An Interesting Case

Case presentation

- Healthy 30 M presenting to ER with one week hx of feeling unwell:
  - vomiting, dizzy, sore throat and then cough
- CXR - LLL PNA
- Decreased O2 sats req. 5L -> admitted
- WBC 19.7
- Rapid Covid/RSV negative
- Rapid strep negative
- Viral panel and BC pending
- Ceftriaxone and flagyl

Case presentation

- Decreased PO intake due to sore throat
- IV fluids
- SLP assessment; unclear if aspirating, decreased pharyngeal clearance. Level 4 pureed. ? throat infection vs irritation from prolonged vomiting
- CT neck - mild edema of aryepiglottic folds and vocal cords ? Acute laryngitis. No epiglottitis.
- Internal consult

Case presentation

- CT chest - Tree-in-bud opacities lower lobe with patchy sub segmental consolidation in RLL and to lesser extent LLL/lingula ? Multifocal PNA, TB, non-TB, infectious bronchiolitis
- Switched to pip-taz + azithromycin
- AFB pending
- Consider bronchoscopy if no improvement

Case presentation

- Started to improve by day four
- Weaned O2
- Viral panel:
  Human Metapneumovirus
- AFB negative
- Sputum cultures negative

Case presentation

- Discharged home 1 week later
- Hb 102 from 140 in 2020. Full w/o normal. ? second to inflammation. Improved as outpatient up to 124
- Overall improved, d/c with supportive care

Case presentation

- F/U office 2 wks later
- cough improving, clear sputum, no SOB
- But then….

"Doc, I can't feel temperature on the right side of my body"

- Hmm…?

Case presentation

- Decreased temp + sharp/dull sensation on R. body and face
- Strength, coordination, reflexes, balance all normal
- EOM, PERL, no tongue deviation
- CT head
- Refer to Foell

Case presentation

- CT head - nil acute
- MRI - chronic lacunar infarcts in L. cerebellar hemisphere and L. posterior-lateral medulla
- Prominent appearance of L. vertebral artery flow void

Case presentation

- CTA ordered
- Spoke with Foell start ASA 81 mg
- Phone call, patient now reporting some L. sided facial tingling

Case presentation

- CTA - suspicious for L. vertebral artery dissection from V2-V4 segments
- Foell - Recommended switching to Eliquis for 3-6 months, f/u with himself next week in office
- Discussed hemorrhagic transformation with patient and advised to go to ER if this occurs

Case presentation

- F/u Foell - slight L. ptosis (very subtle), no facial anhydrosis, pinprick decreased on L. face and R. hand/foot. Temp decreased in R. hand/foot and to lesser extent on R. face. Normal EOM, no nystagmus, no dysarthria or facial weakness, normal strength, reflexes, Rhomberg negative, tandem stance negative

Case presentation

- Dx - L. lateral medullary and small L. cerebellar infarct secondary to L. vertebral artery dissection likely secondary to violent/ intractable vomiting
- Cont Eliquis next few months
- Repeat CTA

Case presentation

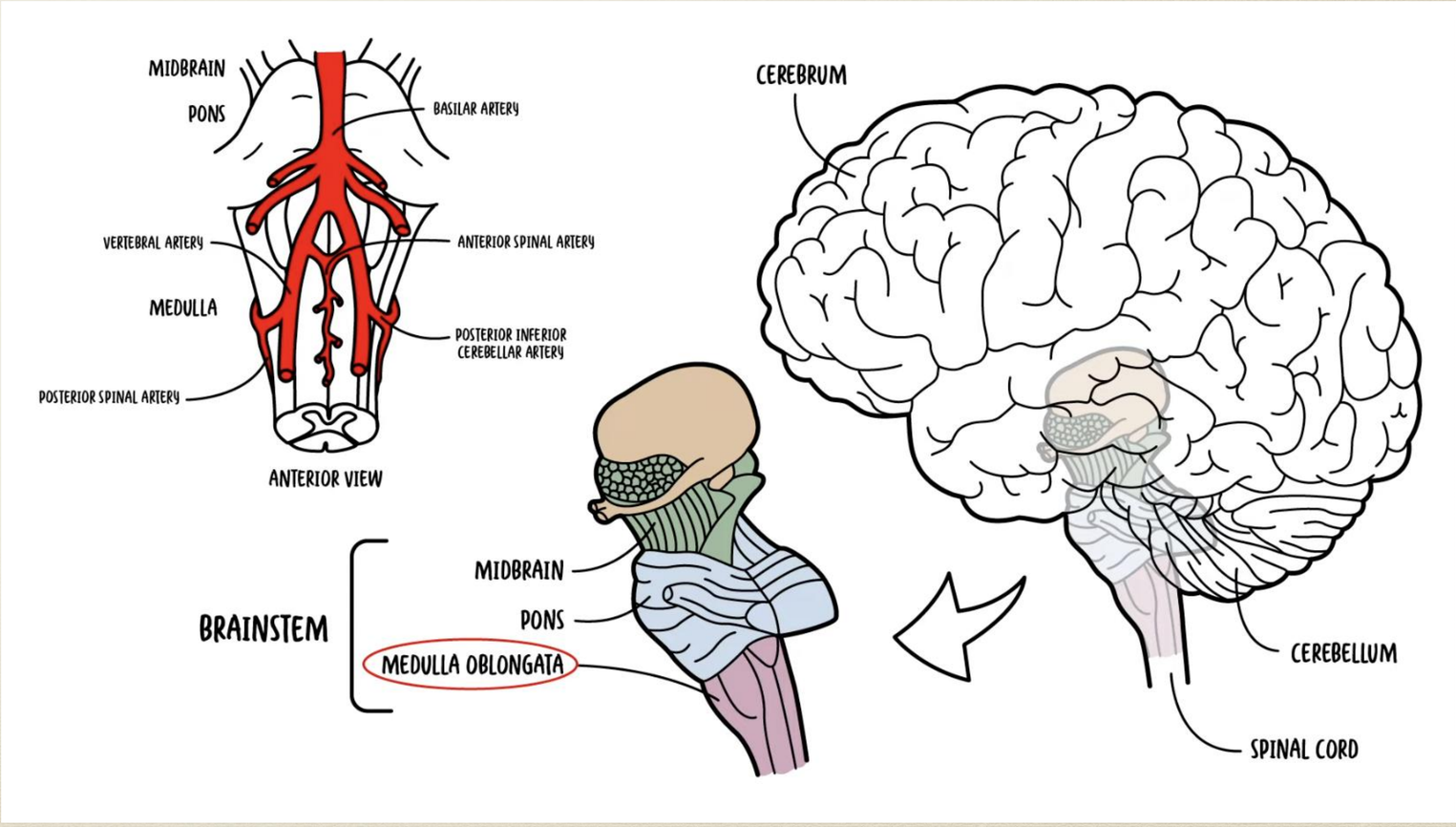
- CTA - no change, most of L. vertebral artery is occluded
- F/U Foell - unlikely to re-canalize, switched back to ASA 81 mg indefinite
- Avoid chiropractic manipulation/ heavy lifting
- Office f/u - patient reporting worsening L. facial tingling
- Repeat MRI, no change from previous. Trial of lyrica - w/ no significant improvement in symptoms

Outline/Learning Objectives

- Case discussion
- Neuroanatomy review/clinical localization of some brainstem stroke syndromes
- Management/review of vertebral artery dissection

Brainstem stroke syndromes

- Posterior circulation
- Focus on lateral medullary syndrome and medial medullary syndrome



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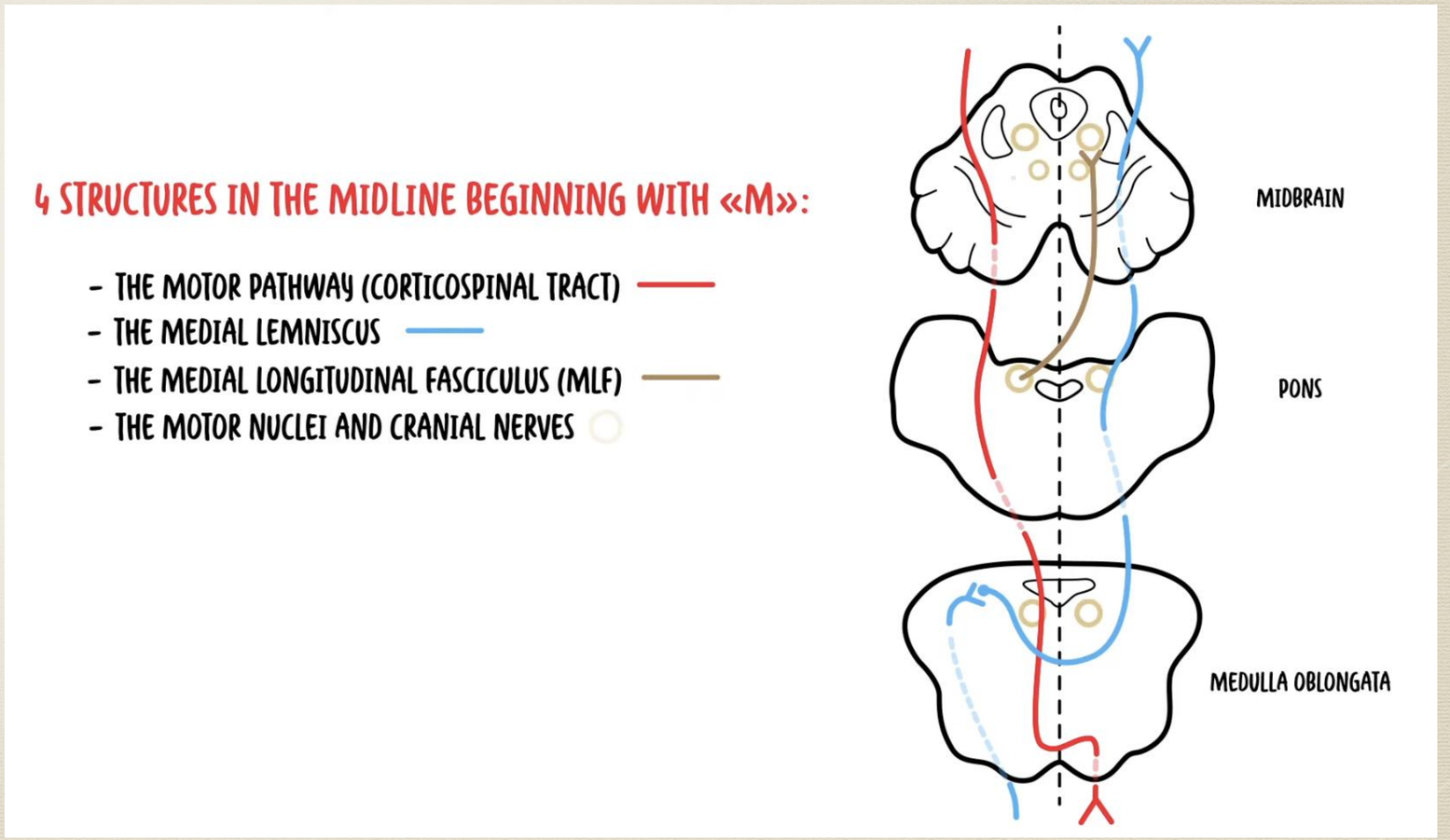
https://www.youtube.com/watch?v=cVQ1My1jHf8

Brainstem stroke syndromes

Some general rules:

- Rule of 4
  - 4 midline structures beginning with **M**
  - 4 lateral/side structures beginning with **S**



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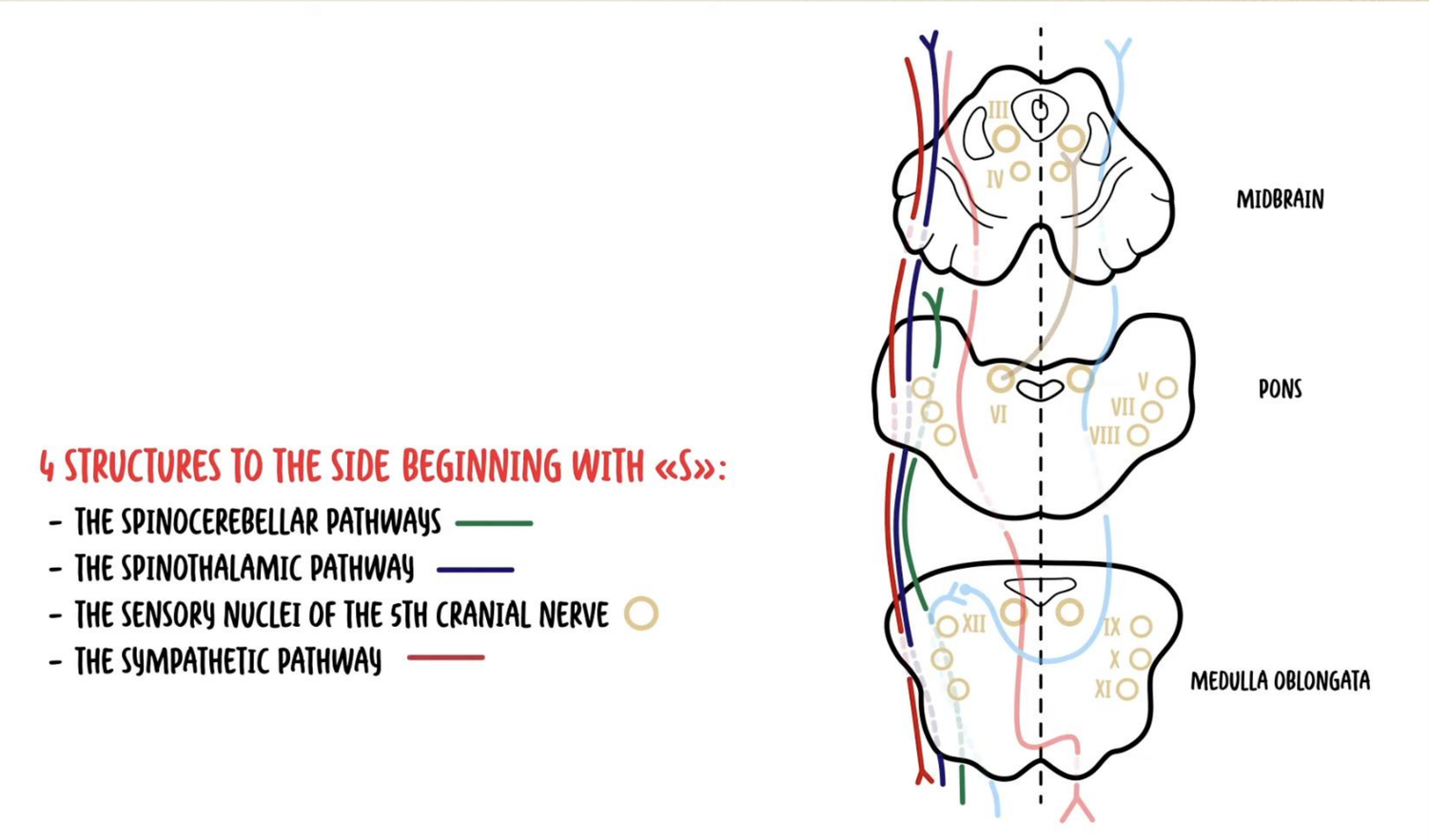

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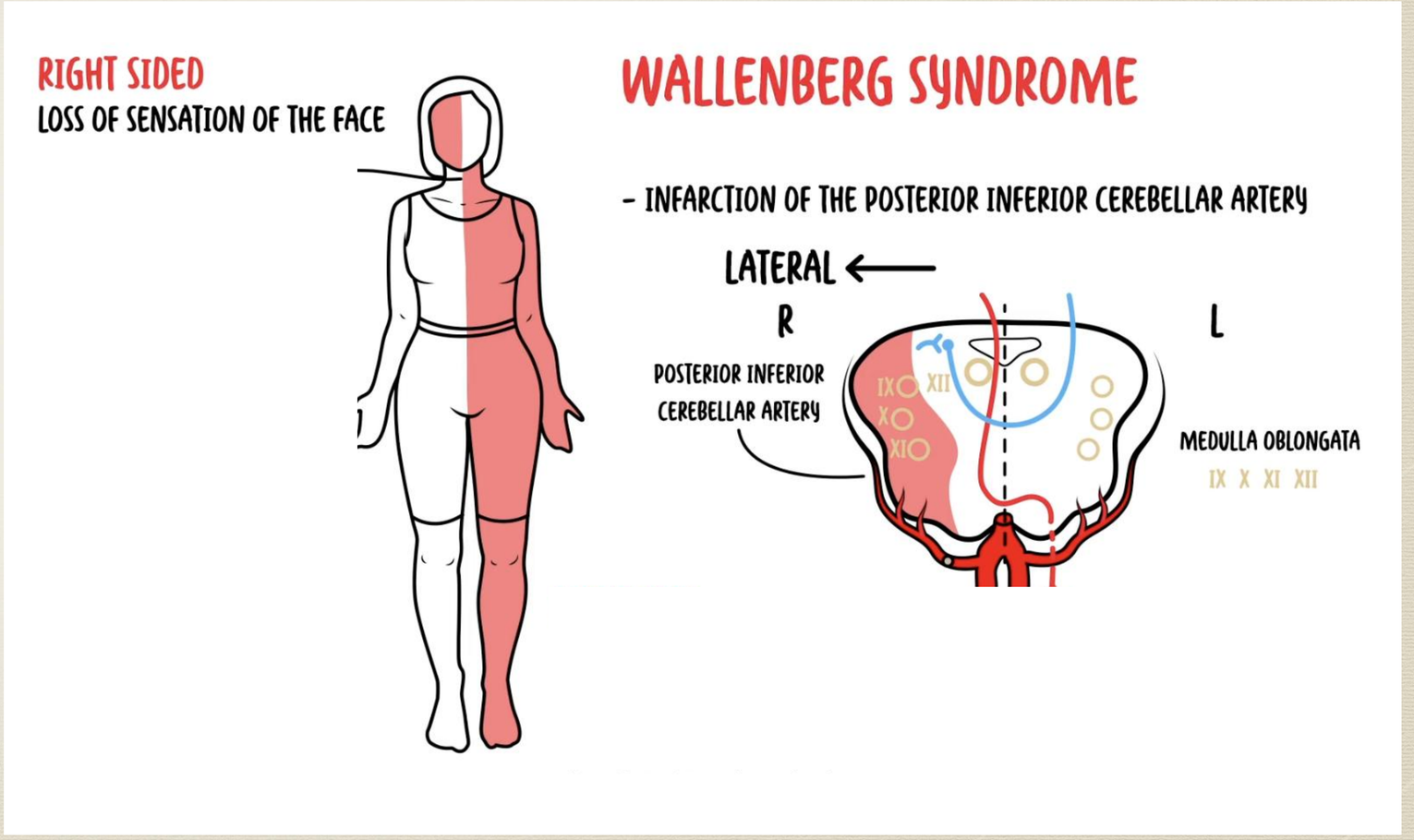
Lateral Medullary Syndrome (Wallenberg Syndrome)

- Most common brainstem stroke
- Brainstem ~ 10-15 % of all ischemic strokes
- Generally crossed symptoms due to decussation of long tracts in brainstem/spinal cord
  - Face ipsilateral - CN's do not decussate except trochlear N.
  - Body contralateral
- Usually occlusion of vertebral artery (70-90%) or PICA



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WALLENBERG SYNDROME

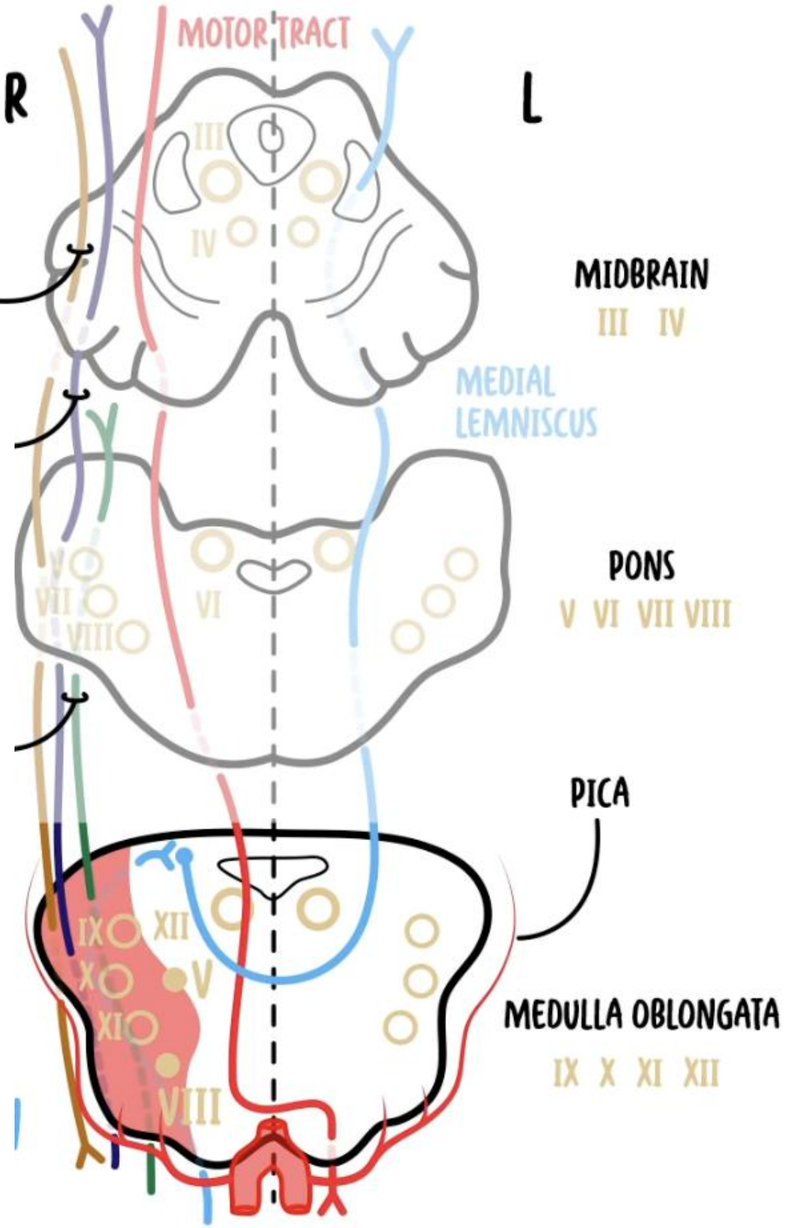
OR LATERAL MEDULLARY SYNDROME

SYMPATHETIC TRACT

-> IPSILATERAL HORNER'S SYNDROME

RIGHT SIDED
HORNER'S SYNDROME

PTOSIS
MIOSIS
ANHIDROSIS



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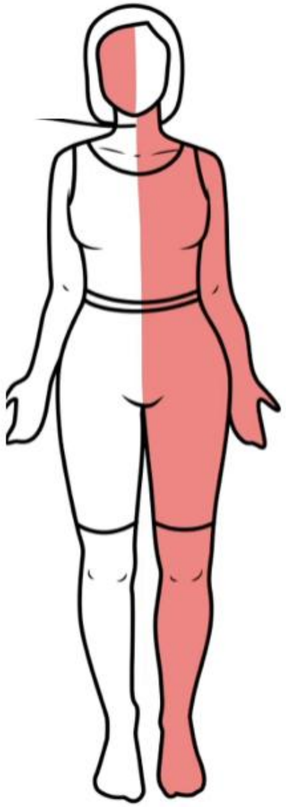
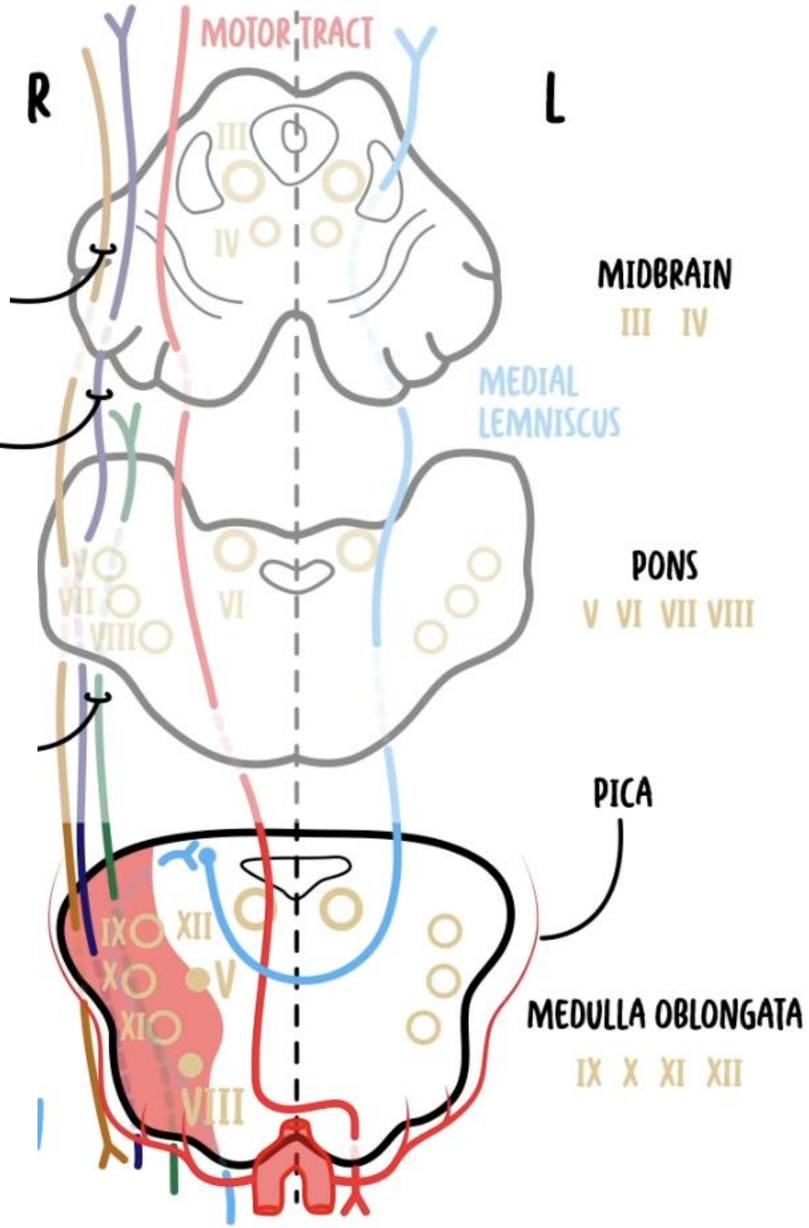


LATERAL SPINOTHALAMIC TRACT

-> CONTRALATERAL LOSS OF PAIN AND TEMPERATURE SENSATION



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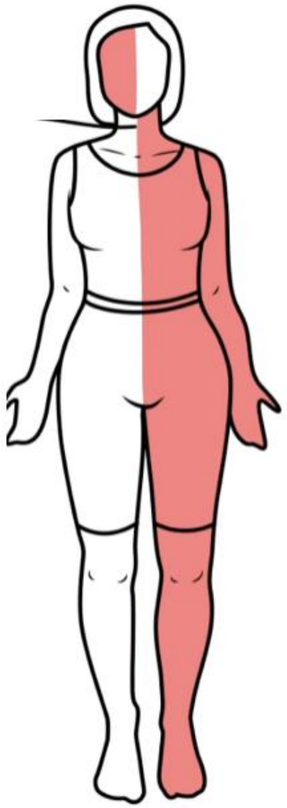
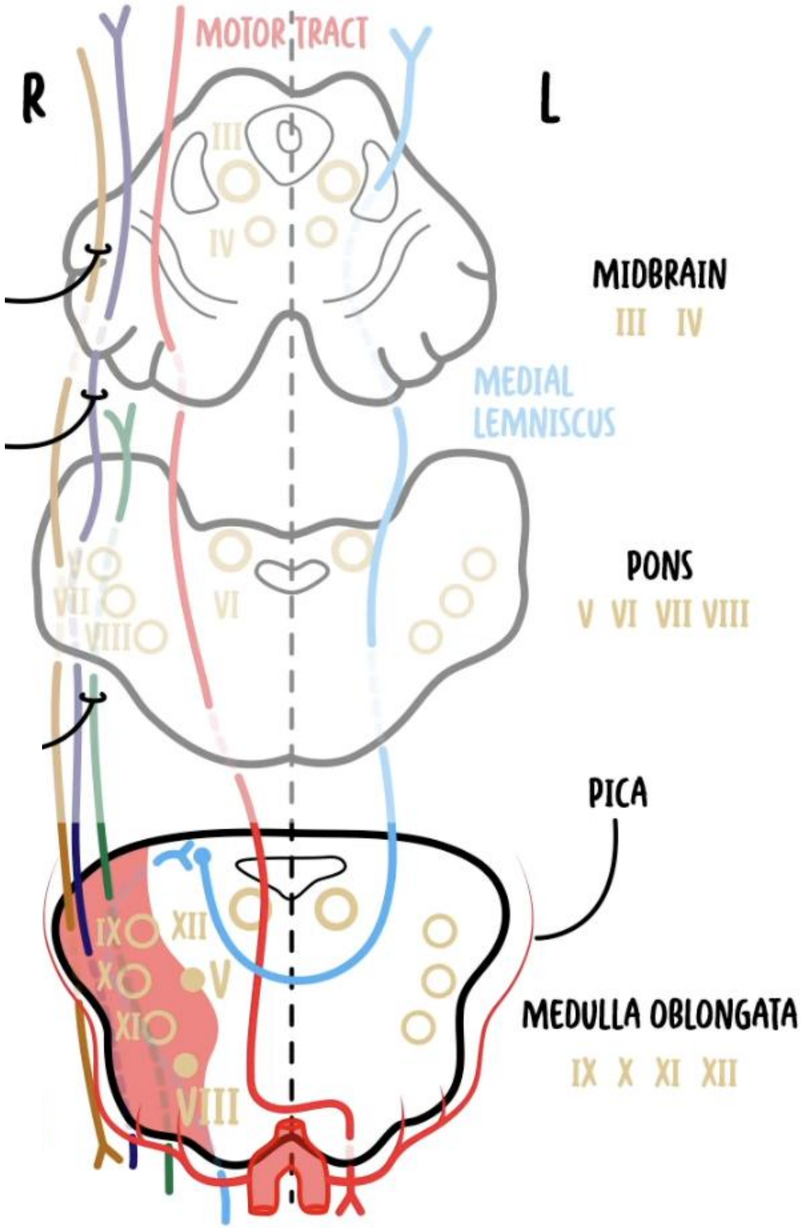


TRIGEMINAL NERVE (SPINAL) ●V

-> IPSILATERAL LOSS OF SENSATION TO FACE



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WALLENBERG SYNDROME

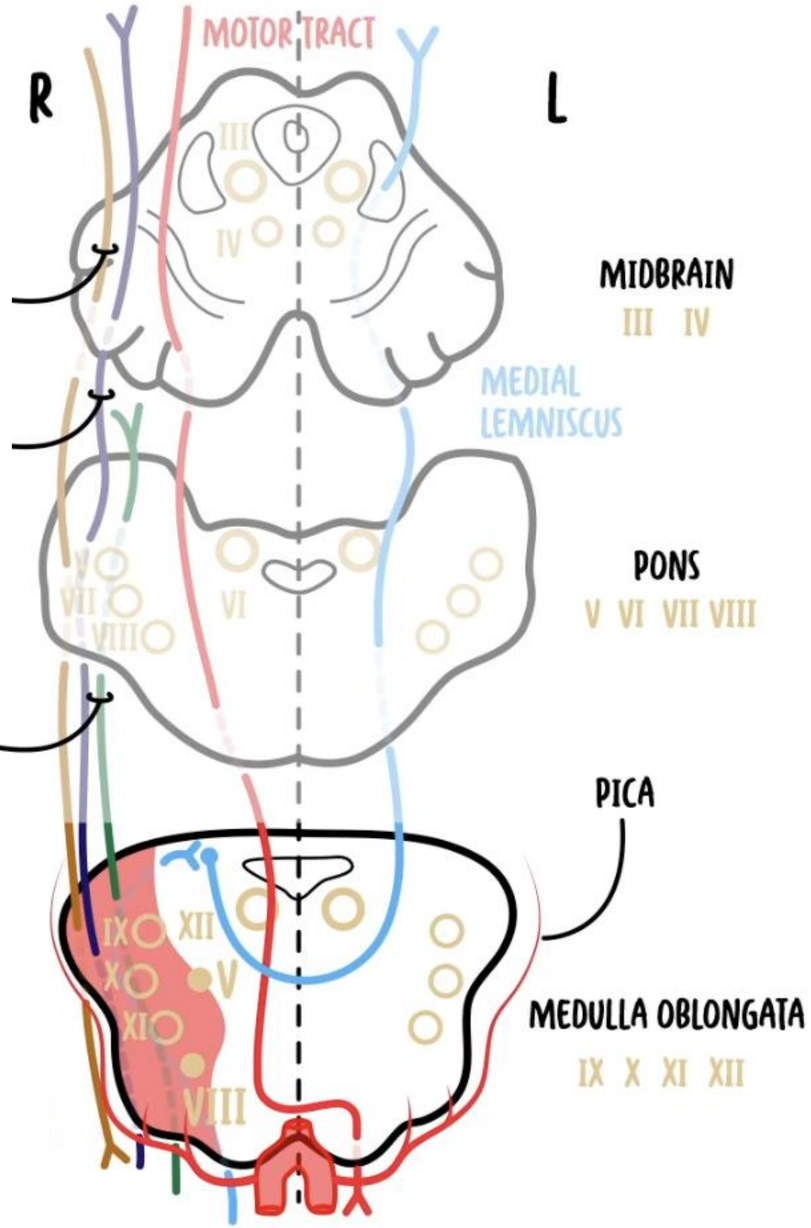
OR LATERAL MEDULLARY SYNDROME

INFERIOR VESTIBULAR NUCLEUS ● VIII

-> VERTIGO, NAUSEA AND VOMITING

SPINOCEREBELLAR TRACT

-> ATAXIA



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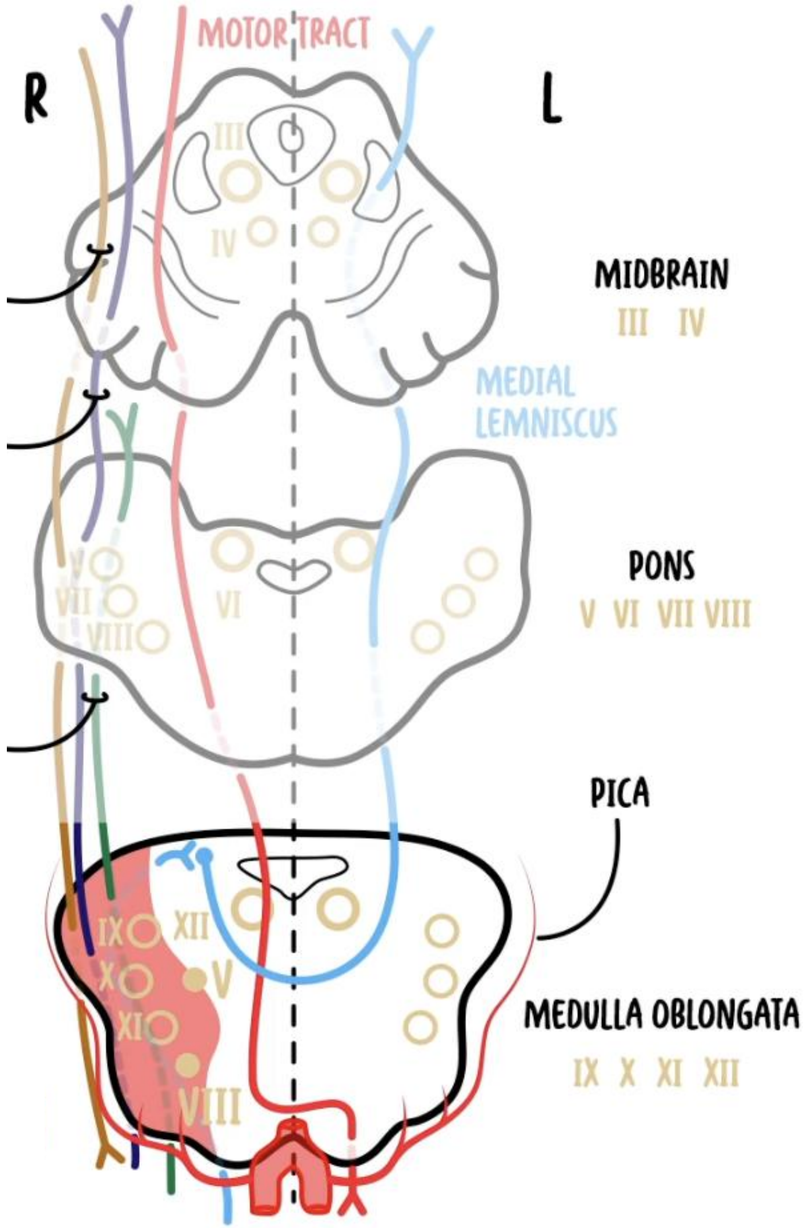
WALLENBERG SYNDROME

OR LATERAL MEDULLARY SYNDROME

VAGUS (X) AND GLOSSOPHARYNGEAL (IX) NUCLEUS/NERVES

-> DIFFICULTY SWALLOWING



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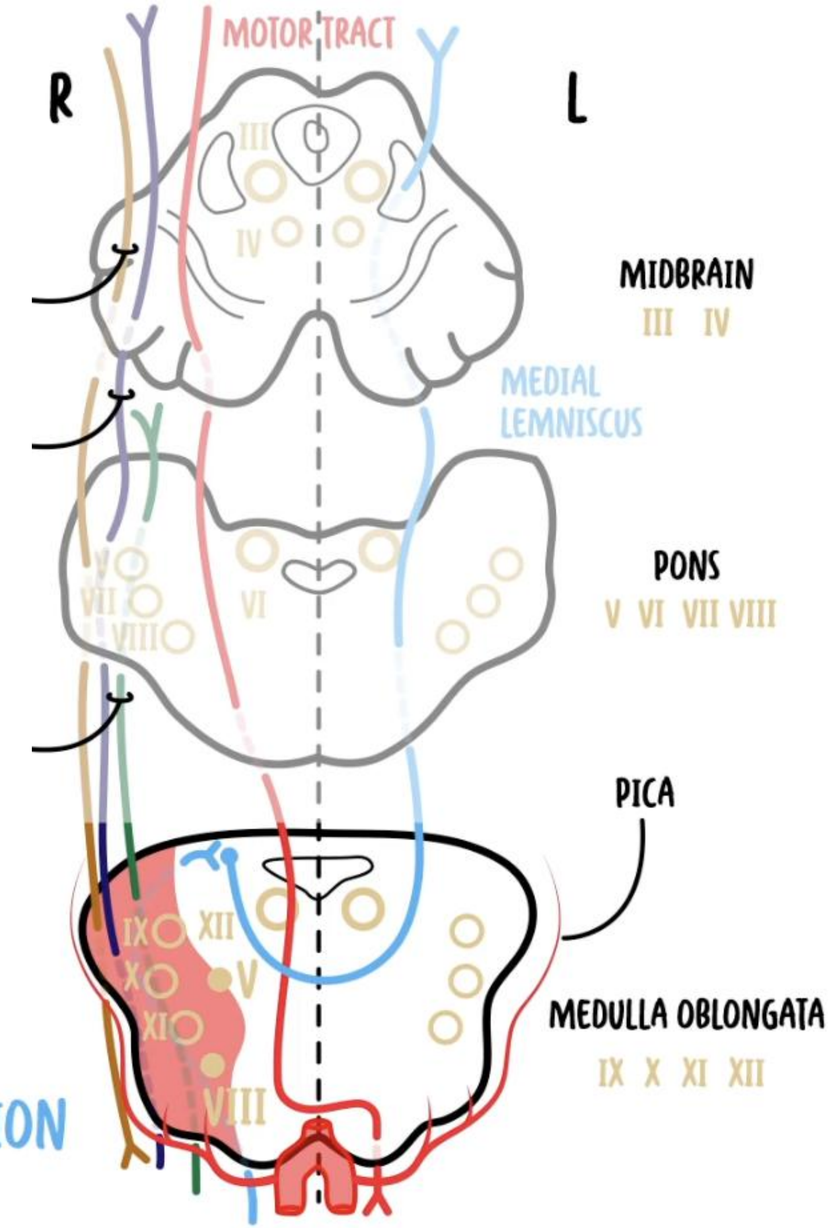

NO LIMB WEAKNESS

NO LOSS OF TOUCH/VIBRATION

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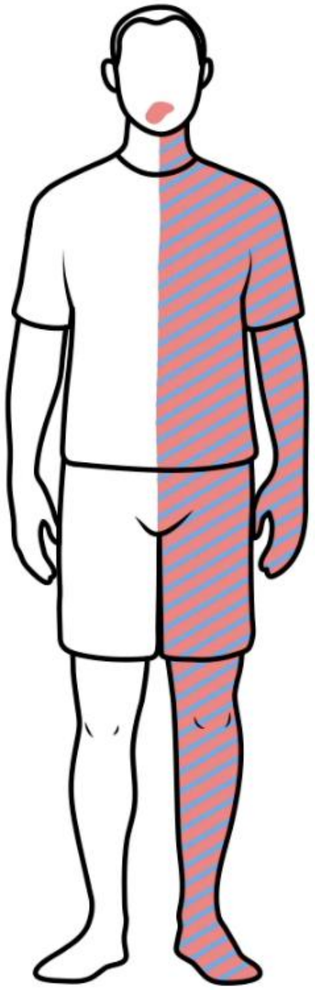
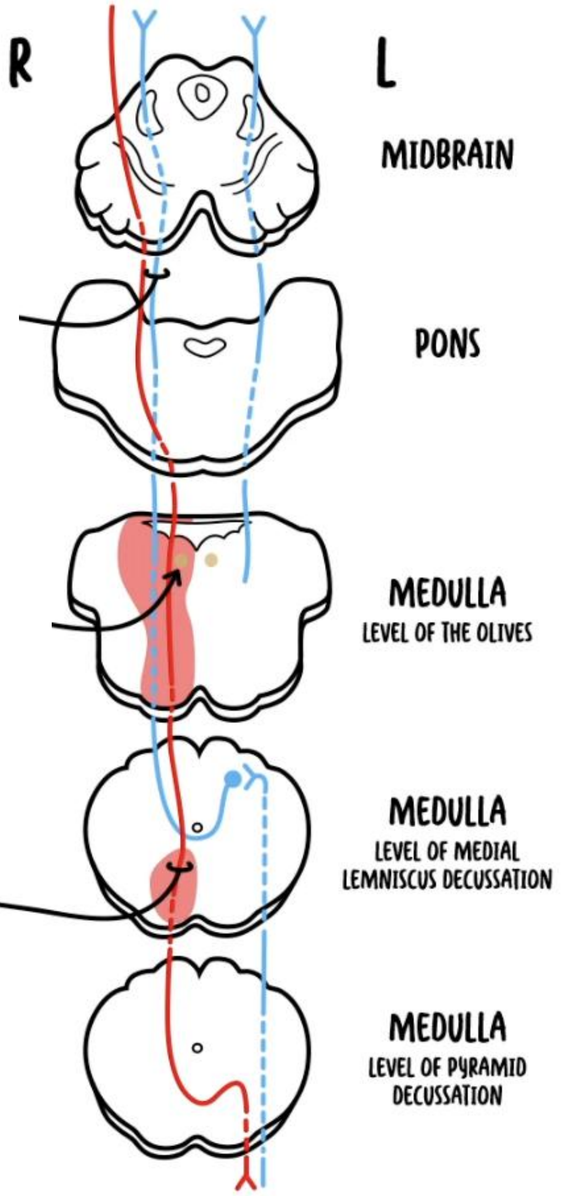
DEJERINE SYNDROME

OR MEDIAL MEDULLARY SYNDROME





MOTOR TRACT (PYRAMIDAL TRACT)

-> CONTRALATERAL PARALYSIS/WEAKNESS OF THE UPPER AND LOWER LIMB OF THE BODY

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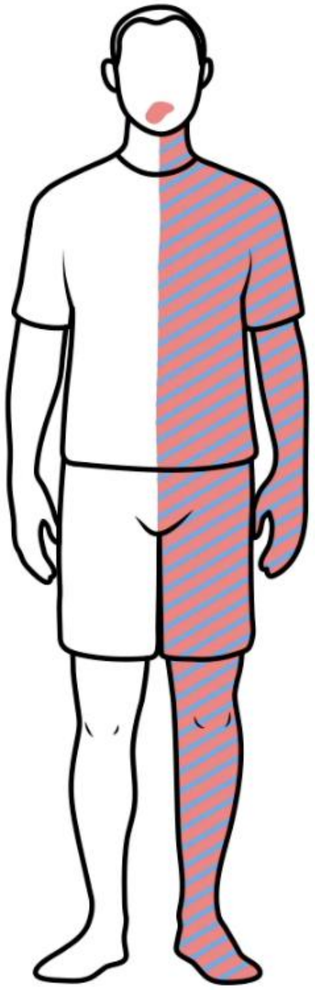
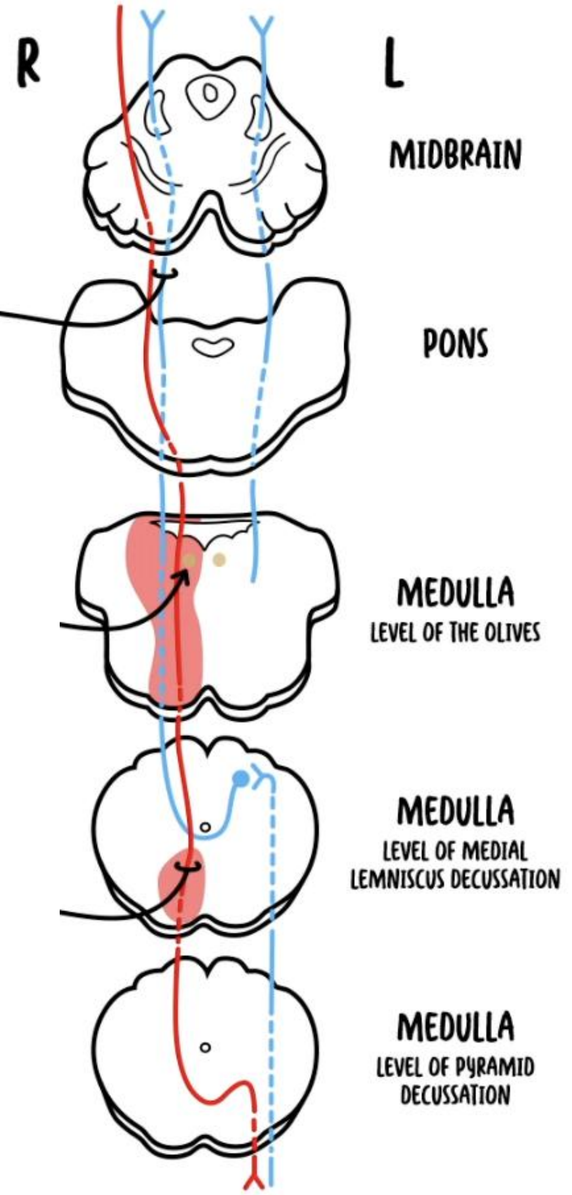


DEJERINE SYNDROME

OR MEDIAL MEDULLARY SYNDROME

MEDIAL LEMNISCUS TRACT

-> CONTRALATERAL DECREASE IN PROPRIOCEPTION, VIBRATION AND/OR FINE TOUCH SENSATION



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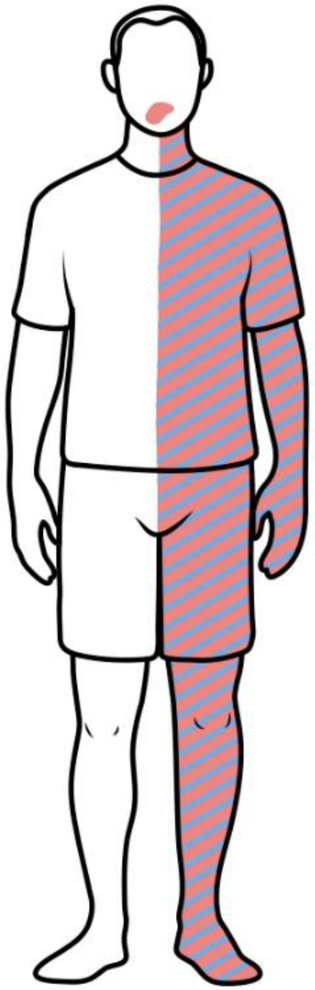
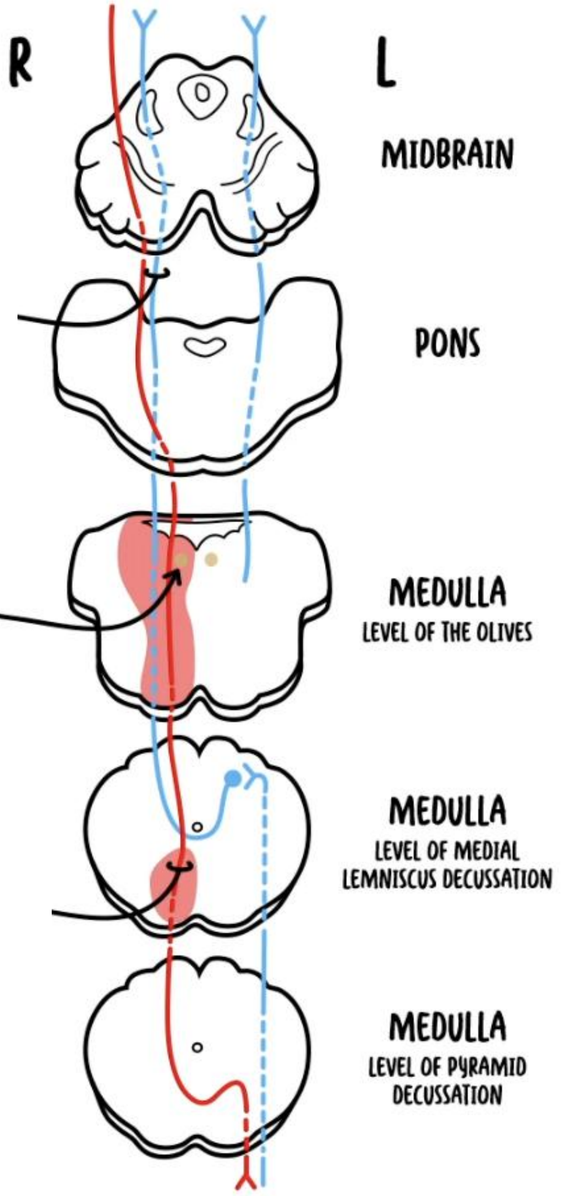


HYPOGLOSSAL (XII) NUCLEI/NERVE

-> DEVIATION OF THE TONGUE TO THE SIDE OF THE INFARCT (IPSILATERAL)



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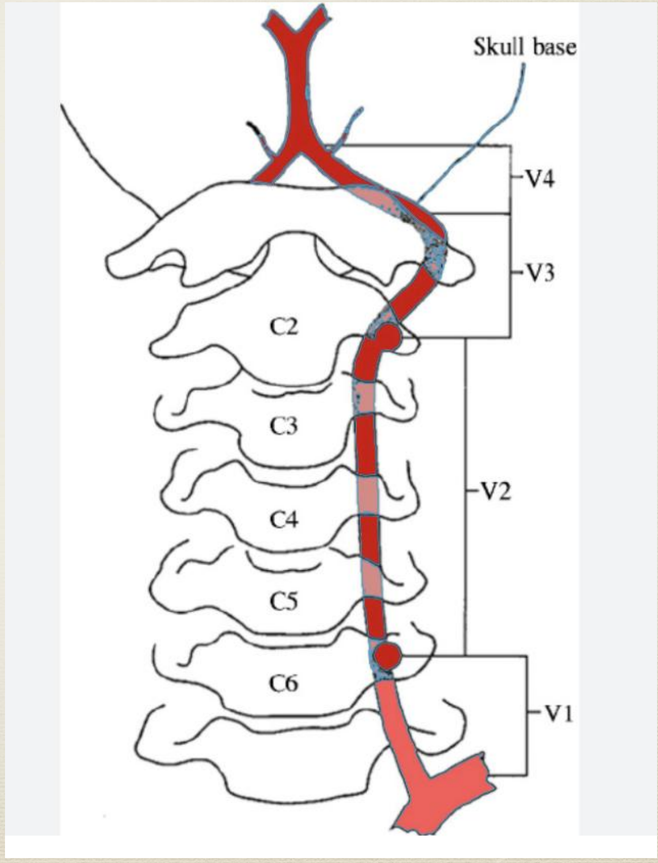
Vertebral Artery Dissection

- Usually causes stroke through intra-luminal thrombus -> embolism
- CADISS and TREAT-CAD studies found no significant difference in stroke or death b/w anticoagulation and anti platelet therapy at 3 months
- JAMA meta-analysis 2024 - anticoagulation significantly fewer strokes (0.5% vs 4.0%), but more bleeding events, no sig. diff. in primary endpoints (1.4% vs 4.4%)
- DAPT - efficacy and safety in cervical artery dissection remains unclear
- Limited data suggest DOAC's may be comparable to Vitamin K antagonists.
- Generally anti platelet recommended if intracranial involvement



https://journal.parker.edu/article/122622-what-evidence-can-case-reports-on-spine-manipulative-therapy-and-cervical-artery-dissection-provide

References

- Antithrombotic Treatment for Cervical Artery Dissection: A Systematic Review and Individual Patient Data Meta-Analysis. JAMA Neurol. May 31, 2024. Kaufmann JE, Harshfield EL, Gensiicke H, et al.
- Antiplatelet Treatment Compared With Anticoagulation Treatment for Cervical Artery Dissection (CADISS): A Randomized Trial. The Lancet. Neurology. 2015. Markus HS, Hayter E, et al.
- Aspirin Versus Anticoagulation in Cervical Artery Dissection (TREAT-CAD): An Open-Label, Randomized, Non-Inferiority Trial. The Lancet. Neurology. 2021. Engelter ST, Tranenka C, Gensicke H, et al.
- https://www.stroke-manual.com/brainstem-syndromes/
- Medulla Oblongata Syndromes - Medial and Lateral Medullary Syndrome, Medullary Lesions, By Armando Hasudungan, YouTube. https://www.youtub.com/watch?v=cVQ1My1Hf8
- Neuroanatomy through Clinical Cases. Blumenfeld, Hal. 2002
- Brainstem Stroke. National Library of Medicine Supreeth N. Gowda; Sunil Munakomi; Orlando De Jesus. Feb 25, 2024

Questions?