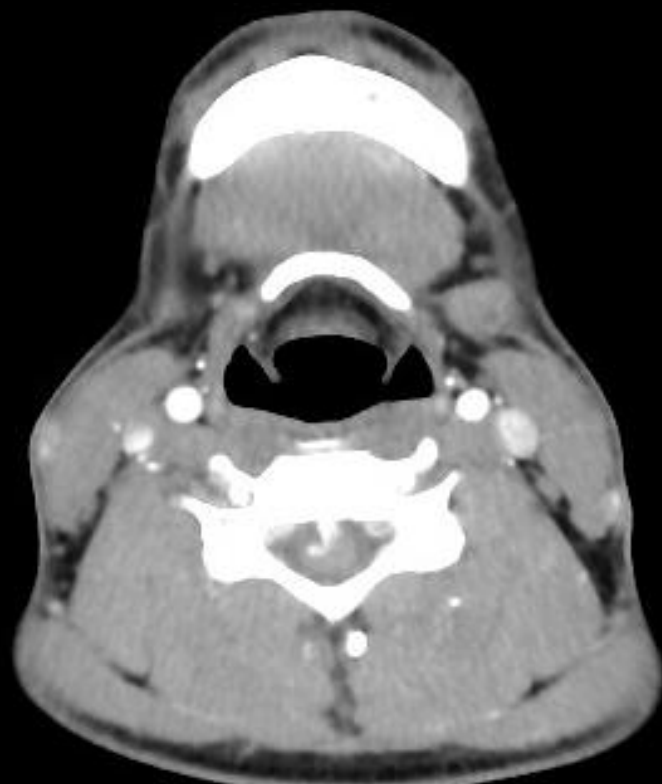
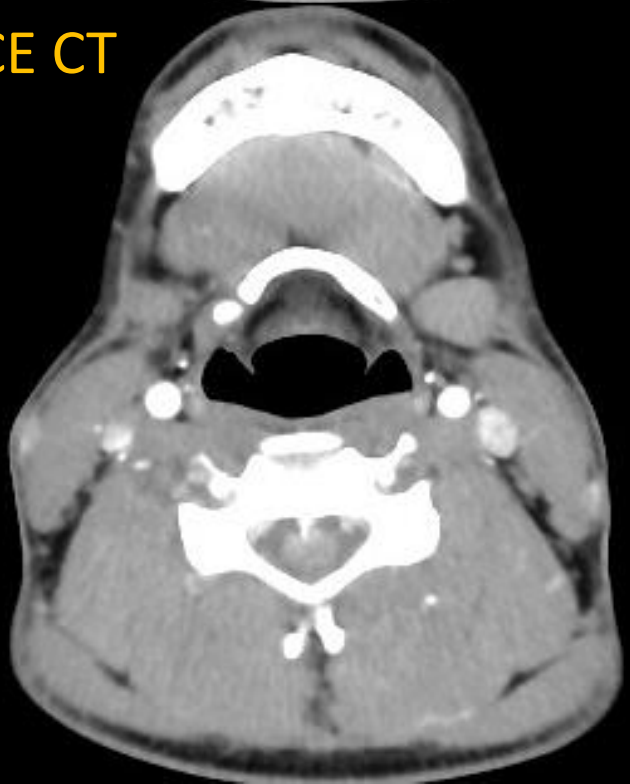
Gd-T1  
Sag



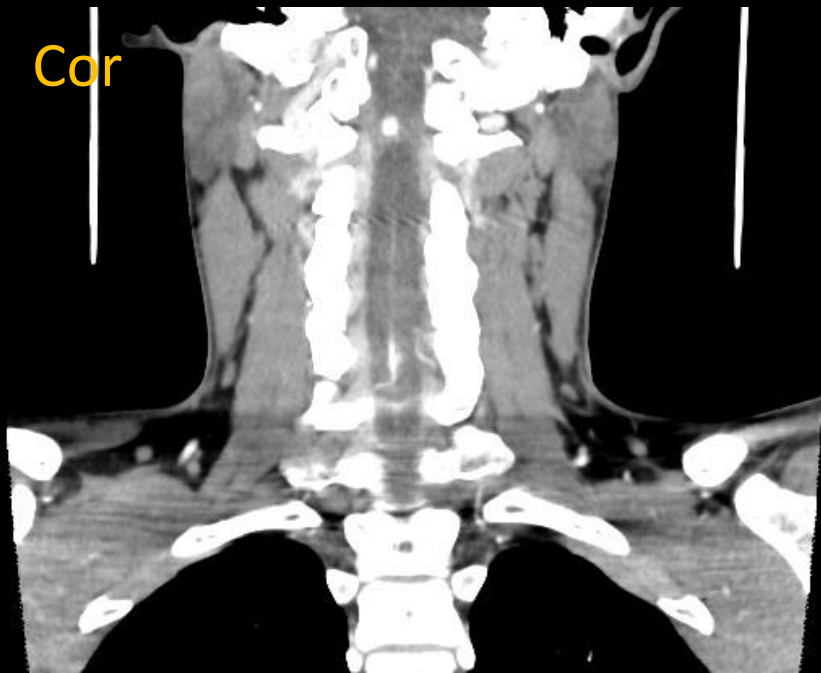
Unenhanced CT



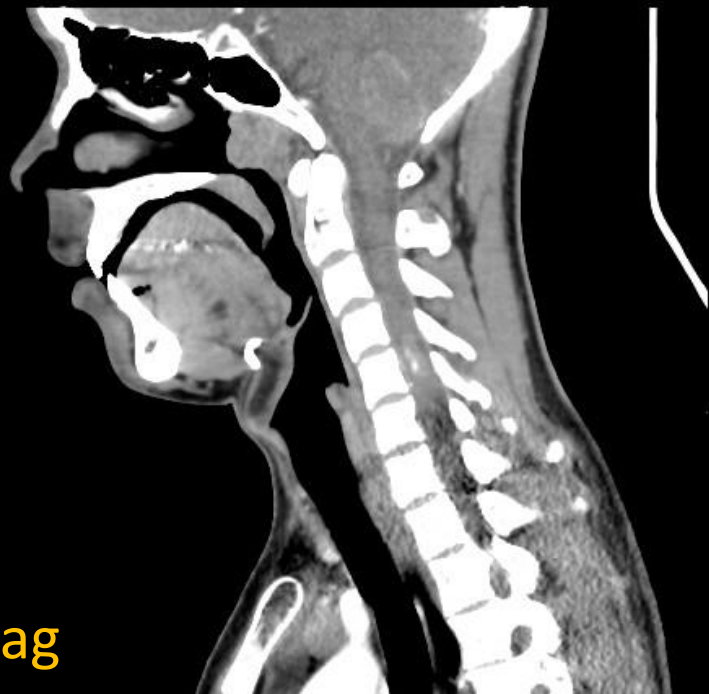
CE CT



Cor



Sag



# Finding

- Intramedullary hyperdense lesion in unenhanced CT
- Low intensity lesion in T1WI, T2WI and T2\*WI, and heterogenous high intensity around it in T2WI.
  - Indicate intramedullary hemorrhage with edematous change.
- Feeding artery is evident in subarachnoid space on MRI and contrast-enhanced CT.
- No apparent dilated vessel in perimedullary or subdural space.

# Right VA angiogram: AP view

FOV: 30x30 cm  
LAD: 0.0 deg  
CRA: 0.2 deg  
L: 0.0 deg  
Tilt: 0 deg  
Mag = 1.00  
FL: ROT:

XA 750x750

(Flt 3)

FRNT  
Seq: 4  
FRAME = 38 / 38  
MASK = 1

# Right VA angiogram: lateral view

FOV: 30x30 cm  
LAO: 90.0 deg  
CRA: 0.5 deg  
L: 0.0 deg  
Tilt: 0 deg  
Mag = 1.00  
FL: ROT:

XA 750x750

(Flt 3)

LAT  
Seq: 4  
FRAME = 35 / 36  
MASK = 1

# Left VA angiogram: oblique view

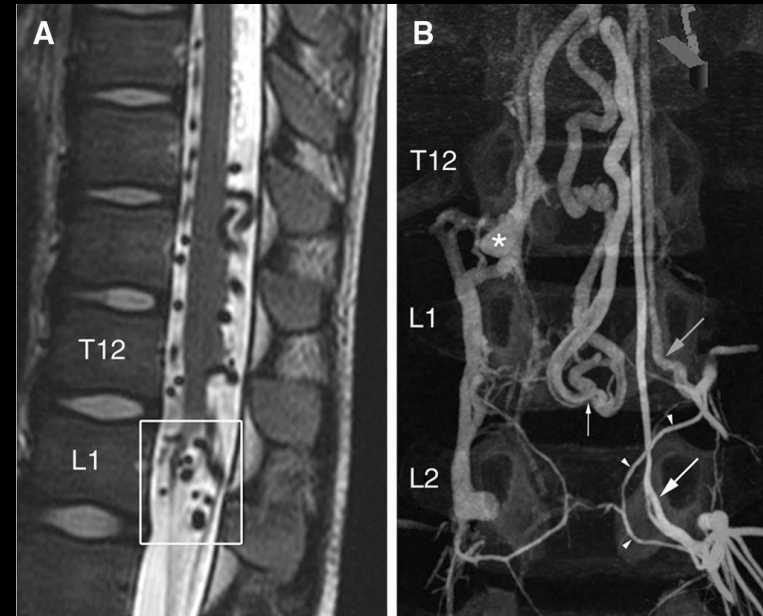


# Diagnosis

***Intramedullary spinal  
arteriovenous malformation  
(intramedullary AVM)***

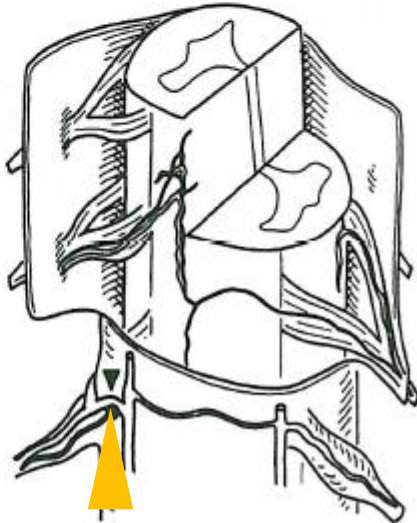
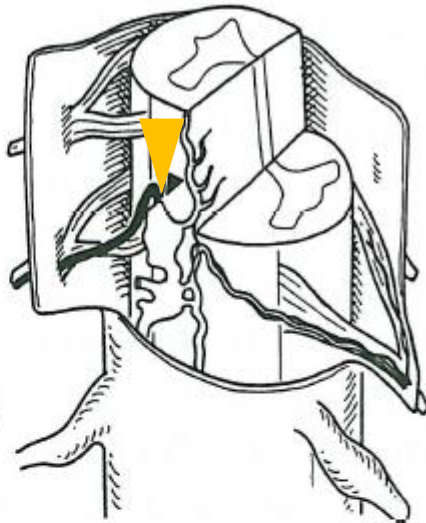
# AVM<sub>-1.2.3</sub>

- Main AVM (2-4% for all spinal disease) classification from shunt point
  - I dural AVF (>80%, treated safely with IVR)
  - II intramedullary AVM (glomus type)
  - III juvenile or combined type AVM (rare)
  - IV perimedullary type



Intramedullary AVM

Perimedullary AVM



▼ : shunt point

intradural AVF

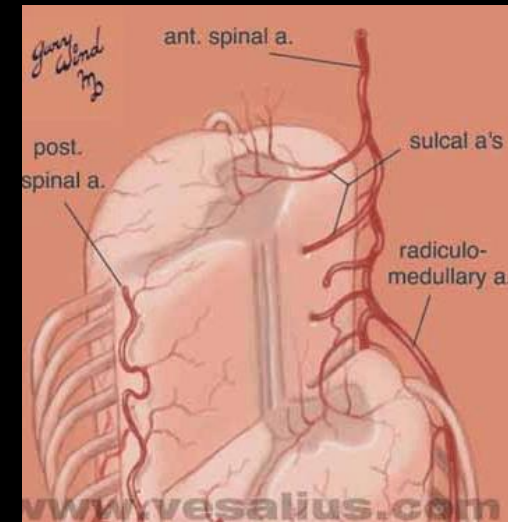
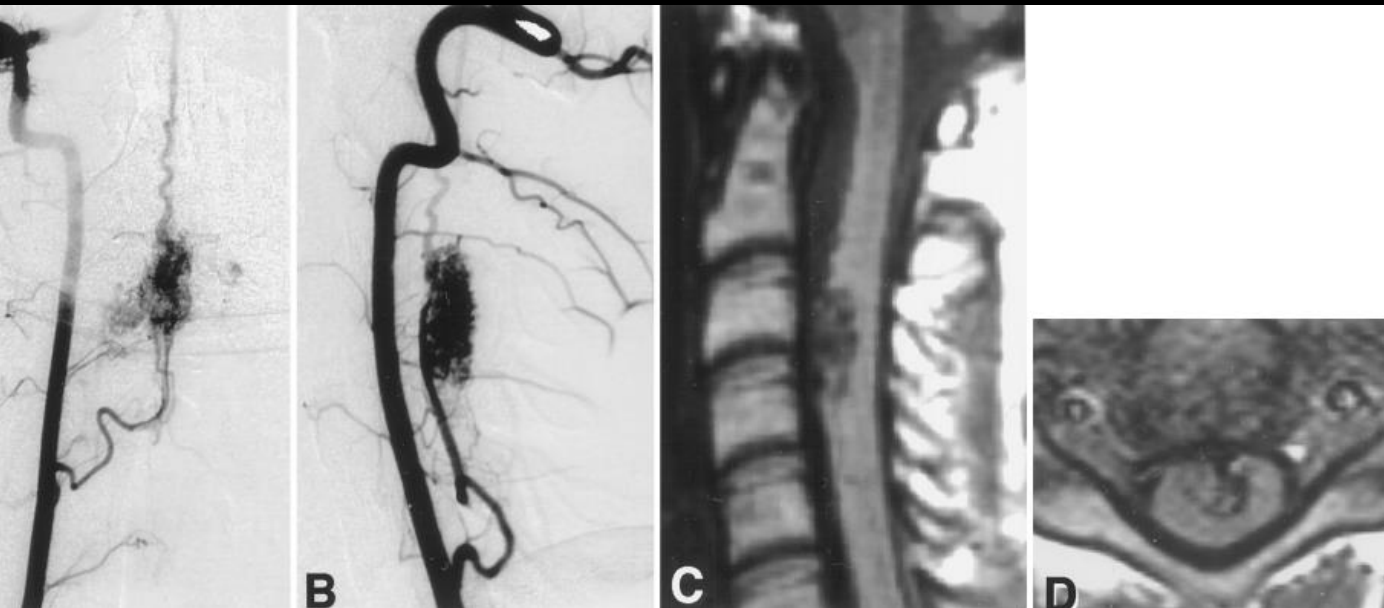
Extradural AVF

# Intramedullary AVM<sub>-4,5,9</sub>

- Over view: occur at younger age in male, predominantly more hemorrhagic.
- Location: thoracic level dominant (67%), but hemorrhagic event occur cervical region
- Presentation: sudden/acute onset pain or paralysis
- Treatment : Mixed with endovascular and surgical technique
- Postoperative neurological improvement: 21.7%  
(34.9% for perimedullary, 50% for dural )

# Image finding<sub>-9,10</sub>

1. Signal / flow void: mainly located in spinal cord
2. Feeding artery: ASA, PSA ,its perforator  
from RMAs, VA, AsCA, thyrocervical artery etc.
3. Pseudoaneurysm: related to hemorrhagic portion.



anterior spinal artery : ASA, posterior spinal artery: PSA, radiculomedullary artery: (RMA)  
Vertebral artery: VA, ascending cervical artery: AsCA

# Other cause of intramedullary hemorrhage

- Cavernous hemangioma<sub>6</sub> (left)
- AVM associated Congenital disease  
Klippel Trenaunay Weber syndrome  
Osler-Weber-Rendu syndrome, etc
- Primary tumor (ependymoma<sub>7</sub>(middle), hemangioblastoma , melanoma)
- Metastatic tumor (rare: lung<sub>8</sub>(right), melanoma)
- Anti-coagulation, bleeding disorder
- Idiopathic



# Take home message

- Intramedullary AVM is important disease for presenting paralysis as hemorrhagic event in young patient.
- There are several other diseases that cause intramedullary hemorrhage.

# Reference

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