ASPECTS

Alberta stroke programme early CT score

Types of Stroke

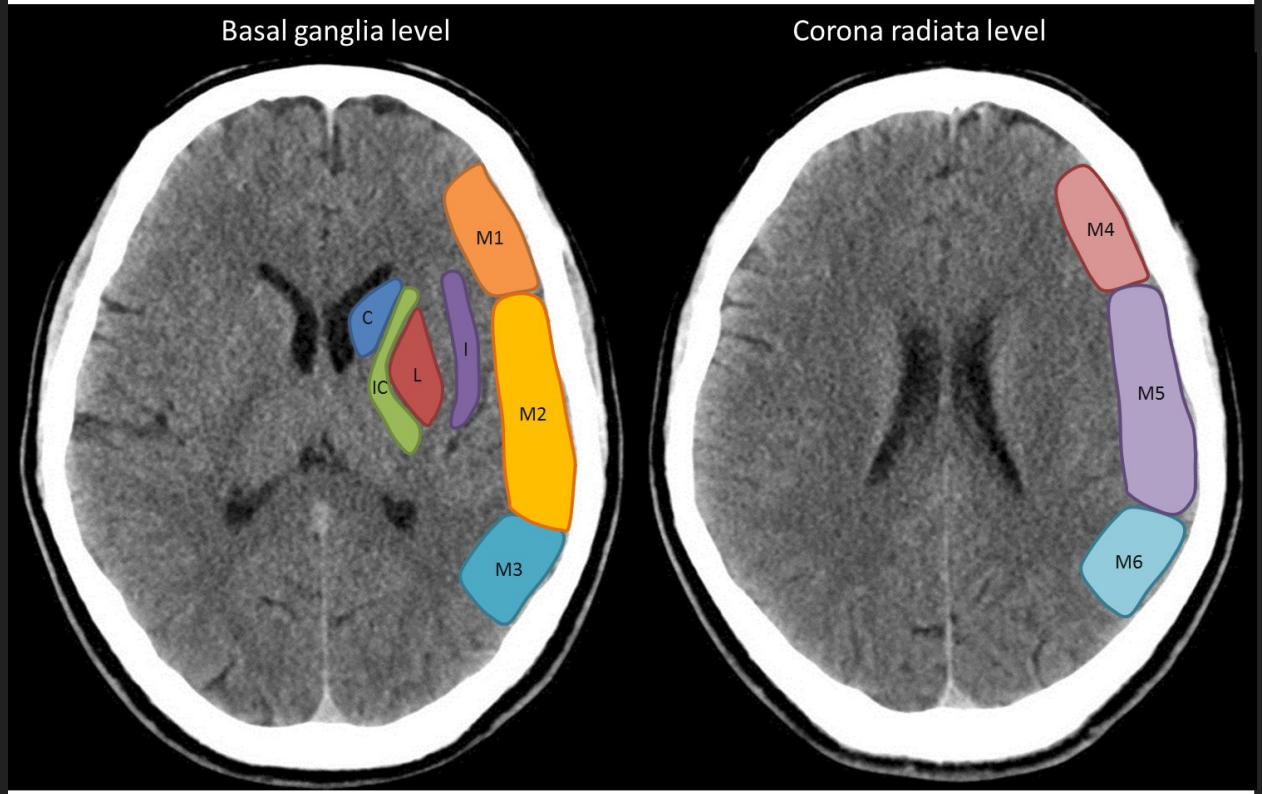
Ischemic stroke: An artery is blocked, and blood supply no longer reaches all the parts of the brain.

Hemorrhagic stroke: A blood vessel bursts or leaks, and blood enters parts of the brain where it would not normally be.

Changes doesn’t appear immediately after stroke it takes time to apparent changes to appear in brain.

It takes around 3 hours to see a change in basal ganglia region and could take up to half a day for other changes to become apparent.

MCA Alberta stroke program early CT score (ASPECTS)



C: Caudate; IC: internal capsule; L: lentiform nucleus; I: Insular Cortex.

Osamah Alwalid
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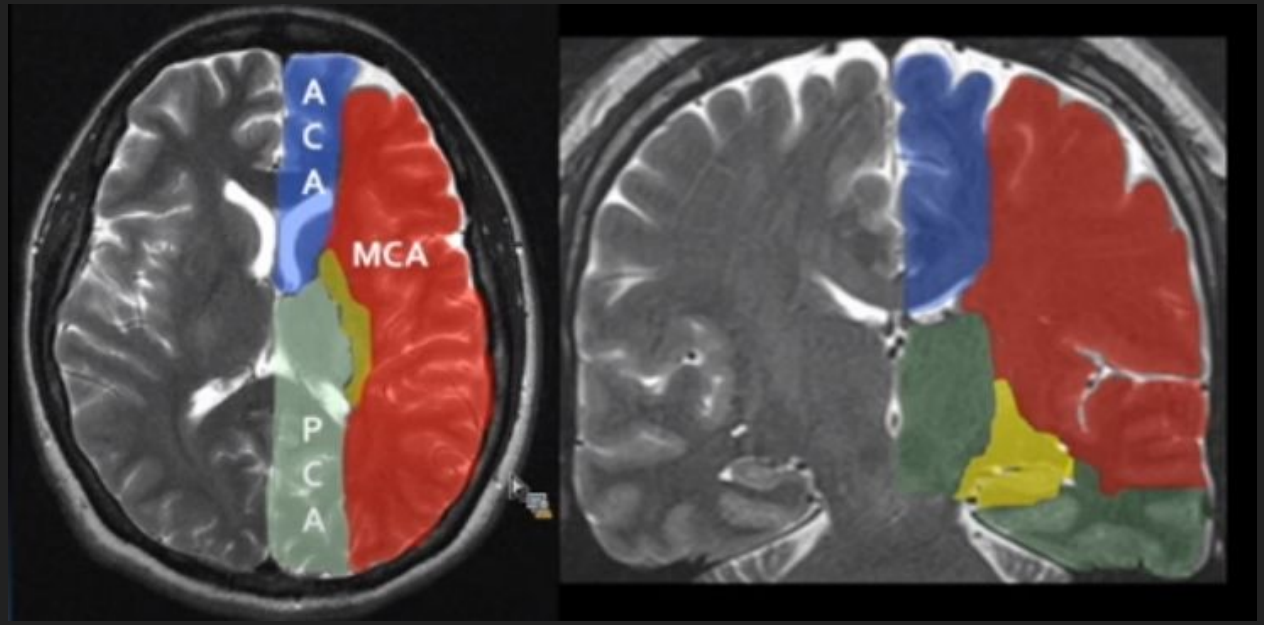
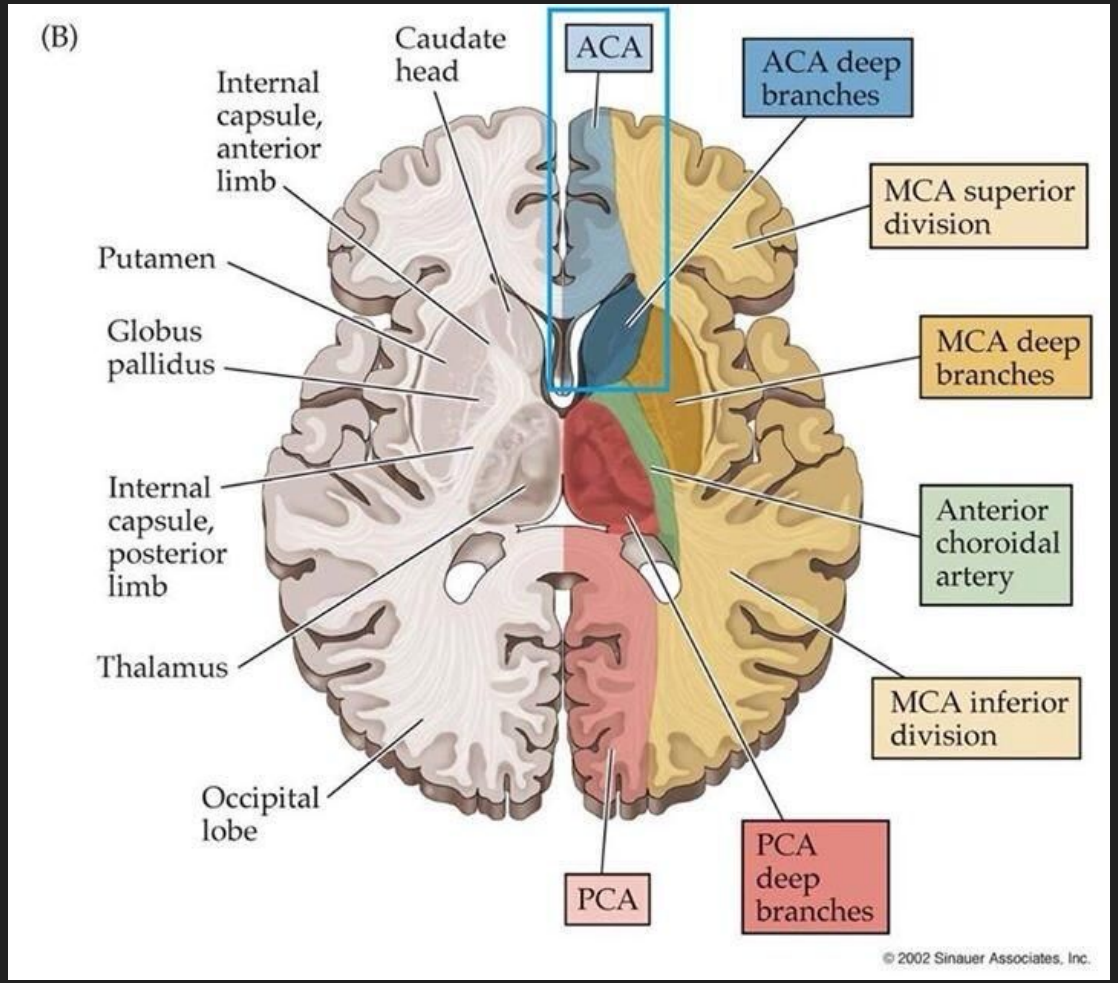
Why above regions

ASPECTS is used for MCA regions.




(B)
Caudate head
ACA
ACA deep branches
Internal capsule, anterior limb
MCA superior division
Putamen
Globus pallidus
MCA deep branches
Internal capsule, posterior limb
Anterior choroidal artery
Thalamus
MCA inferior division
Occipital lobe
PCA
PCA deep branches
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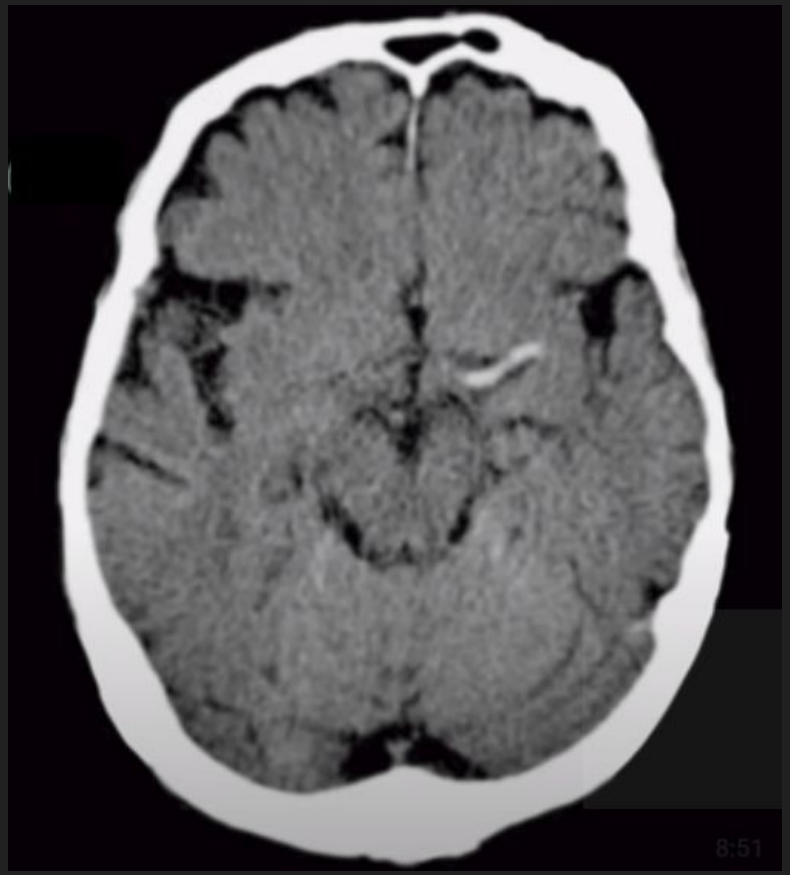
Middle Cerebral Artery

MCA (middle cerebral artery) supplies blood to the outer region of the brain.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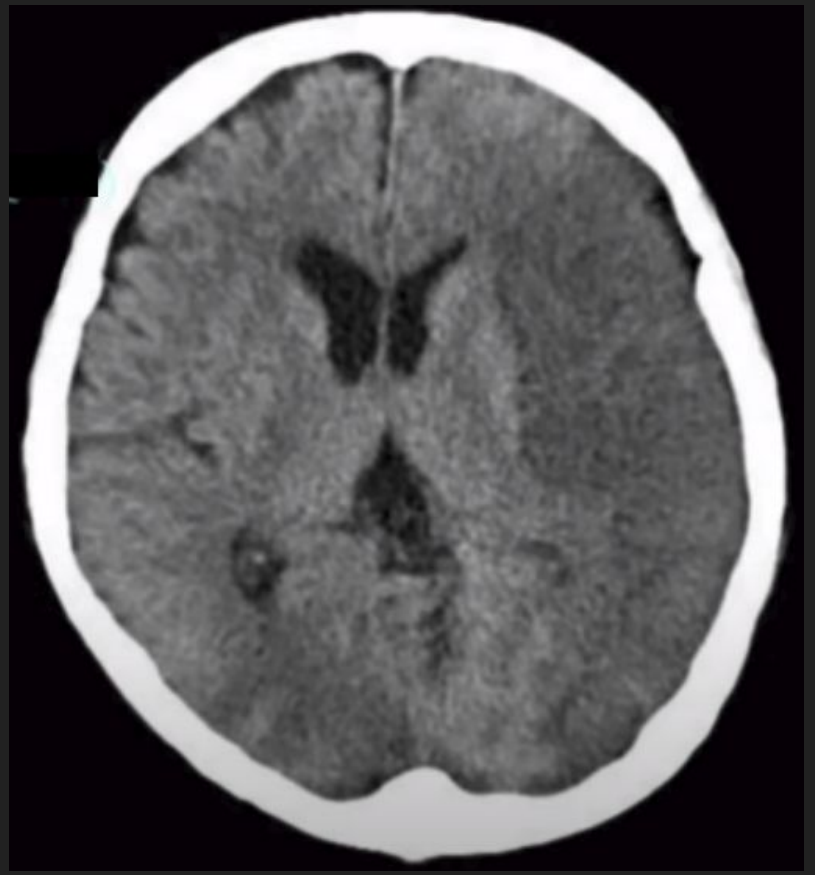


ASPECT Features

Loss of Gray white matter differentiation

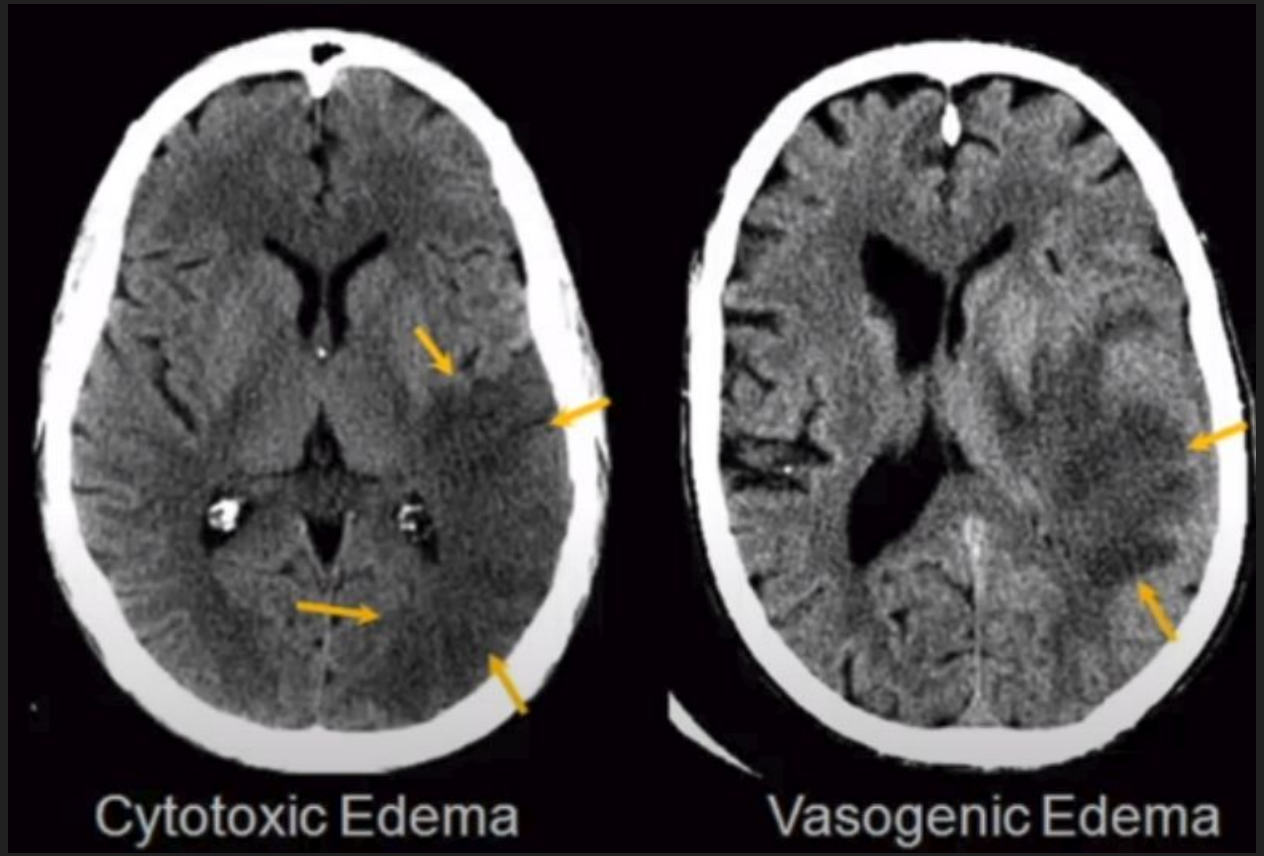
Hypodensity

Sulcal effacement and progrssive mass effect

(peaks after 4-7 days)

All these are manifestations of edema, cytotoxic edema.

Involves both gray and white matter

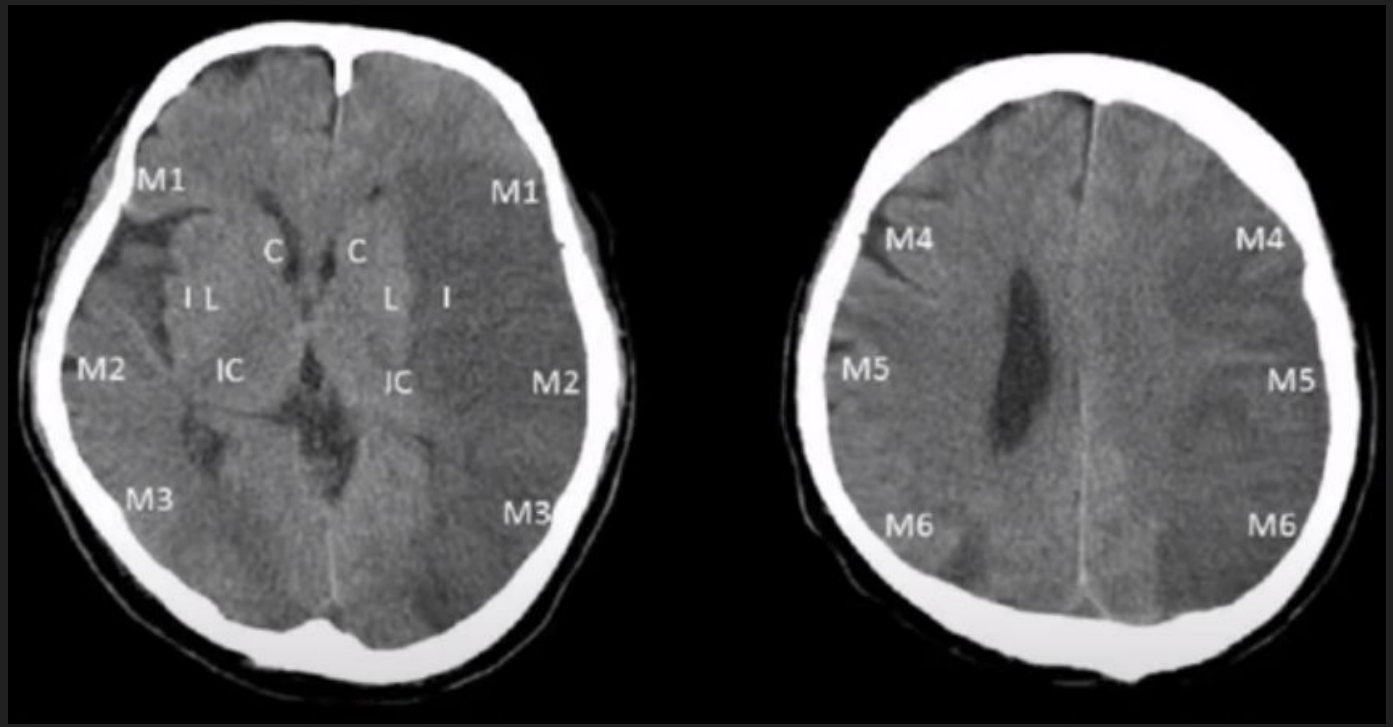


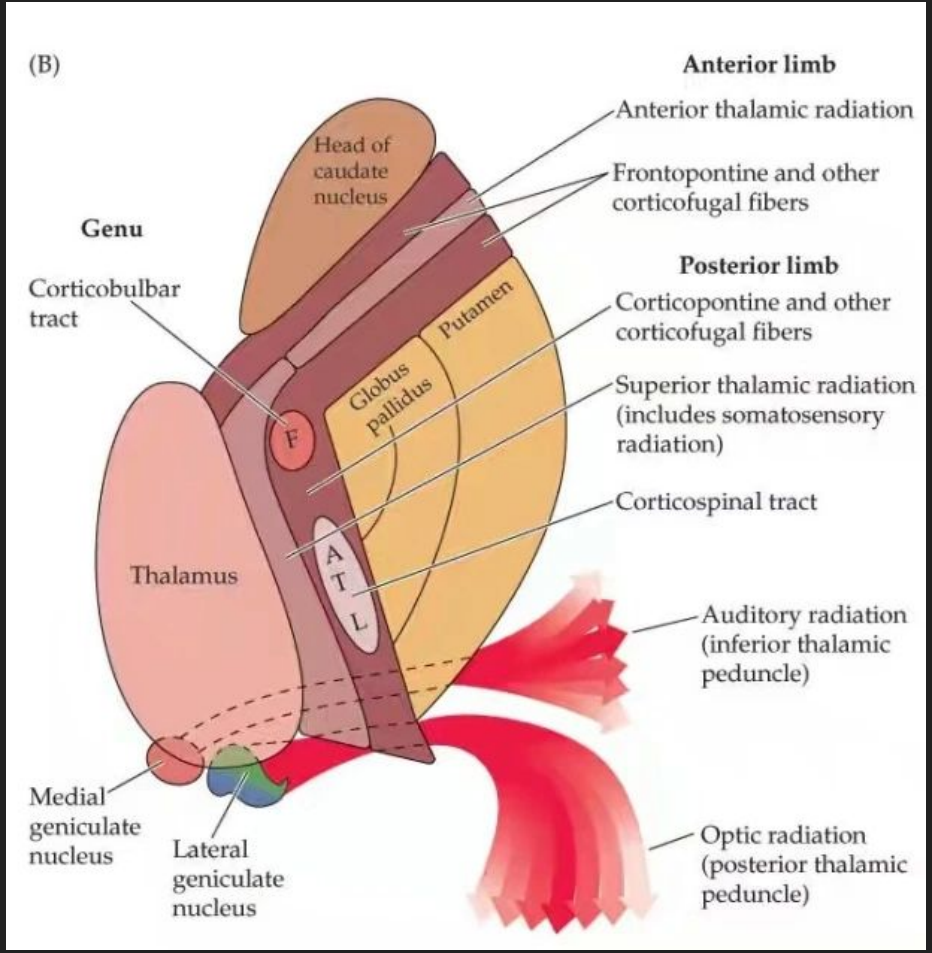
Gray Matter preserved

Let’s look at some examples

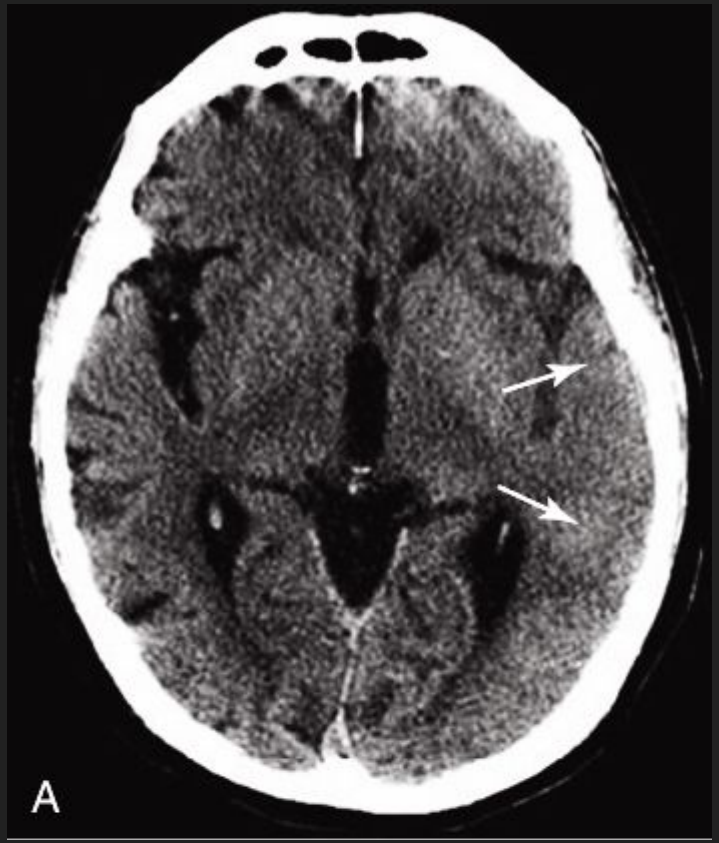
4 Hours

24 Hours


M1
M1
C
C
I L
L I
M2
IC
IC
M2
M3
M3
M4
M4
M5
M5
M6
M6

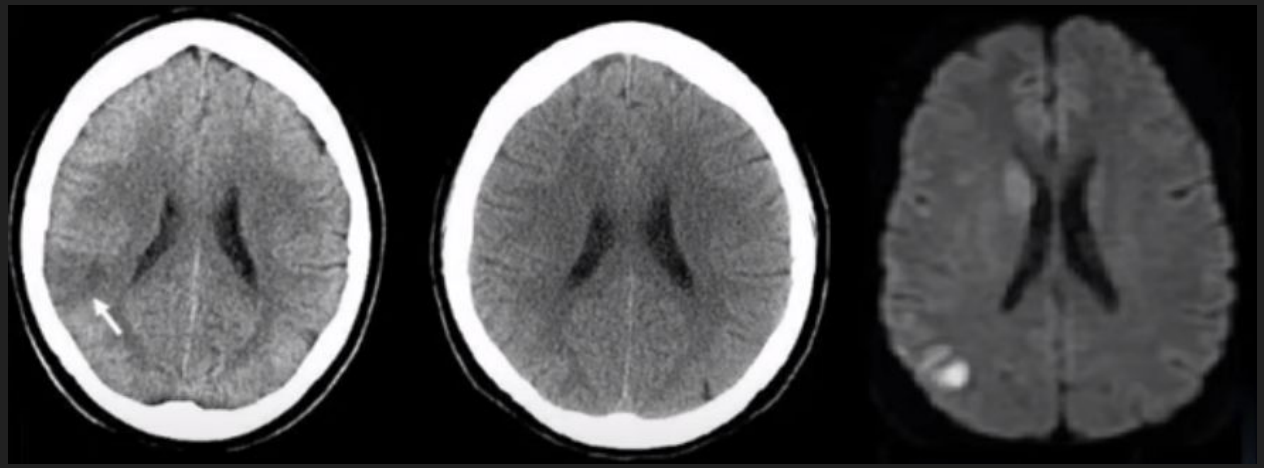

(B)
Anterior limb
Anterior thalamic radiation
Frontopontine and other corticofugal fibers
Head of caudate nucleus
Genu
Posterior limb
Corticobulbar tract
Corticopontine and other corticofugal fibers
Putamen
Globus pallidus
F
Superior thalamic radiation (includes somatosensory radiation)
Corticospinal tract
A
T
L
Thalamus
Auditory radiation (inferior thalamic peduncle)
Medial geniculate nucleus
Lateral geniculate nucleus
Optic radiation (posterior thalamic peduncle)

a

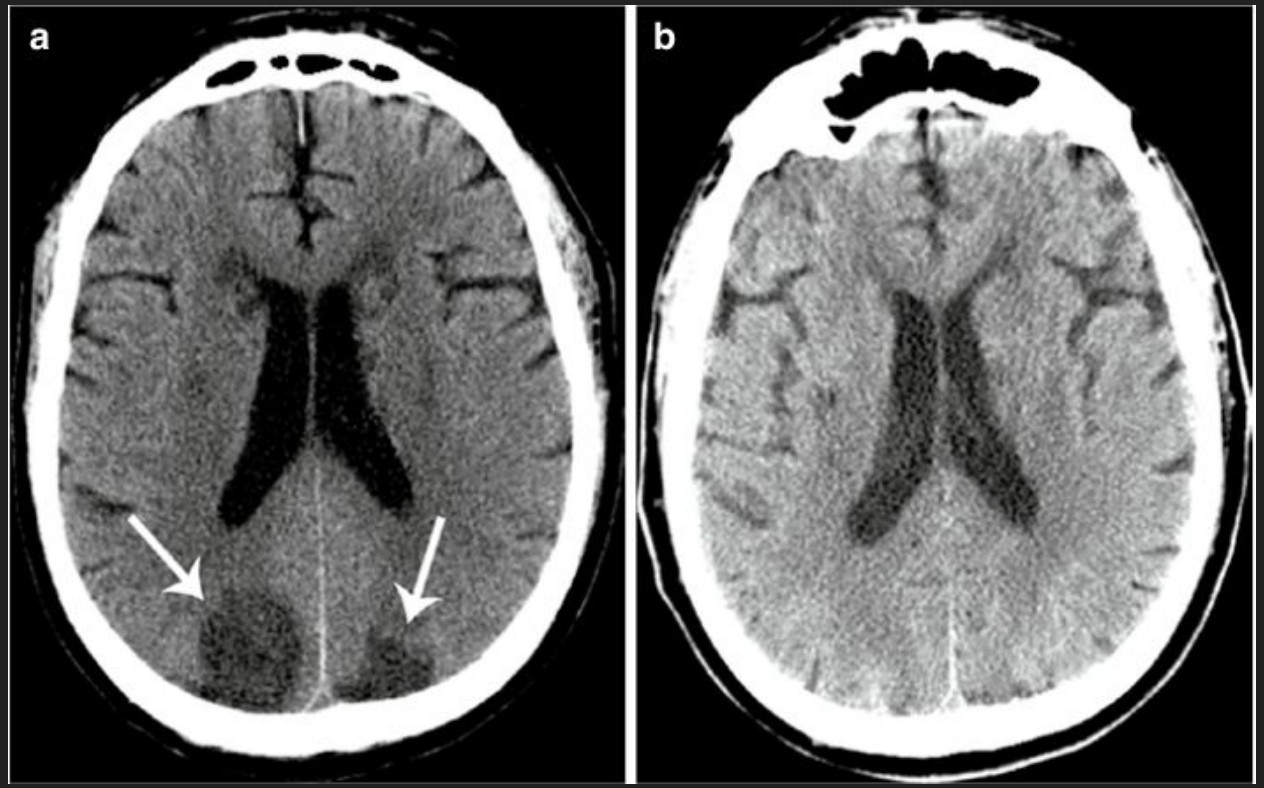

A

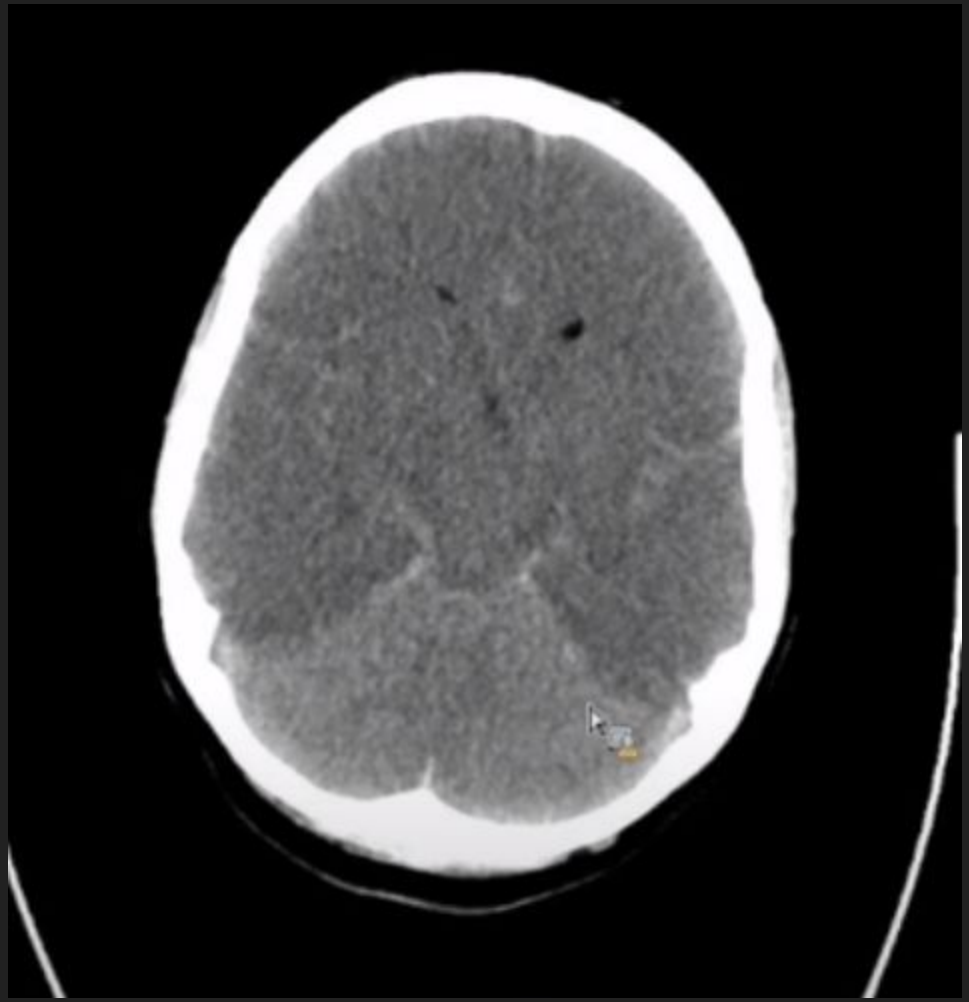
D

DAY1 | DAY10 | DAY10 MRI



Fogging Effect





Why ASPECTs?

- Easily Applicable: Based on the Plain/Non-contrast CT Head
- Imaging Based: initial imaging modality to screen and diagnose provides an opportunity to quantify the degree of ischemic change.
- Easily Communicated - score out of 10
- Data Driven
- Applicable Worldwide

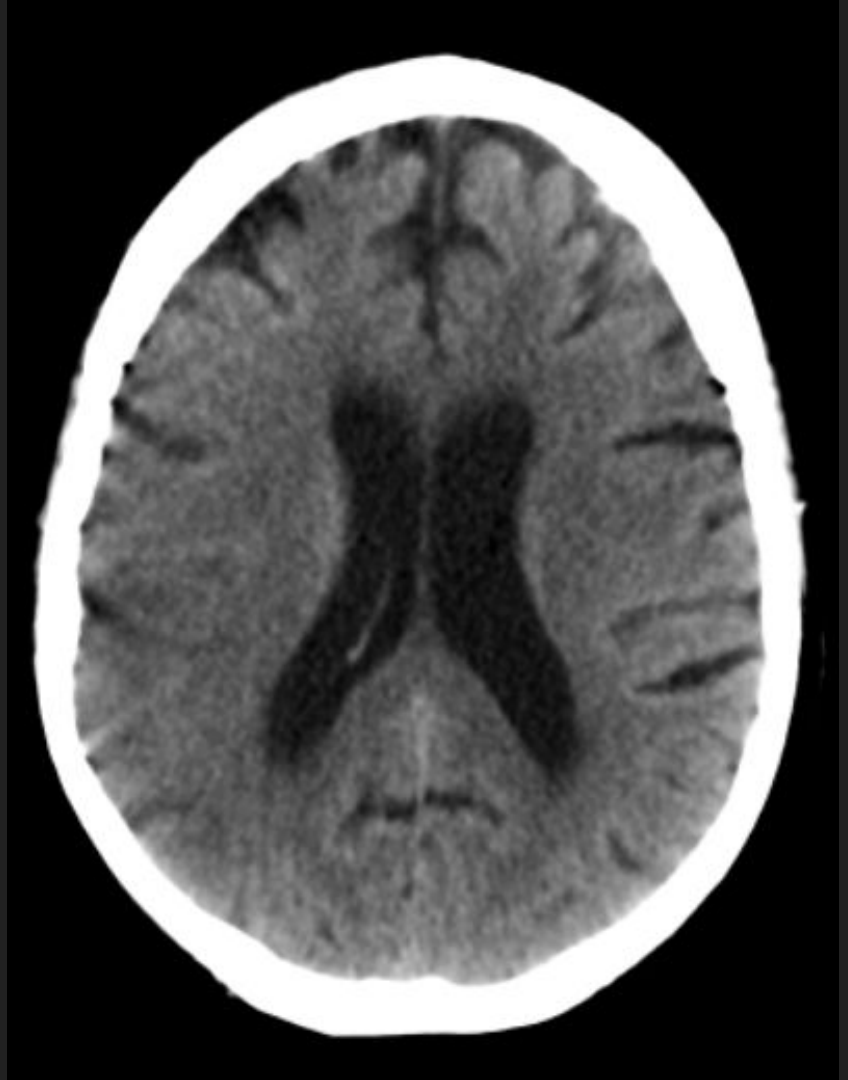
Value of Non Contrast CT

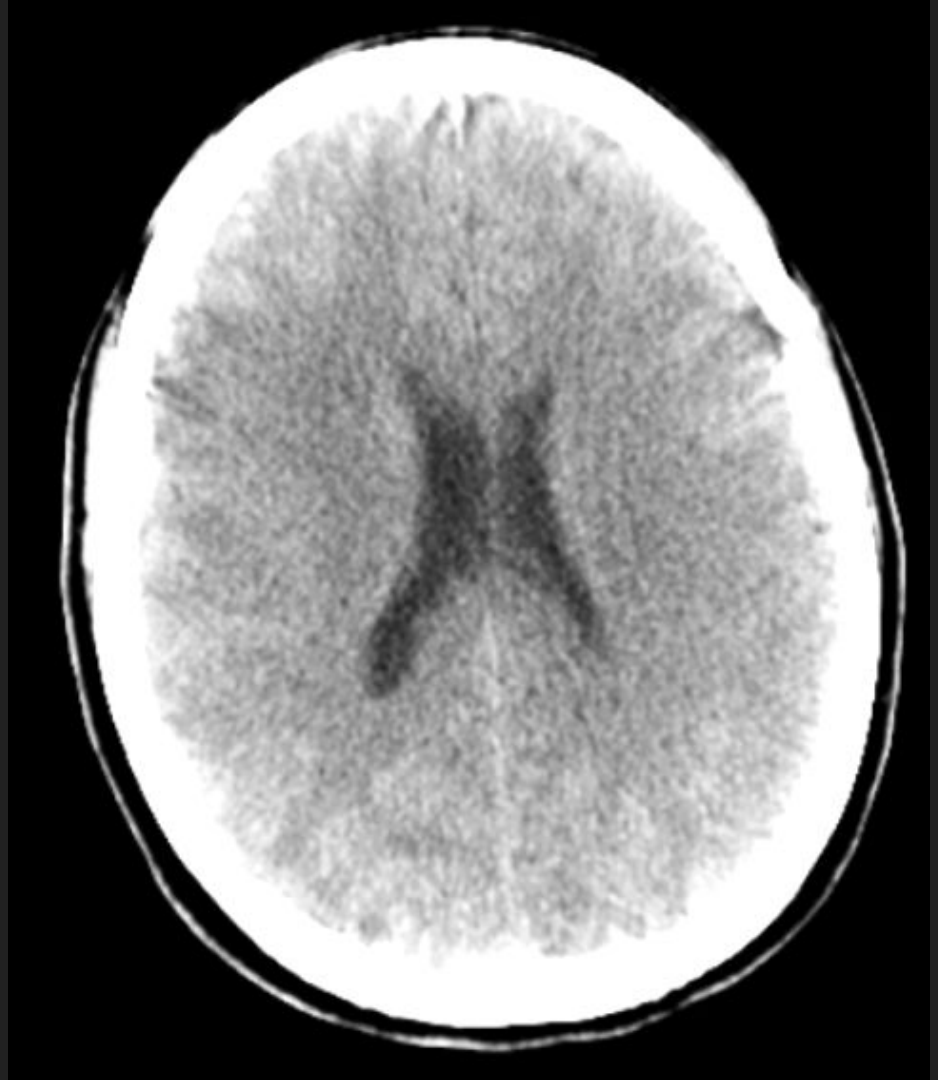
- Acute Infarcts don’t enhance (will exclude intracerebral hemorrhage and lesions that might mimic acute ischemic stroke such as tumor or intracerebral hemorrhage.)
- Can enhance subacutely (vasogenic edema)
- Ischaemic tissue on NCCT appears hypodense because of a combination of reduced blood volume and cytotoxic oedema.
- Dense Vessel Sign (clot detection)
- First-line diagnostic test for the emergency evaluation
- Treatment selection
  - Hemorrhage
  - ASPECTS
  - ⅓ of MCA territory

Which region shows loss of gray white differentiation?

What issue here?

Which artery system is affected?





Treatment

ASPECT = 10 (NORMAL)

ASPECT (9-8) rtPA - recombinant tissue plasminogen activator

6 < ASPECT < 8 - Recovery through time, Endovascular treatment

ASPECT < 6 - Generally bad,

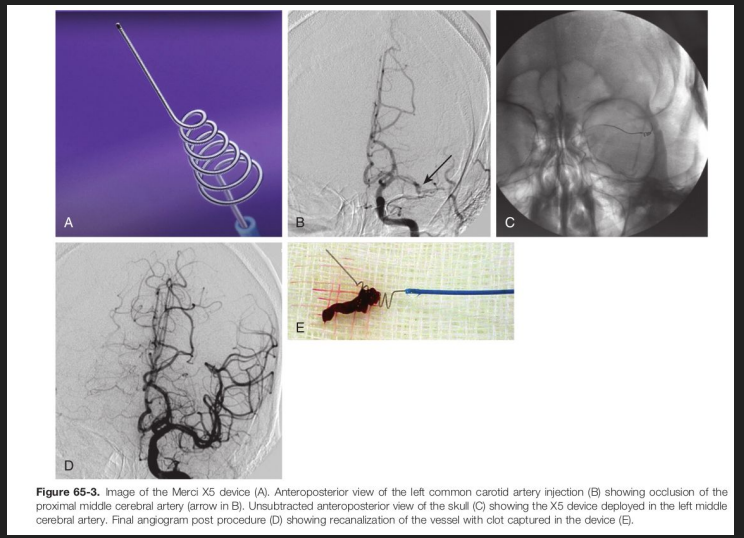


Figure 65-3. Image of the Merci X5 device (A). Anteroposterior view of the left common carotid artery injection (B) showing occlusion of the proximal middle cerebral artery (arrow in B). Unsubtracted anteroposterior view of the skull (C) showing the X5 device deployed in the left middle cerebral artery. Final angiogram post procedure (D) showing recanalization of the vessel with clot captured in the device (E).

Earliest Sign

- Dense Vessel, Vanishing Basal Ganglia, Insular ribbon

Early Sign

- Gray White differentiability lost, hypodensity, sulcii vanishing