

一. Hemorrhage

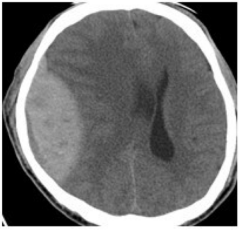
- ① EDH] Trauma
- ② SDH] Trauma

* ③ ICH : 常見原因 HTN, amyloid angiopathy, AVM

* ④ SAH : 非常致命, 可能造成 chronic SDH, 混在 CSF, 常見原因: aneurysm

⑤ IVH : ICH → IVH

①

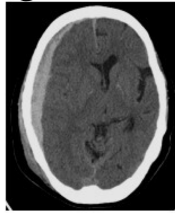


EDH due to trauma

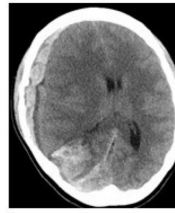


EDH in posterior fossa due to trauma

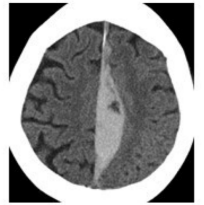
②



SDH due to trauma



SDH caused by AVM rupture



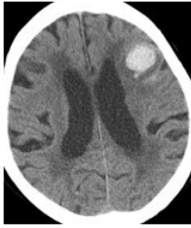
SDH in interhemispheric due to trauma

双凸透镜, 不跨脑沟. 动脉出血 新月形, 跨脑沟. 静脉出血

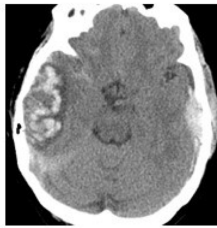
③



Deep hemorrhage due to hypertension



Lobar hemorrhage due to amyloid angiopathy



Contusion hemorrhage due to trauma

⑤

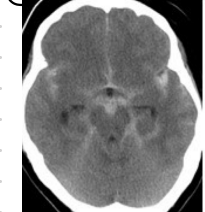


IVH caused by rupture of aneurysm

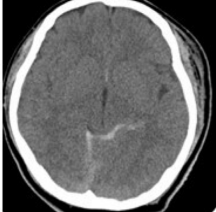


Secondary IVH, ICH ruptured into ventricles

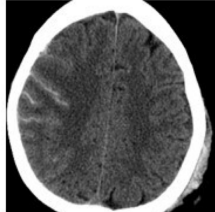
④



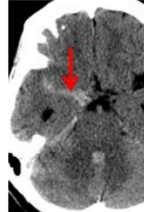
spontaneous SAH due to aneurysm rupture



Traumatic SAH



Traumatic SAH



动脉出血

secondary SAH (red arrow)

ICH (white arrow) ruptures into cistern (red arrow)

A, ICH

ICH 位置區分為 Deep hemorrhage, Lobar hemorrhage

① Deep Hemorrhage $\Rightarrow$ Chronic HTN $\rightarrow$ small vessel disease

- 出血在 putamen, thalamus, pons, cerebellum
- calcification 區 $\Rightarrow$ 150-300Hu, 在 globus pallidus, pineal gland, choroid plexuses
- 出血瞬間就決定出血量
- thalamic hemorrhage $\rightarrow$ contralateral hemiparesis, sensory deficit
- pontine hemorrhage $\rightarrow$ deep coma with quadriplegia
- cerebellar hemorrhage $\rightarrow$ headache, repeated vomiting, ataxia of gait
- subacute ICH:
 - $\rightarrow$ CT: peripheral brain edema, increase mass effect, hydrocephalus
 - MRI: hyperintensity in T1, T2WI ($\because$ contain methemoglobin)

mass effect



2

- old ICH (after 1-2y)

- $\rightarrow$ CT: peripheral brain atrophy, linear cavity, Wallerian degeneration (白質)
- MRI: hemosiderin deposition beside (環)

atrophy

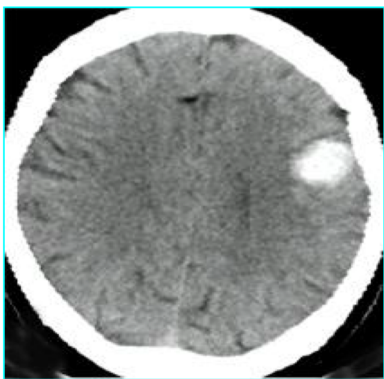
linear cavity

Wallerian degeneration

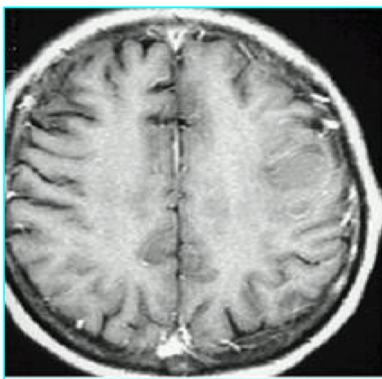


② Lobar Hemorrhage ∴ amyloid angiopathy

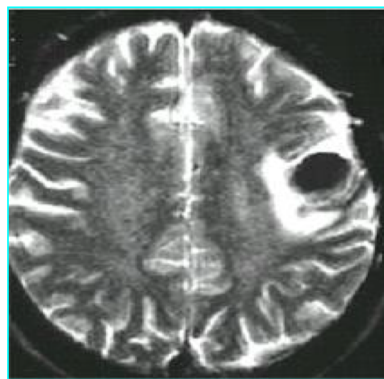
- 出血在 cerebral cortex
- repeat attack
- aged patients



CT



MRI, T1WI

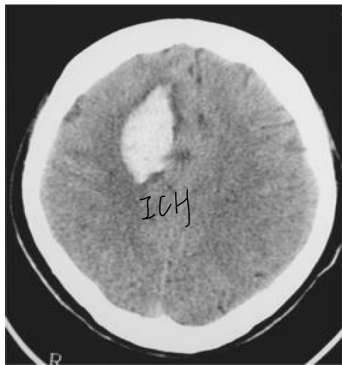


MRI, T2WI

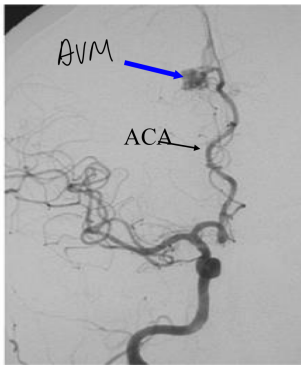
③ Young Stroke ∴ AVM

- 做 CTA, DSA
- 無 HTN, 在非典型位置出血 → 考慮 young stroke

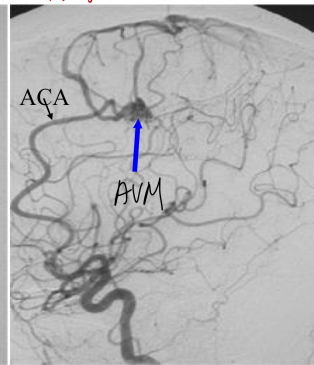
CT



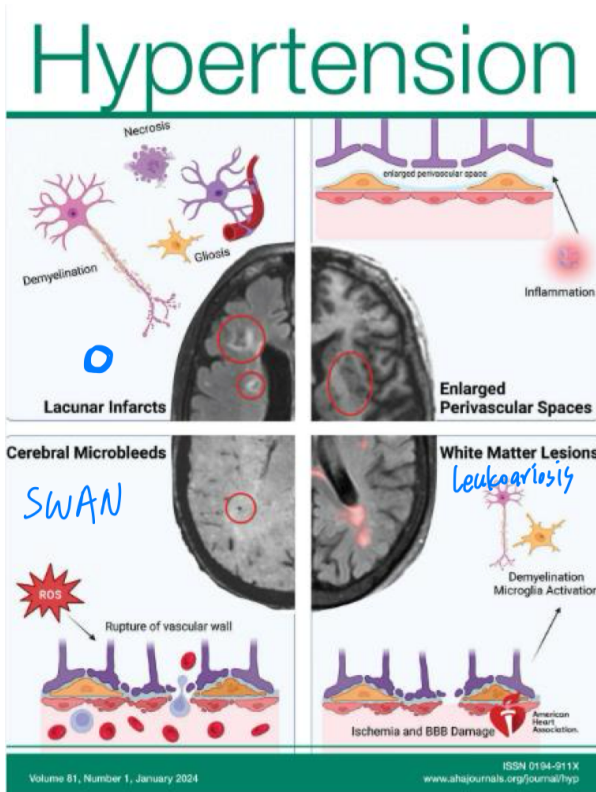
DSA



DSA



* small vessel disease → $\uparrow$ dementia



- ① lacunar infarction
- ② microbleed
- ③ white matter changes (leukoaraiosis)
- ④ virchow-robin space widening

B, SAH

- 症狀似 meningitis ex. headache, vomiting, neck stiffness. conscious ↓
- Traumatic SAH

Secondary SAH: ICH → SAH

Spontaneous SAH:

① 大多由 aneurysm rupture 引起.

② 做 CTA, DSA

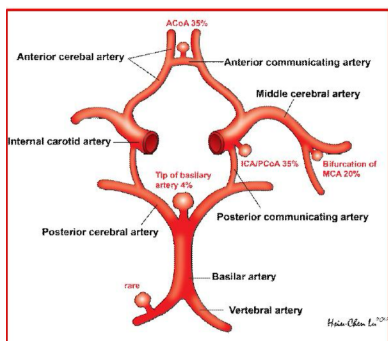
③ 若合併 ICH, 可推 aneurysm 位置

frontal lobe, septum pellucidum ⇒ ACoA

temporal lobe 內側 ⇒ ICA/PCoA

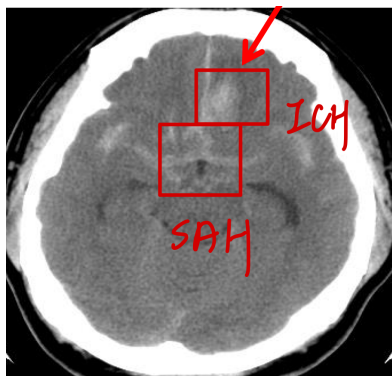
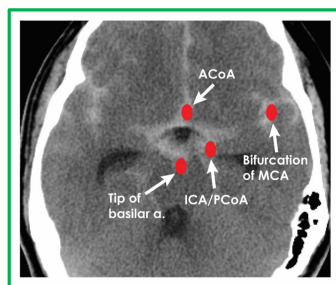
temporal lobe 外側, sylvian fissure ⇒ MCA

cisterna magna, C1-2 spinal cord ⇒ vertebral artery



Aneurysm 出血型態:

Pure SAH (70%)
SAH + ICH (25%)
Pure ICH (5%)



* aneurysm 未破裂

在 ICA/PCoA 的 aneurysm

可能壓到 CN3

⇒ ptosis, diplopia

- 常見併發症, 後遺症

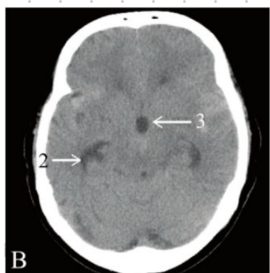
① Vasospasm $\rightarrow$ Ischemic edema

② Communicating hydrocephalus

- 因沾黏, CSF 循環不好, 使 all ventricle hydrocephalus, 要做 VP shunt 長期引流

- mild hydrocephalus: 大鼻子: 3rd ventricle

大鬍子: temporal horn



大鼻子
大鬍子

- 比較: obstructive hydrocephalus

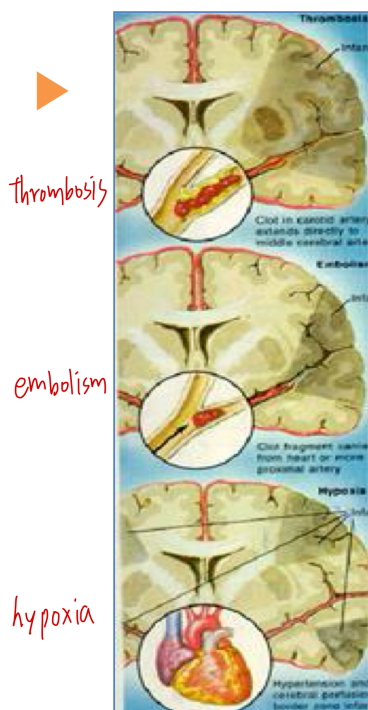
壓到 4th ventricle / aqueduct

導致 1st, 2nd, 3rd ventricle hydrocephalus

③ superficial siderosis

- 出血後, hemosiderin 在腦表面沉積 $\rightarrow$ 小腦萎縮

* Infarction



缓慢, 在 infarction 前侧侧循环已建立好, 可能无症状, 每个病人差异大

整片, 完整的 infarction.

可能是 wedge, triangle, multiple

常见原因: AF

Flow-limiting stenosis.

出现 watershed ischemia

① Large infarction ($> 10\text{ mm}$)

- CT findings

① 10 hour 内无

② subtle positive: a. insular ribbon 消失

b. sulci 平

c. Gray-white matter contrast 消失

d. inverted putaminal sign

- Mass effect (2-7 hours)

→ uncal / Transient herniation

< 五边形 suprasellar cistern
 微多边形 quadrigeminal cistern

- Acute brain edema = cytotoxic edema

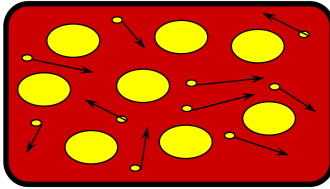
→ FLAIR/DWI 亮, ADC 暗 • cf, leukoaraiosis: FLAIR 亮, DWI X

* white matter edema

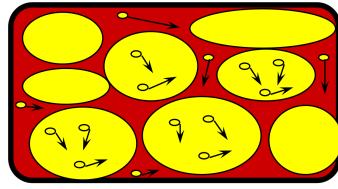
→ Tumor, Abscess, SAH

→ FLAIR, T2, ADC 亮, DWI 暗

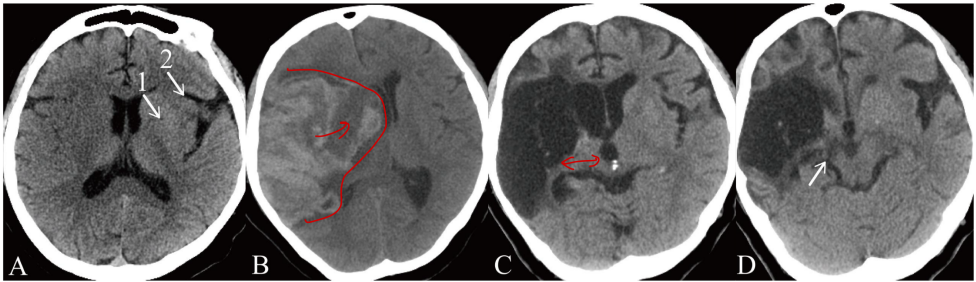
→ contrast !!



Freely Diffusing Water: No signal change
 Normal brain tissue
 Vasogenic edema



Restricted Diffusion = Bright
 Ischemic brain edema
 cytotoxic edema



② Lacunar infarction 新 infarction 舊 infarction
 → 压力很大 更暗、无压力

- 在 penetrating branches 阻塞

- 好发位置: putamen, caudate nucleus, pons, corona radiata

- 有 penumbra (危险)

无 core (危险) ⇒ 刚 infarction 而已

- multiple infarction dementia