

Cardiovascular Syndromes with Vascular Territories.

Vascular territory	Structures affected	Typical clinical pattern	Characteristic cortical signs	Common deficits
Middle cerebral artery (MCA) – Superior division	Lateral frontal lobe, precentral gyrus (face/arm), Broca area (dominant)	Contralateral face/arm > leg weakness, UMN facial palsy	Dominant: Broca aphasia ; Non-dominant: motor neglect	Gaze preference toward lesion, dysarthria
MCA – Inferior division	Lateral temporal and inferior parietal cortex	Mild motor deficit, sensory changes	Dominant: Wernicke aphasia ; Non-dominant: hemispatial neglect	Contralateral superior quadrantanopia
MCA – Complete stem occlusion	Entire MCA territory	Dense contralateral face/arm > leg weakness and sensory loss	Dominant: global aphasia; Non-dominant: profound neglect	Homonymous hemianopia, gaze deviation
Anterior cerebral artery (ACA)	Medial frontal/parietal lobes, leg motor/sensory cortex	Contralateral leg > arm weakness and sensory loss	Abulia, akinetic mutism (bilateral), frontal release signs	Urinary incontinence, gait apraxia
Posterior cerebral artery (PCA)	Occipital cortex, inferior temporal lobe, thalamus (variable)	Contralateral homonymous hemianopia	Dominant: alexia without agraphia (left PCA + splenium)	Visual agnosia, memory impairment, thalamic pain syndrome
Lacunar – Internal capsule (lenticulostriate arteries)	Posterior limb internal capsule	Pure motor stroke	No cortical signs	Face=arm=leg weakness
Lacunar – Thalamus	Ventral posterolateral nucleus	Pure sensory stroke	No cortical signs	Contralateral hemisensory loss
Lacunar – Pons	Basis pontis	Ataxic hemiparesis or dysarthria-clumsy hand	No cortical signs	Ipsilateral ataxia with contralateral weakness
Lacunar – Corona radiata	Subcortical white matter	Pure motor or sensorimotor syndrome	No cortical signs	Variable UMN deficits
Basilar artery	Pons, midbrain, cerebellum	Quadriparesis, reduced consciousness	None unless cortical embolization	Locked-in syndrome (ventral pontine infarct), cranial nerve deficits
Vertebral artery	Medulla, cerebellum	Variable brainstem syndrome	None	Vertigo, dysphagia, crossed findings
Posterior inferior cerebellar artery (PICA)	Lateral medulla	Wallenberg syndrome	None	Vertigo, nystagmus, ipsilateral Horner syndrome, ipsilateral facial pain/temp loss, contralateral body pain/temp loss, dysphagia, hoarseness, ipsilateral ataxia

Vascular territory	Structures affected	Typical clinical pattern	Characteristic cortical signs	Common deficits
Anterior inferior cerebellar artery (AICA)	Lateral pons	Lateral pontine syndrome	None	Facial weakness, hearing loss, vertigo, ipsilateral facial sensory loss, contralateral body pain/temp loss (“facial droop means AICA”)
Superior cerebellar artery (SCA)	Superior cerebellum, rostral pons	Cerebellar syndrome	None	Ipsilateral limb ataxia, dysarthria, nystagmus
Anterior spinal artery (medulla)	Medial medulla	Medial medullary syndrome	None	Contralateral hemiparesis, contralateral loss of proprioception/vibration, ipsilateral tongue weakness
Watershed (ACA–MCA)	Border zone cortex	Bilateral proximal arm weakness	Variable	“Man-in-the-barrel” syndrome
Watershed (MCA–PCA)	Posterior border zone	Higher-order visual dysfunction	Visual neglect or agnosia	Cortical visual deficits

High-yield localization pearls

Finding	Likely localization
Aphasia	Dominant MCA
Hemispacial neglect	Non-dominant MCA
Homonymous hemianopia without weakness	PCA
Face/arm > leg weakness	MCA
Leg > arm weakness	ACA
Pure motor stroke without cortical signs	Internal capsule lacune
Pure sensory stroke	Thalamic lacune
Vertigo + crossed sensory findings + dysphagia	PICA (lateral medulla)
Facial weakness + hearing loss + vertigo	AICA
Locked-in syndrome	Basilar artery
Cortical signs absent	Think lacunar or brainstem stroke
Gaze deviation toward lesion	Large MCA infarct

Clinical approach to vascular localization

Predominant presentation	Most likely vascular territory
Aphasia + right face/arm weakness	Left MCA
Neglect + left face/arm weakness	Right MCA
Isolated leg weakness	ACA
Isolated visual field defect	PCA
Pure hemiparesis	Internal capsule lacune
Pure hemisensory loss	Thalamic lacune
Vertigo + dysphagia + Horner syndrome	PICA
Facial paralysis + deafness + vertigo	AICA
Coma ± quadriplegia	Basilar artery
Bilateral proximal arm weakness after hypotension	ACA–MCA watershed

Key examination principle: The presence of **cortical signs** (aphasia, neglect, gaze deviation, visual agnosia, apraxia, seizures) strongly suggests a **large-vessel anterior or posterior circulation cortical infarct**, whereas their absence with a “pure” motor or sensory syndrome points toward a **lacunar (small-vessel) stroke**. Brainstem strokes are suggested by **crossed neurological findings** (ipsilateral cranial nerve deficits with contralateral long-tract signs).

Wallenberg syndrome (lateral medullary syndrome)

- **Cause:** Infarction of the **lateral medulla**, most commonly due to **PICA** occlusion (or vertebral artery occlusion).
- **Key clinical features:**
 - Vertigo, nausea, vomiting, nystagmus
 - **Ipsilateral** facial pain/temperature loss
 - **Contralateral** body pain/temperature loss
 - Ipsilateral limb ataxia
 - Dysphagia, dysarthria, hoarseness (nucleus ambiguus involvement)
 - Ipsilateral Horner syndrome (ptosis, miosis, anhidrosis)
- **Classic localization clue:** “**Crossed**” **sensory findings** with prominent bulbar symptoms (dysphagia/hoarseness) and **no significant limb weakness**.

★ STROKE TERRITORY SYNDROMES ★

LOCALIZATION = TERRITORY → SYNDROME



KEY PEARLS

- Cortical signs (aphasia, neglect, visual field loss, agnosia) → large vessel (cortical) stroke
- "Pure" motor or sensory syndromes → lacunar (small vessel)
- Crossed findings (cranial nerve ipsilateral, body contralateral) → brainstem stroke

ANTERIOR CIRCULATION

MIDDLE CEREBRAL ARTERY (MCA)



Lateral cortex

- Face/arm > leg weakness (contralateral)
- Gaze preference toward lesion
- Dominant (left): Aphasia (Broca if superior, Wernicke if inferior, Global if complete)



- Non-dominant (right): Neglect



- Homonymous hemianopia (complete infarct)
- Sensory loss (contralateral)

ANTERIOR CEREBRAL ARTERY (ACA)



Medial frontal & parietal lobes



- Leg > arm weakness (contralateral)
- Sensory loss (leg > arm)
- Abulia, disinhibition
- Urinary incontinence
- Gait apraxia

"Think leg!"

POSTERIOR CEREBRAL ARTERY (PCA)



Occipital lobe, inferior temporal lobe, thalamus



- Homonymous hemianopia (contralateral)
- Visual agnosia, alexia (dominant)
- Memory impairment
- Thalamic pain syndrome



Isolated visual loss → think PCA

ANTERIOR CIRCULATION WATERSHED INFARCTS



Border zone cortex



- Bilateral proximal arm weakness ("man-in-the-barrel" syndrome)
- May have cortical signs

Usually due to hypotension or severe carotid disease

POSTERIOR CIRCULATION

PICA (POSTERIOR INFERIOR CEREBELLAR ARTERY)



Lateral medulla

WALLENBERG SYNDROME

- Vertigo, nausea, vomiting, nystagmus
- Ipsilateral facial pain/temp loss
- Contralateral body pain/temp loss
- Ipsilateral ataxia
- Dysphagia, hoarseness
- Ipsilateral Horner syndrome (ptosis, miosis, anhidrosis)

Key: CROSSed sensory loss + Bulbar symptoms, NO limb weakness

AICA (ANTERIOR INFERIOR CEREBELLAR ARTERY)



Lateral pons



- Facial weakness (ipsilateral)
- Hearing loss (ipsilateral)
- Vertigo, nystagmus
- Ipsilateral facial numbness
- Contralateral body pain/temp loss

"Facial droop + deafness + dizzy = AICA"

SCA (SUPERIOR CEREBELLAR ARTERY)



Superior cerebellum & rostral pons



- Ipsilateral limb ataxia
- Dysarthria
- Nystagmus

Pure cerebellar syndrome

BASILAR ARTERY



Pons, midbrain, cerebellum



- Decreased consciousness
- Quadriparesis or "locked-in" (ventral pontine infarct)
- Cranial nerve deficits

Severe, life-threatening

LACUNAR (SMALL VESSEL) SYNDROMES

Deep brain structures (no cortical signs)



- Internal capsule
Pure motor stroke
(Face = Arm = Leg weakness)



- Thalamus
Pure sensory stroke



- Pons
Ataxic hemiparesis / Dysarthria-clumsy hand



- Corona radiata
Pure motor or sensorimotor stroke

Think "PURE" syndromes

CLINICAL APPROACH



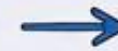
1. Identify key deficits (motor, sensory, speech, vision, brainstem signs)



2. Look for cortical signs (aphasia, neglect, visual field loss, agnosia, apraxia, seizures)

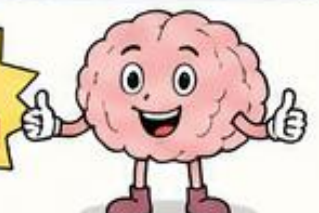


3. Localize to territory (use patterns above)



4. Confirm with imaging (CT / MRI)

Remember: TIME IS BRAIN!



WALLENBERG SYNDROME

(LATERAL MEDULLARY SYNDROME)

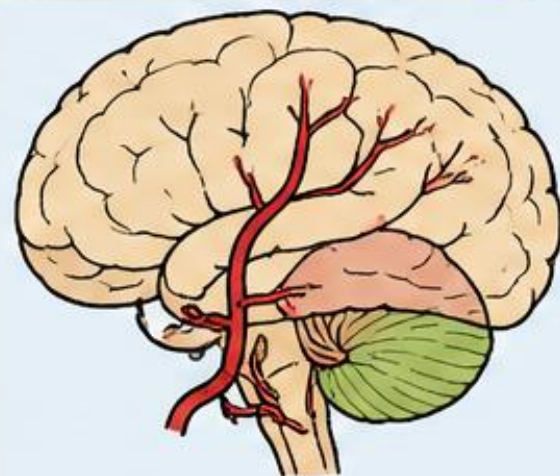
CAUSE

Infarction of the lateral medulla, most commonly due to PICA occlusion (or vertebral artery occlusion).



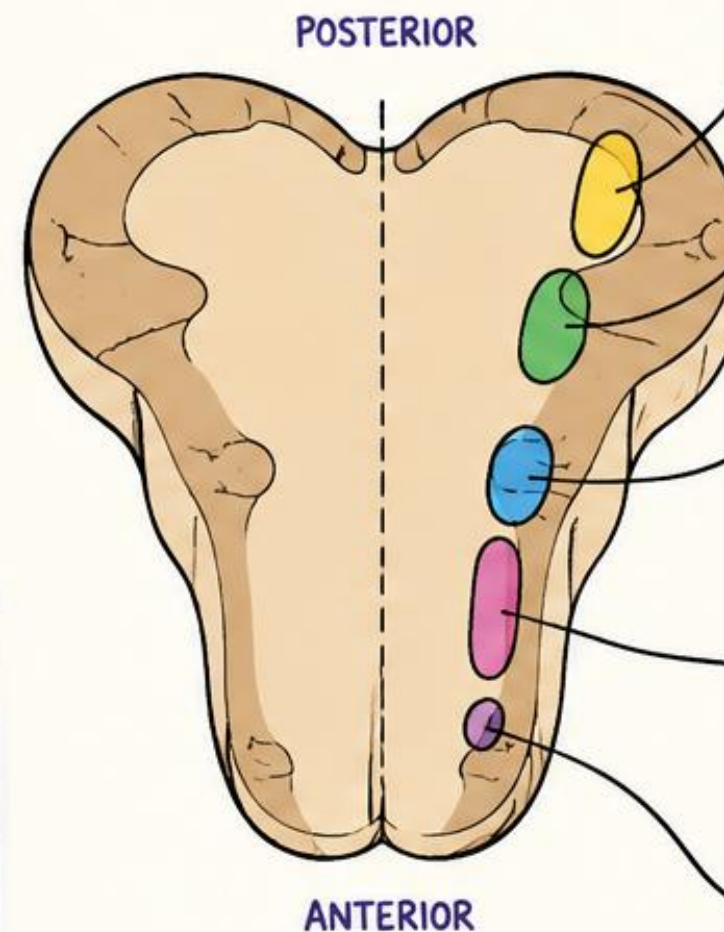
PICA

VASCULAR SUPPLY



PICA
(Posterior Inferior Cerebellar Artery) supplies the lateral medulla

LATERAL VIEW OF MEDULLA



POSTERIOR

ANTERIOR

SPINAL TRACT & NUCLEUS OF TRIGEMINAL NERVE
→ Ipsilateral loss of face pain & temperature

INFERIOR CEREBELLAR PEDUNCLE
→ Ipsilateral limb ataxia

SPINAL TRACT & NUCLEUS OF TRIGEMINAL NERVE
→ Contralateral loss of body pain & temperature

NUCLEUS AMBIGUUS
→ Dysphagia, dysarthria, hoarseness

DESCENDING SYMPATHETIC FIBERS
→ Ipsilateral Horner syndrome (ptosis, miosis, anhidrosis)

KEY CLINICAL FEATURES



Vertigo, nausea, vomiting, nystagmus



Ipsilateral facial pain/temperature loss



Contralateral body pain/temperature loss



Ipsilateral limb ataxia



Dysphagia, dysarthria, hoarseness



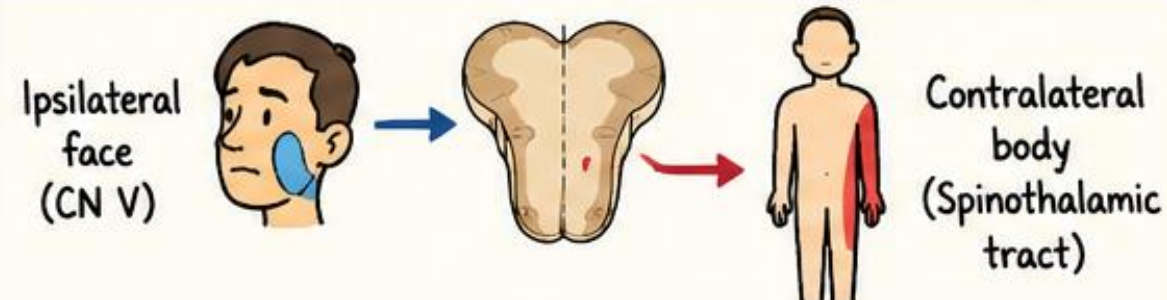
Ipsilateral Horner syndrome (ptosis, miosis, anhidrosis)

CLASSIC LOCALIZATION CLUE



"CROSSED" SENSORY FINDINGS with prominent bulbar symptoms (dysphagia/hoarseness) and **NO** significant limb weakness.

WHY "CROSSED" FINDINGS?



Cranial nerve nuclei/sympathetic fibers run **IPSILATERALLY**, while spinothalamic tract has **ALREADY CROSSED**.

TAKE-HOME MESSAGE



Think lateral medullary syndrome (Wallenberg) in a patient with vertigo, dysphagia/hoarseness, and "crossed" sensory loss without significant weakness.

★ Remember: **PICA infarct = Wallenberg**