

•Right-sided subdural hematoma with midline shifting and compression on the lateral ventricle

•Subdural hematoma \rightarrow Crescent-shaped

•The source of blood in subdural hematoma \rightarrow from the bridging veins (stretch of these veins lead to subdural hematoma)

•patient presented after a period of time with dementia and headache

•Patients with dementia \rightarrow we must do imaging to make sure if there is any vascular injury or subdural hematoma

•subdural hematoma Treated by surgery \rightarrow if it's large , causes midline shifting with compression on ventricles and edema

•if it is small treated by \rightarrow controlling the blood pressure /stop anticoagulants /surgical intervention if needed / follow up imaging

• Causes of subdural hematoma:

- Most commonly → aging (aging lead to brain atrophy which cause pressure on the bridging veins → lead to bleeding)
- 2- May be trauma
- 3- Hypertension
- 4- Ruptured Micro Aneurysms (more common in intracerebral hemorrhage than subdural hemorrhage)
- 5- Patients on anticoagulants or antiplatelets
- 6- Alcoholic (fragile blood vessels)



•Left epidural hematoma with mild midline shifting, mild compression on the lateral ventricles and edema

•Epidural hematoma \rightarrow lens-shaped (it is outside the sutures and dura matter)

•The source of blood in Epidural hematoma \rightarrow high pressure arterial blood cause pressure on the dura matter from outside to inside

•Most common cause of epidural hematoma \rightarrow trauma (trauma commonly cause <u>subarachnoid and epidural</u> then subdural and intracerebral)

•Epidural hematoma needs surgical intervention



•Old/chronic bilateral subdural hematoma (on the right and left) with new/acute ongoing subdural hematoma on the left side

•There is volume loss and tissue loss due to subdural hematoma / no midline shifting (because it is bilateral) / no compression on the lateral ventricles



Subarachnoid hemorrhage

•if the patient presents with sudden /abrupt / severe headache (thunderclap headache) with irritation of meninges

(photophobia and phonophobia) then the CT was normal, what's your next step?

•we do LP \rightarrow we see Xanthochromia in the CSF (characteristic for subarachnoid hemorrhage even if the CT was normal)

• Causes of subarachnoid hemorrhage:

3 most common causes

- 1- Trauma
- 2- Ruptures peri-aneurysms (treated by clipping and coiling)
- 3- AV malformations (treated by surgical removal or embolization)

-We have to do CTA or MRA to see the ruptures aneurysms or AV malformation because we can't see the arteries on brain CT

•Subarachnoid hemorrhage \rightarrow need surgical intervention



•Left intraparenchymal / intracerebral hemorrhage with surrounding edema

•Patient present with high blood pressure and headache

•Causes of intracerebral hemorrhage :

- 1- Hypertension
- 2- Ruptures micro-aneurysm
- 3- AV malformations
- 4- In elderly (there is amyloid angiopathies cause microaneurysms)

•If it is small intracerebral hemorrhage \rightarrow don't need surgery (just control blood pressure and correct the coagulopathies, stop anticoagulants and antiplatelet, do follow up image)



•Brain CT

•Deep intracerebral / intraparenchymal hemorrhage reach the ventricles (cause fluid level in the ventricles)

•Calcifications in the choroid plexus (symmetrical bilateral)

•We can differentiate the calcification from the blood <u>by density</u> (calcification's density >100 and blood density 60-100) and <u>by symmetry (</u>blood not symmetrical but calcification symmetrical bilateral)



•Right MCA infarction

•May be beginning of hemorrhagic transformation or hyperdense MCA (advanced level \mathfrak{S})

• On physical exam :

-left weakness (upper limb >lower limb)
-motor loss or sensory loss or both
-Left sided neglect

-on CT the old hemorrhage or old stroke \rightarrow black color like CSF

-Acute stroke \rightarrow gray color on CT

-old hemorrhage \rightarrow has it's specific shape on CT

-Stroke \rightarrow follow the territory of the artery



•Left PCA stroke

•On Physical exam:

-Right Hemianonymous anopia with macular sparing



• In T1 (anatomical / structural picture) \rightarrow black CSF / dark grey for grey matter / light grey for white matter (very clear sulci and gyri) (used to see mass or cysts)

• In T2 \rightarrow white CSF / light grey matter / dark white matter <u>(important for infectious / inflammatory causes</u>)

• FLAIR \rightarrow mix between T1 and T2 (to make dark CSF with volume restriction to make the periventricular area more clear) (use for multiple sclerosis and periventricular ischemia in chronic small vessel disease)



•On MRI to see the stroke clearly we have to see the diffusion weighted (DWI) and ADC

•Acute Stroke On MRI → hyperintense (white) on DW and hypointense (black) on ADC in the same area

•DW is the clearest image to see the stroke

•We don't give thrombolytics in this case (because there is no mismatch between flair and DW \rightarrow the stroke seen on both DW and Flair)

-We don't give thrombolytics after 4.5 hours (window period) \rightarrow due to increasing risk of bleeding (The longer the time, the higher the risk of bleeding)

after approximately 4.5 hours of ischemia (lack of blood supply to brain tissue), there is no viable tissue left to be repaired in the core area of infarction. At this point, administering thrombolytic drugs does not provide any benefit, Instead, giving thrombolytics after this period can increase the risk of bleeding without any significant chance of recovery of the affected tissue (but we can increase this period to 9 hours If the conditions mentioned by Dr. Iman in the lecture are met)



• MRI image (axial cut) → left ACA stroke (hyperintense)

•In CT we \rightarrow only axial

•In MRI \rightarrow axial , coronal , sagittal





•MRI image

•From left to right

All Right MCA Stroke \rightarrow white (hyperintense)

Anterior right MCA stroke

Left MCA in the middle part

Right MCA posteriorly



•MRI image

-In the left image \rightarrow right PCA stroke

-In the right image \rightarrow right ACA stroke

-the intensity on the left image (DW technique) clearer than on the right side (T1 technique)





Right PICA infarction \rightarrow lateral medullary syndrome

<u>●On Physical exam →</u>

-loss of pain and temperature on the right side on the face (ipsilateral)

-Loss of pain and temperature on the left side of the body (contralateral)

-nystagmus / ataxia

-hoarseness of voice / dysphagia (due to involve the 9 and 10 nuclei)



•MRI images

•thalamic infarction (stroke)

•Bilateral thalamic lesions (may be stroke , mass , venous thrombosis)



•EEG

•Focal seizure on EEG \rightarrow the sharp discharges only in one area

•Generalized seizure on EEG \rightarrow the abnormal discharges in whole EEG (left and right in the same manner)



• Generalized seizure on EEG



• On flair \rightarrow we see periventricular ischemia or MS plaques in periventricular area (irregular plaques)

•MS plaques raised from corpus callosum called (Dawson's Fingers)



•MS plaques in the cerebral cortex (cortical , subcortical)



• Locations of plaques of MS lesions \rightarrow infratentorial in cerebellum / spinal cord / periventricular / cortical or subcortical



•Active MS plaques (relapse MS) \rightarrow when we give contrast on gadolinium lead to enhancement (so we have to do MRI with contrast for MS patients to know if the lesions are active or not)



•In MS we have to ask about gait (spastic) and urine incontinence (due to sphincter dysfunction) and we see upper motor neuron lesions (clonus , spasticity , hyperreflexia , hypertonia , Babinski sign and Hoffmann sign)

$MS \rightarrow UPPER \text{ motor neuron lesion}$

GBS (Guillain-Barré Syndrome)→ LOWER motor neuro lesion



•MS plaques in spinal cord \rightarrow cigarette shaped



•Very extensive MS plaque \rightarrow we have to think about Neuromyelitis Optica /NMO spectrum disorder (NMOSD) or Myelin Oligodendrocyte Glycoprotein-associated Demyelination (MOGAD)

-If it is extensive lesion \rightarrow You should think about NMOSD and MOGA initially, and then consider MS

-if it is small plaques \rightarrow you should think about MS initially

•we have to do brain imaging also because:

-MS \rightarrow Occur in brain and spinal cord

-NMOSD and MOGA \rightarrow may be in spinal cord alone



•Upper motor neuro facial nerve palsy (right image) \rightarrow sparing the wrinkles in the forehead /sparing the eyebrows

•Lower motor neuro facial nerve palsy (left image) \rightarrow loss of the wrinkles in one side /affected eyebrows

•We have to differentiate between upper and lower motor neuron facial nerve palsy \rightarrow to choose the proper treatment and management

-in lower motor neuron (Bell's Palsy)→ give steroid early to avoid the damage of facial nerve

-in upper motor neuron we have to diagnose the patient early to know if there is any mass and give the proper treatment \rightarrow don't give steroid



•Herpes Zoster (vesicles) rash in ophthalmic branch \rightarrow need IV Acyclovir



Ramsay Hunt Syndrome

Rash around the ear, palate, tongue

Involve nerve (7+8) \rightarrow so the patient may present with facial nerve palsy and deafness





Herpes Zoster in the dermatome (with vesicles) Treated by antiviral (Acyclovir)



Behçet's Disease

Other Causes of oral ulcers \rightarrow SLE , HSV , syphilis , B12 deficiency



Left image \rightarrow SLE rash (butterfly rash)

Right image \rightarrow rash on the upper eyelid (heliotrope rash) in dermatomyositis

dermatomyositis \rightarrow cause proximal muscle weakness / muscle involvement <u>with rash</u> on the hand and around the eyes / \uparrow CK / picture of myositis on EMG and muscle biopsy / treated by steroid and immunosuppressant

Polymyositis \rightarrow cause proximal muscle weakness / muscle involvement with no rash / $\uparrow CK$ / picture of myositis on EMG and muscle biopsy / treated by steroid and immunosuppressant



Dermatomyositis Rash on the Hand (Gottron's Papules)



Right eye partial ptosis

Causes of ptosis \rightarrow Myasthenia graves (bilateral ptosis) / Horner's syndrome (seen in carotid artery dissection) / oculomotor nerve palsy (third nerve palsy) / facial nerve palsy / cluster headache

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Good luck 😩