Deep ICH / Spontaneous SAH

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Deep ICH

Intracerebral Hemorrhage

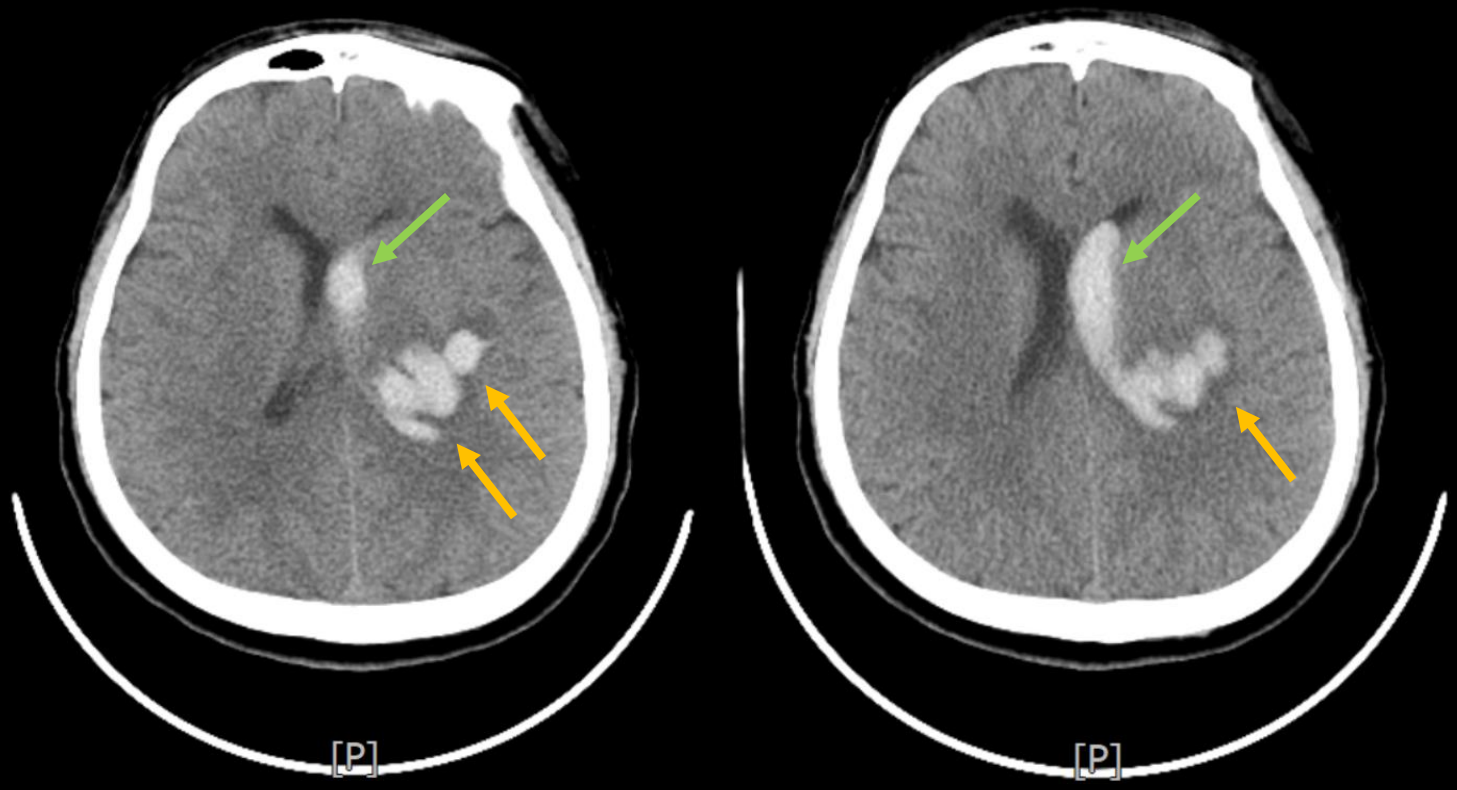
Clinical Data

- 63y/o Man, underlying **Hypertension**
- Chief Complaint: **right side weakness** since 2022/05/07 9am
- Physical Examination: E4V1M6, MP upper: **0**/4, lower **0**/4



Brain CT Findings

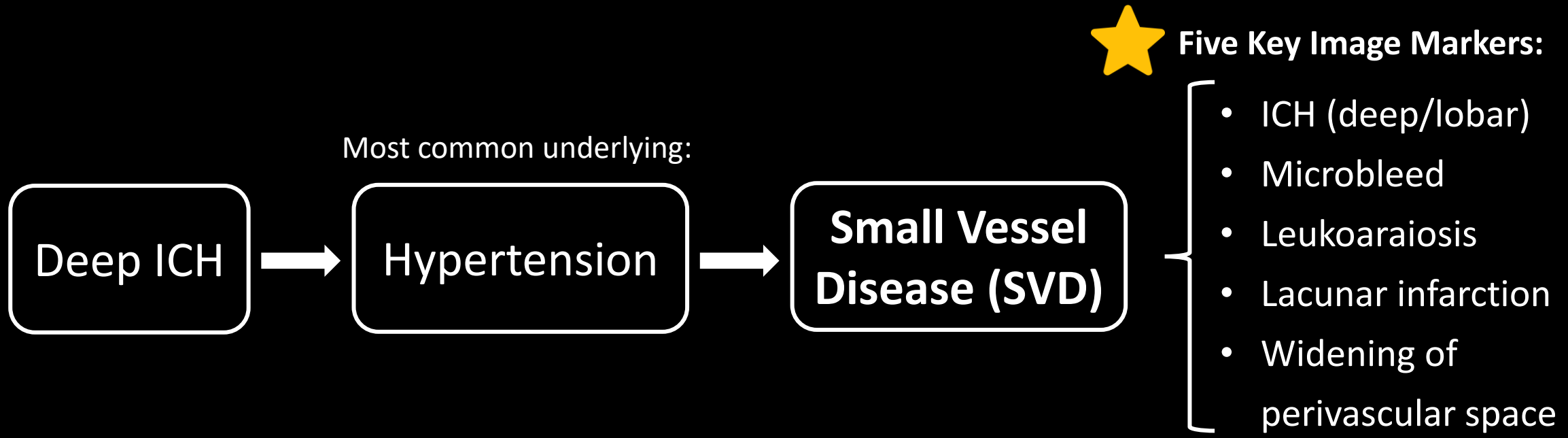
2022/05/07 15:14 Non-contrast Brain CT



- Acute hematoma in the **left thalamus and left putamen**
- The mass ruptured into the **left lateral ventricle**
- The midline was not shifted
- The lateral ventricles and sulci were not dilated

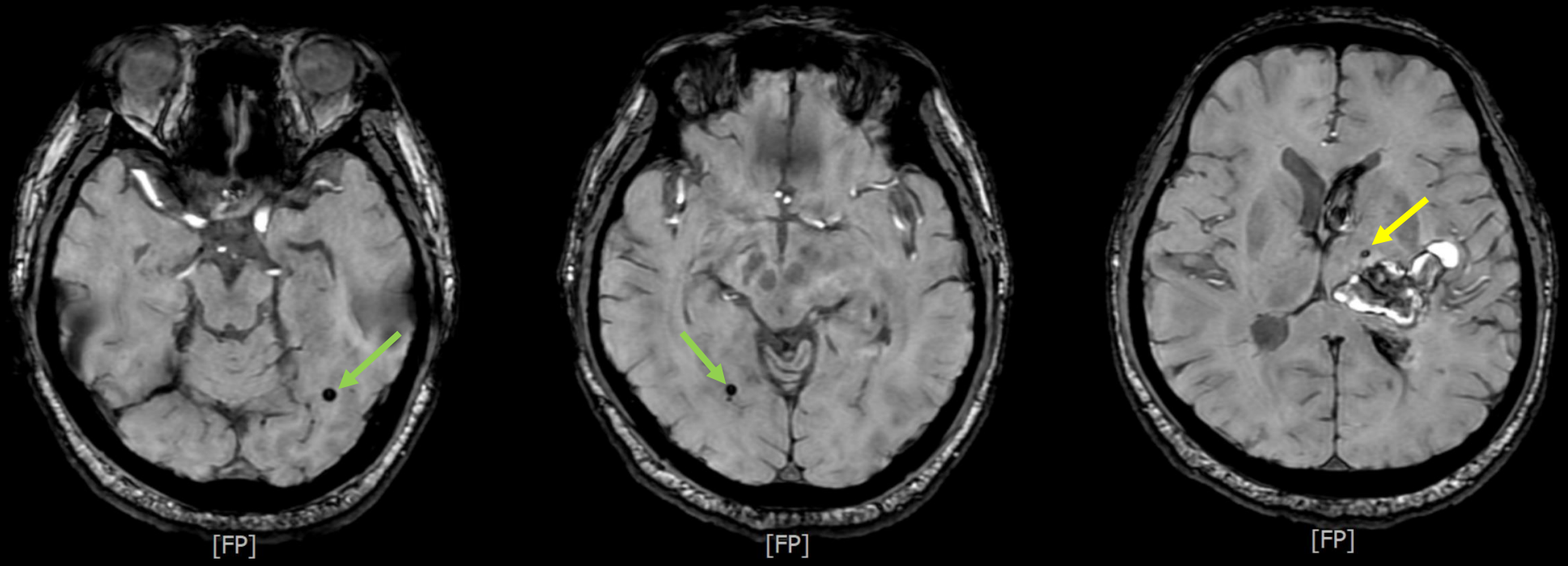
→ **Deep ICH + IVH**

Brain Image Interpretation Roadmap



SVD Marker 1: Microbleed

2022/05/17 Brain MRI: SWAN Fast (10 days after ICH)

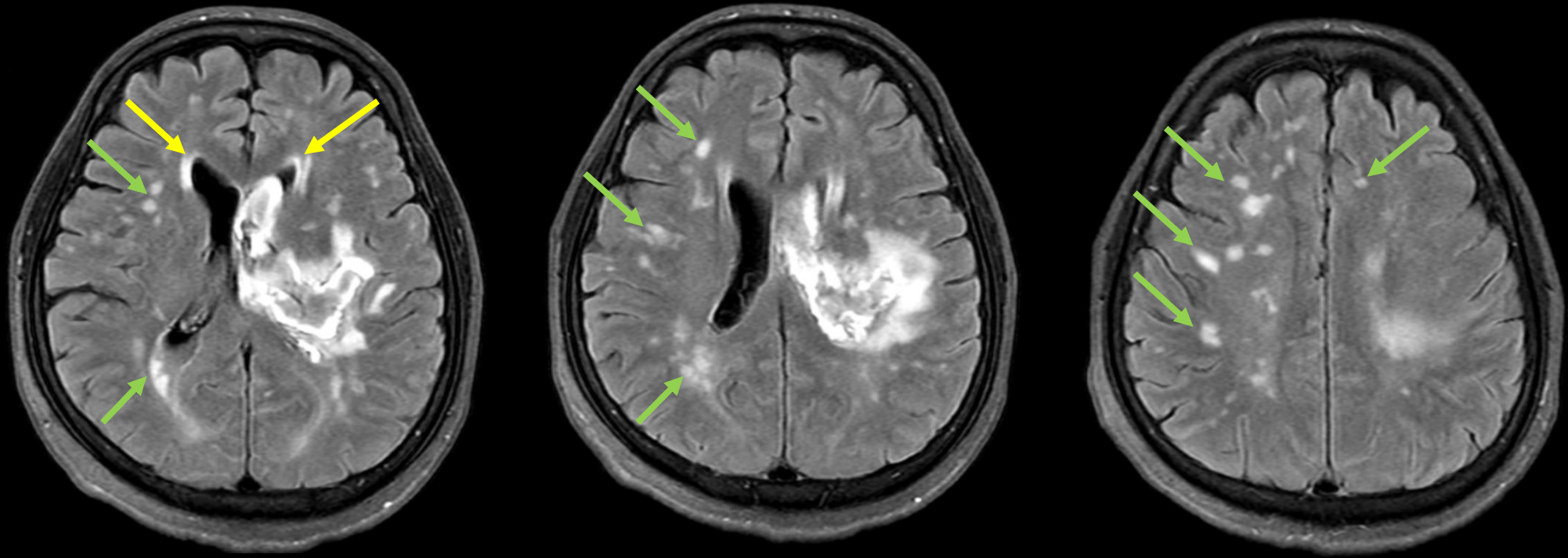


Three hypointensity area in SWAN Fast

→ **Microbleeds** in **bilateral occipital lobes** and **left thalamus**.

SVD Marker 2: Leukoaraiosis

2022/05/17 Brain MRI: T2 FLAIR (10 days after ICH)

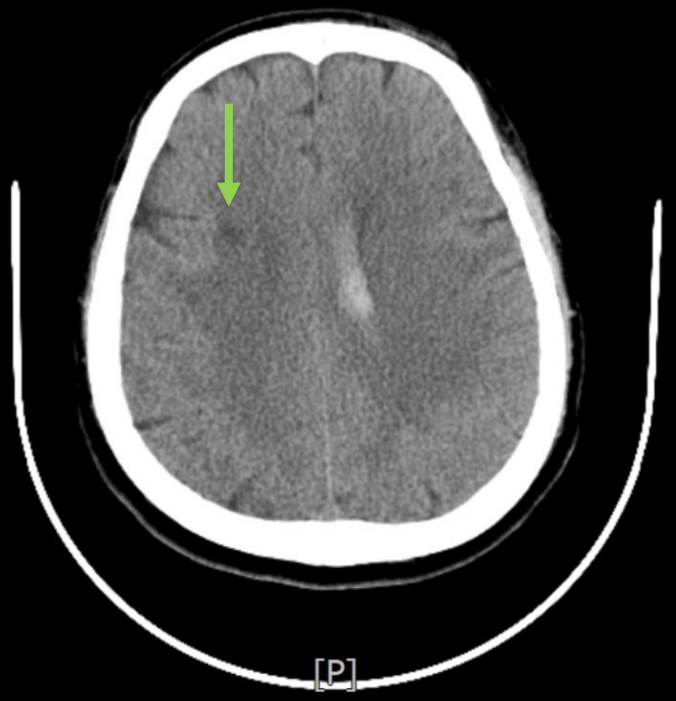


Multiple small hyperintensity area in T2 FLAIR

→ **Leukoaraiosis** in **subcortical area** and **periventricular area**.

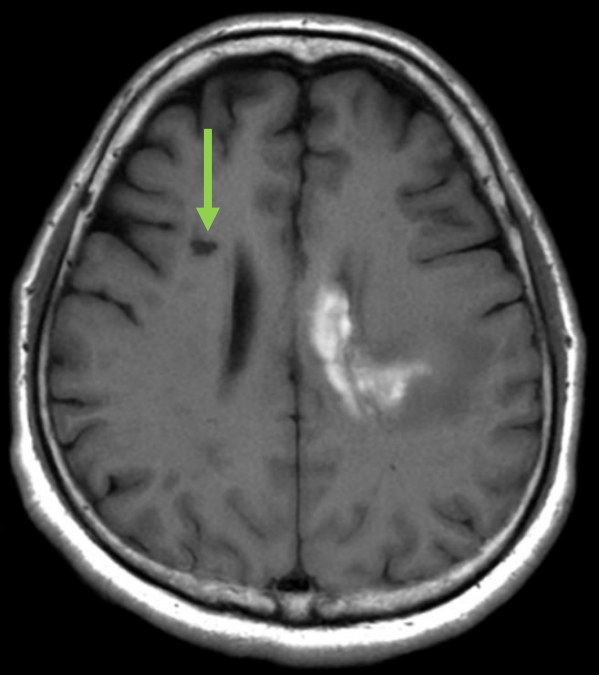
SVD Marker 3: Lacunar infarction

2022/05/07 Brain CT

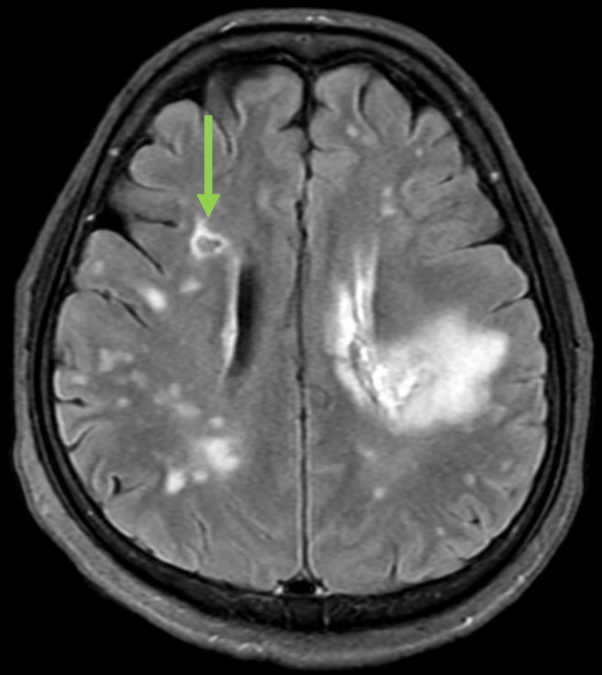


Hypodense in CT

2022/05/17 Brain MRI (10 days after ICH)



Hypointense in T1



Hyperintense in T2

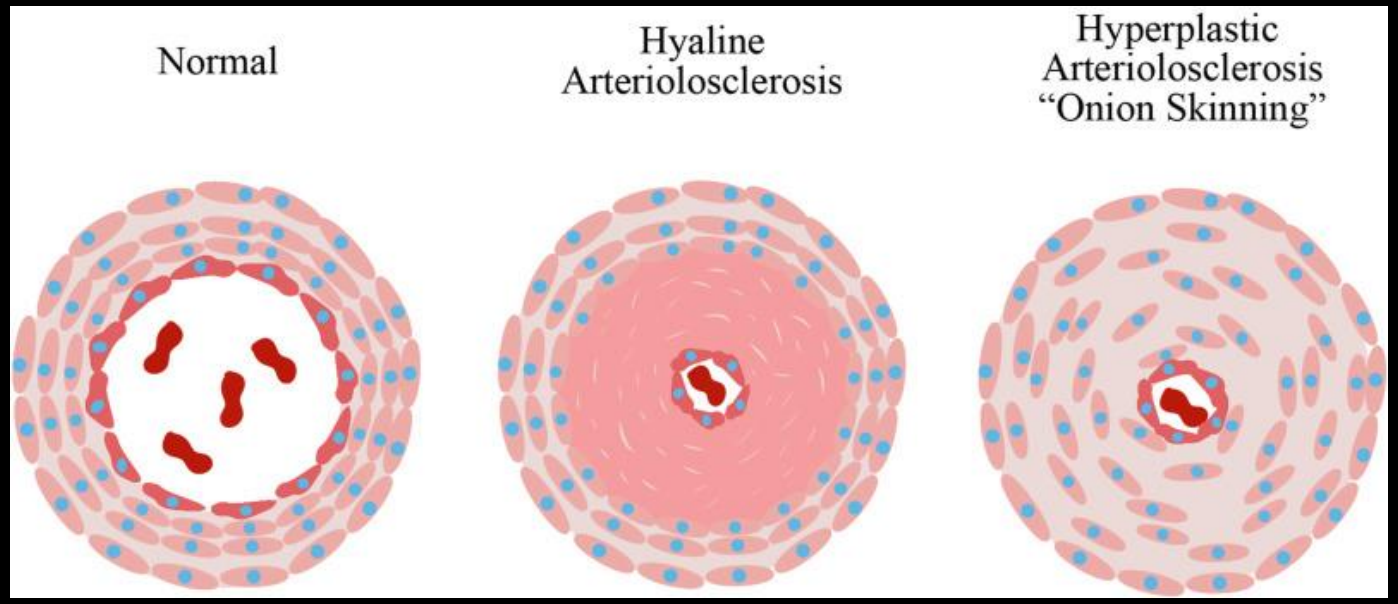
→ **Old lacunar infarction** in **right corona radiata**.

Final Impression of Brain MRI

- **Subacute hematoma** in **left putamen to thalamus** with **intraventricular hematoma.**
- Mild enlargement and mild increased edema than former CT. No progression of ventricular dilatation. No significant abnormality of the large intracranial arteries.
- **Old lacune** in right corona radiata.
- Multiple small periventricular and subcortical T2 hyperintense lesions can reflect **small vessel ischemic demyelination**, vasculitis or other gliosis or demyelination.
- **Microhemorrhage** in bilateral occipital lobes and left thalamus are depicted.

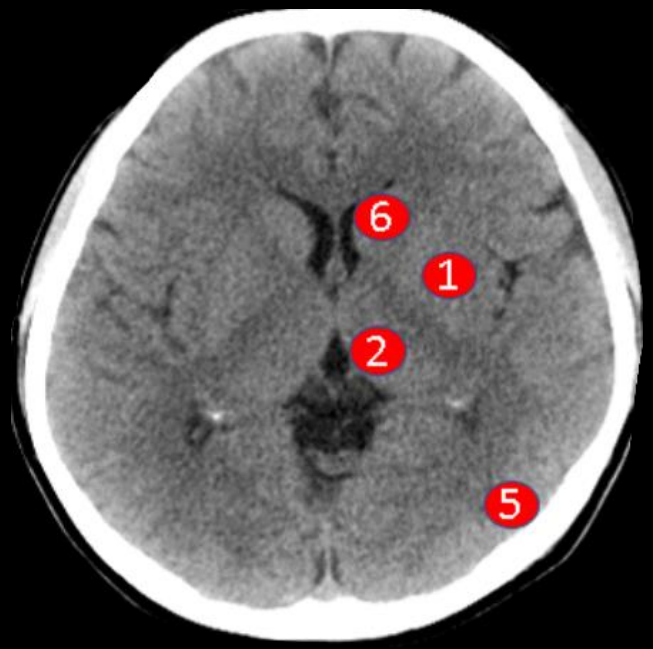
Pathophysiology of Deep ICH

Chronic Hypertension → Small vessel **hyaline arteriolosclerosis** → Easily ruptured in deep brain tissue



Richmond J, Quarles J, Talati S ... Educational Case: Mechanism and locations of intracranial hypertensive hemorrhage leading to stroke Academic Pathology, 2025; 12

Common Locations of Deep ICH



https://shenbbnr.lib.cmuh.org.tw/



Followed by **incidence rate:**

1. **Putamen**
2. **Thalamus**

Our case

3. **Pons**
4. **Cerebellum**
5. **Subcortex of cerebrum**
6. **Caudate nucleus**

Spontaneous SAH

Subarachnoid Hemorrhage

Clinical Data

- 70y/o Woman, unknown underlying
- Chief Complaint: **one-hour headache**, **vomiting**, then **conscious lost**
- Physical Examination: E4V2M4, BP 204/117 mmHg

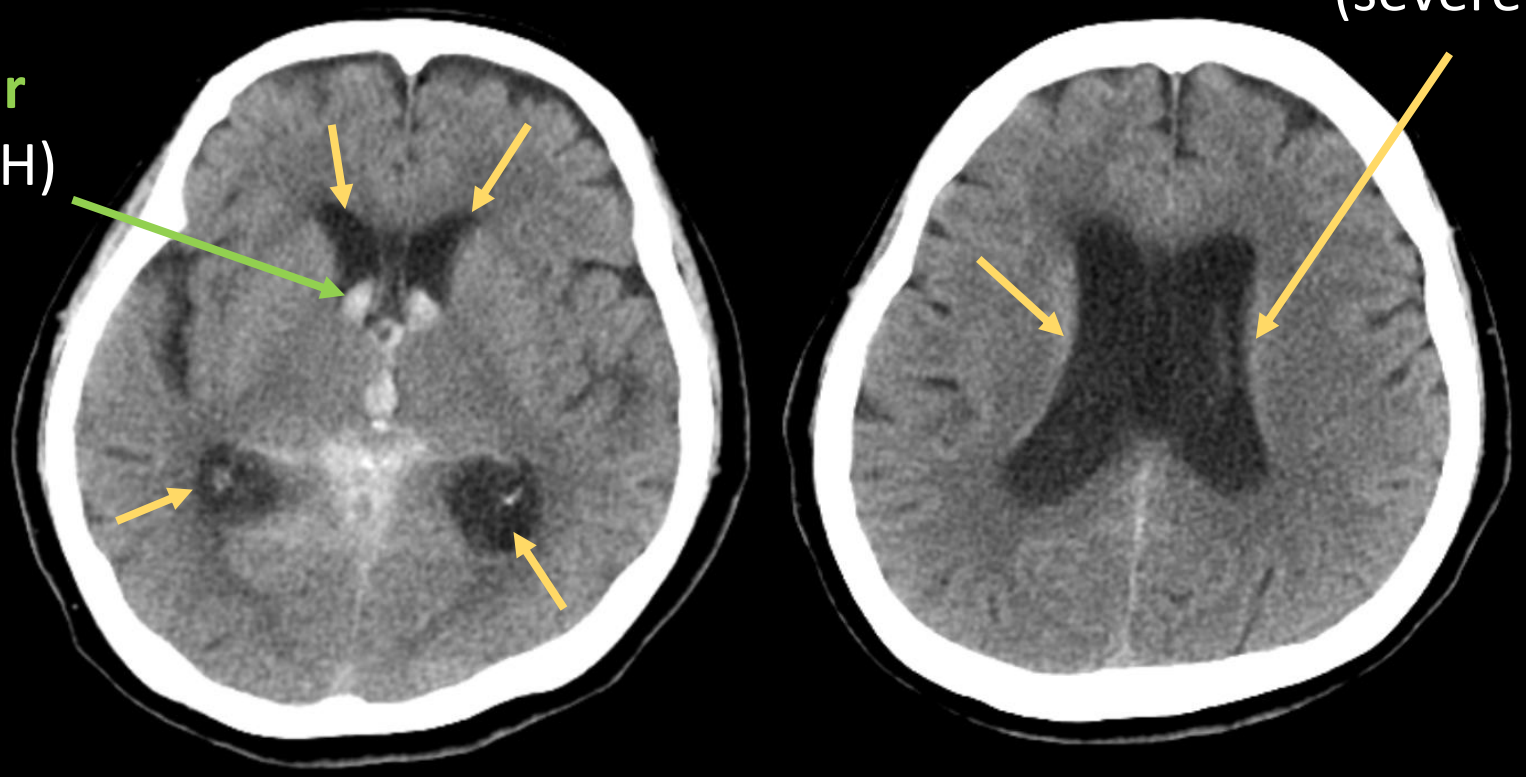


Brain CT Findings

2026/10/15 4:18 Non-contrast Brain CT

Ventricular dilatation
(severe hydrocephalus)

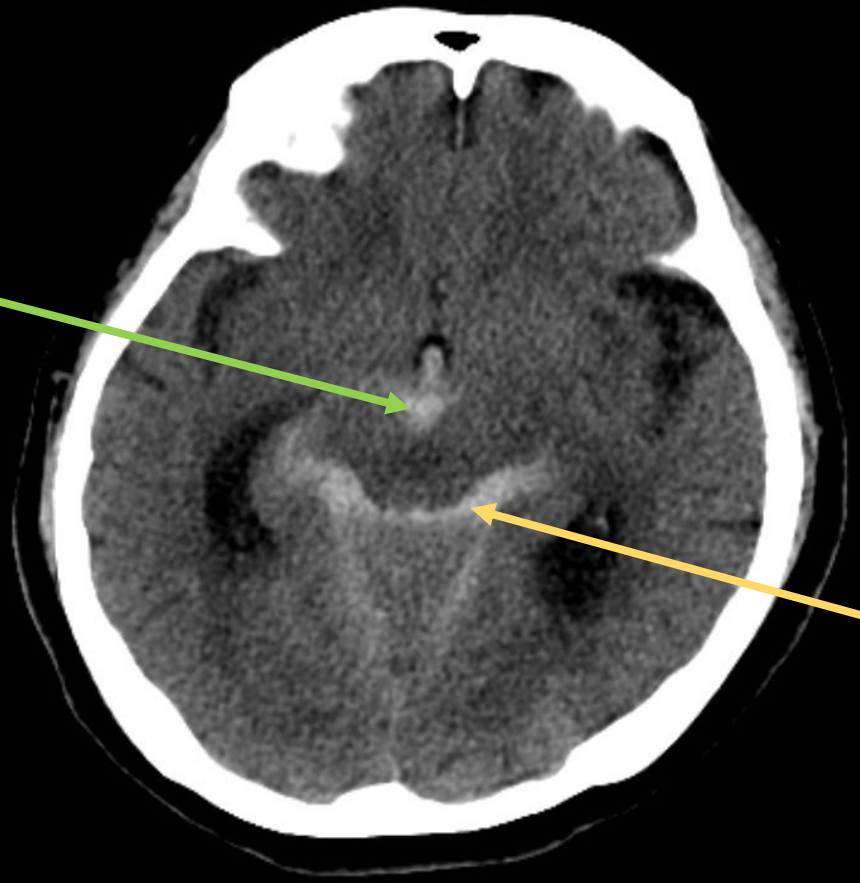
Intraventricular
hemorrhage (IVH)



Brain CT Findings

2026/10/15 4:18 Non-contrast Brain CT

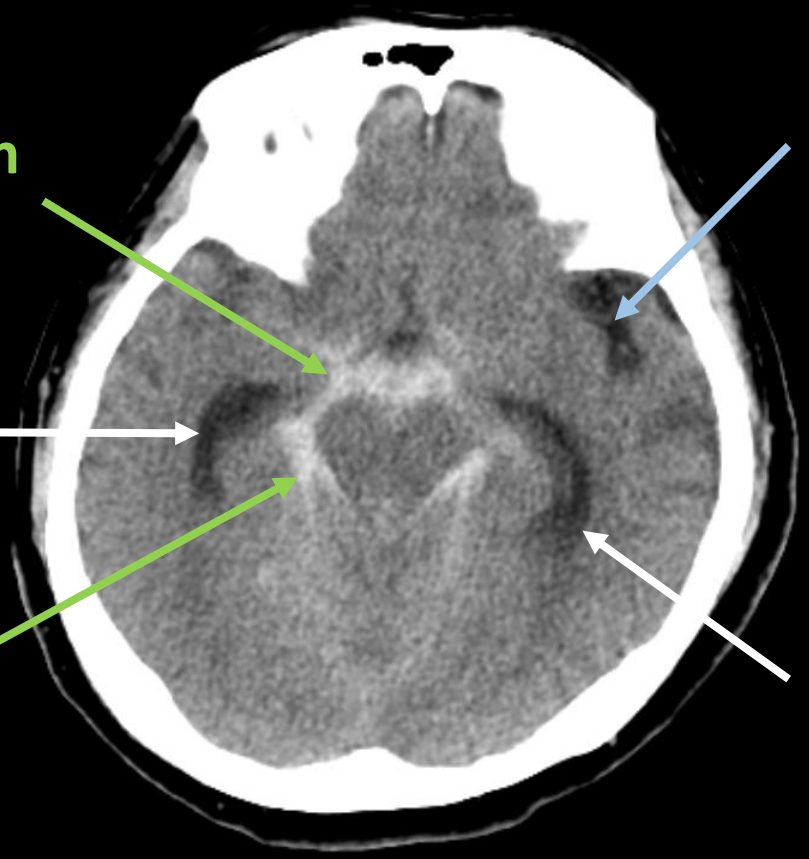
Hemorrhage in
interpeducular cistern



Hemorrhage in
quadrigeminal cistern

Brain CT Findings

2026/10/15 4:18 Non-contrast Brain CT



Hemorrhage in **suprasellar cistern**

Dilated **temporal horn**

Hemorrhage in **ambient cistern**

(x) No hemorrhage in **Sylvian fissure**

Dilated **temporal horn**

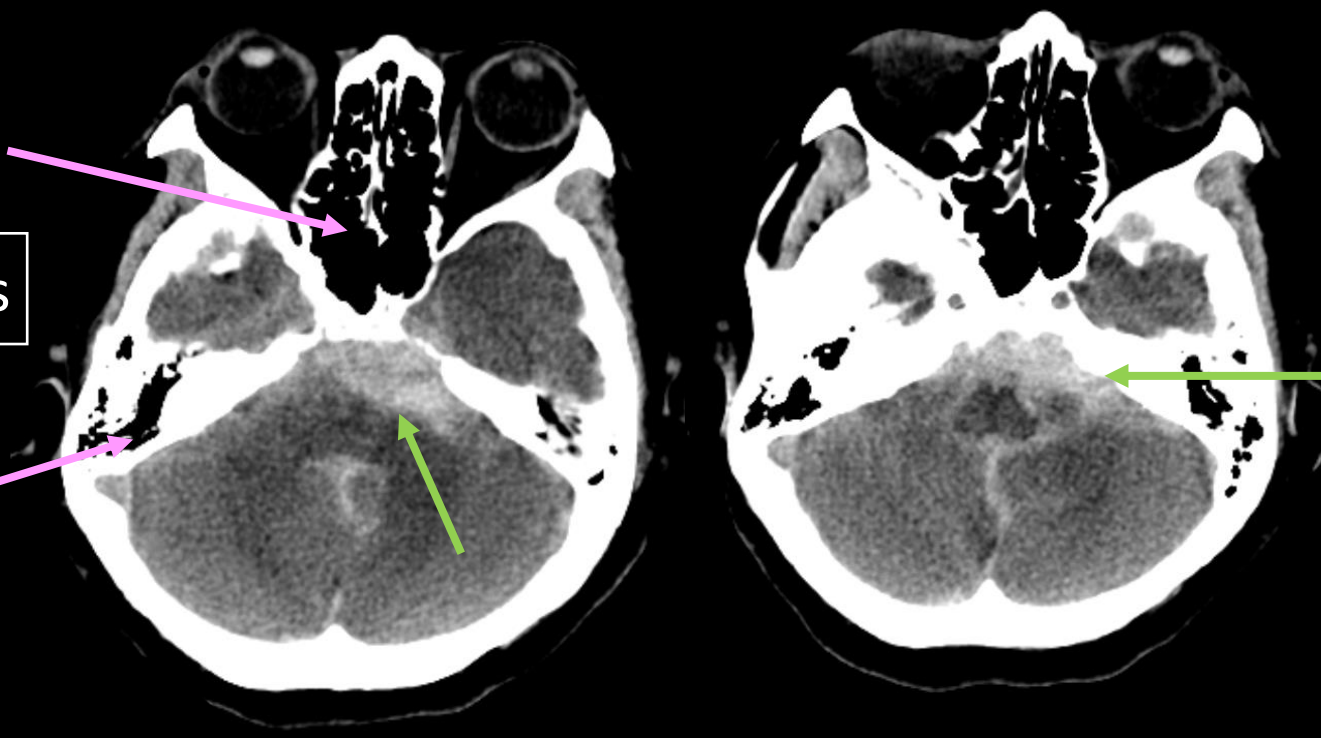
Brain CT Findings

2026/10/15 4:18 Non-contrast Brain CT

Air in
ethmoidal sinus

✓ Normal findings

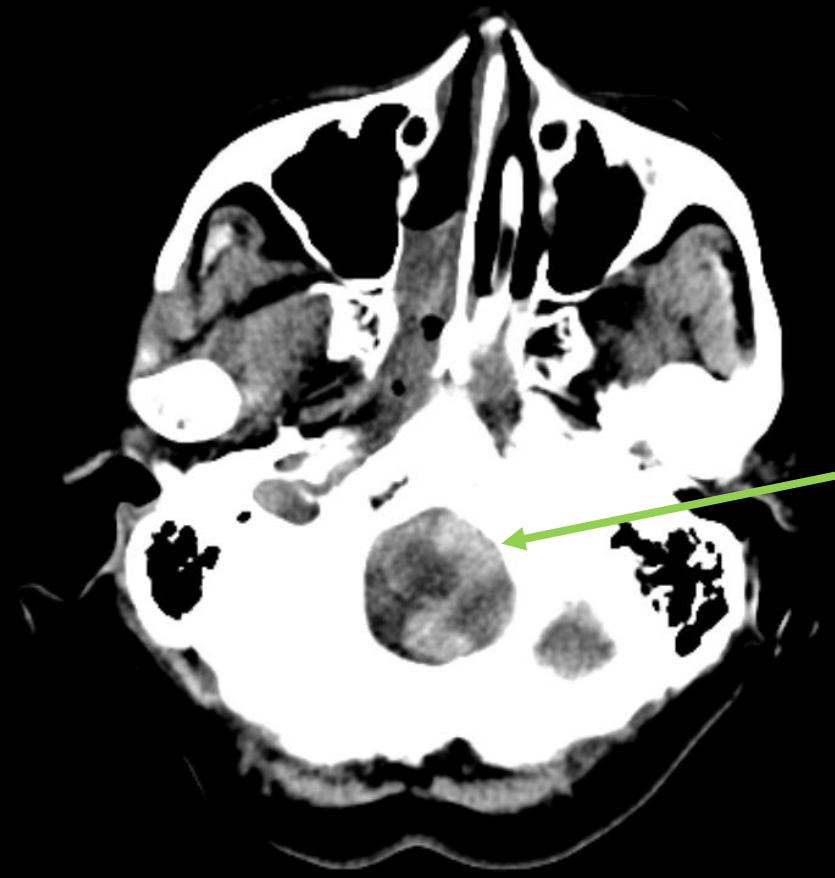
Air in
Mastoid cavity



Hemorrhage in
ventral side of cerebellum
(subarachnoid space)

Brain CT Findings

2026/10/15 4:18 Non-contrast Brain CT



Hemorrhage in
foramen magnum area
(subarachnoid space)

Thinking Process of SAH

Hemorrhage in **multiple cisterns** and **intraventricle** + **Hydrocephalus**

May possibly be:

Spontaneous (Primary) Subarachnoid Hemorrhage

Aneurysm location guessing:

Cerebral **posterior circulation**: ⭐
- ICA/P-com
- Basilar a.
- Vertebral a. and branches

(X) Sylvian fissure

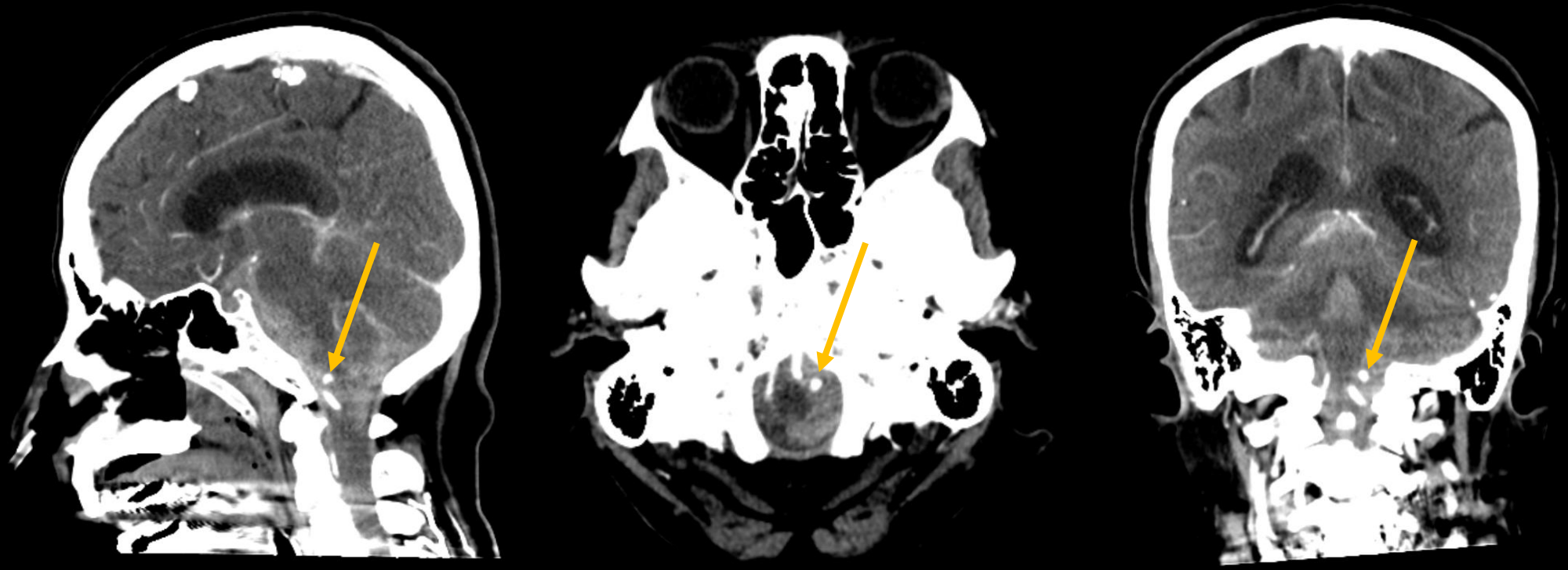
(O) Suprasellar cistern

↓ all the way down to

(O) Foramen magnum

Aneurysm Location Confirm: CTA

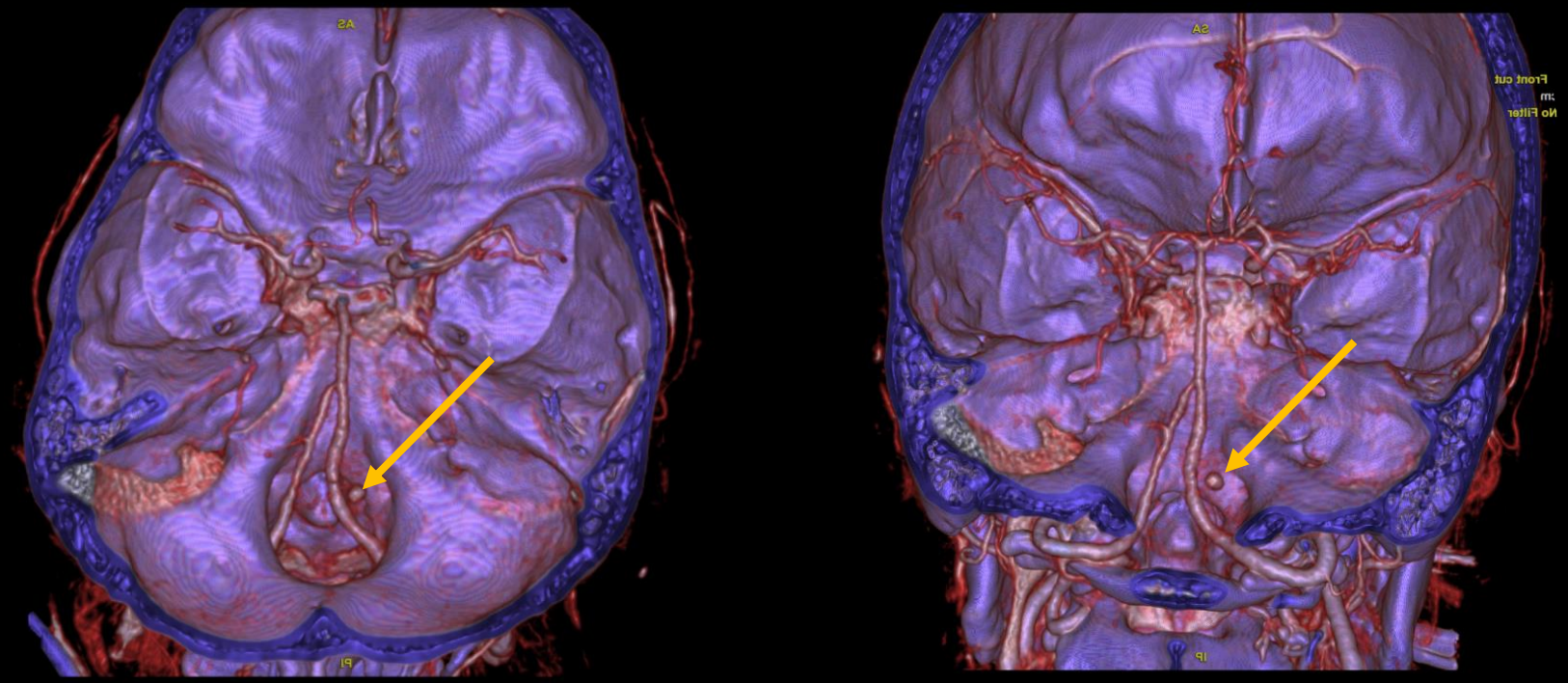
2026/10/15 4:37 Brain CT Angiography: source image



→ an **aneurysm** in **a branch of left vertebral artery**.

Confirmation: CTA

2026/10/15 4:37 Brain CT Angiography: 3D processed image

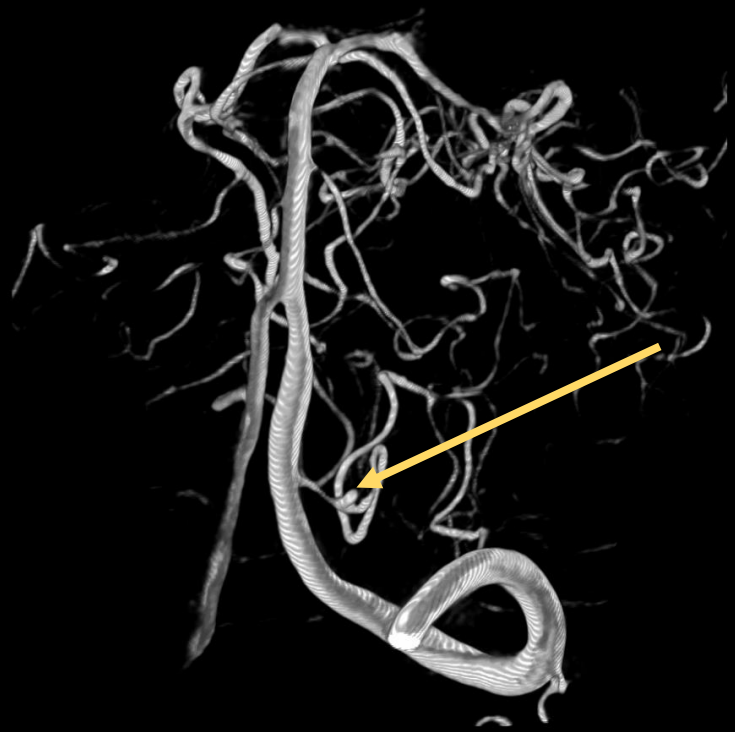


→ an **aneurysm** in **a branch of left vertebral artery**.

Confirmation: DSA

2026/10/15 6:42 Brain DSA / 3D processed Brain DSA





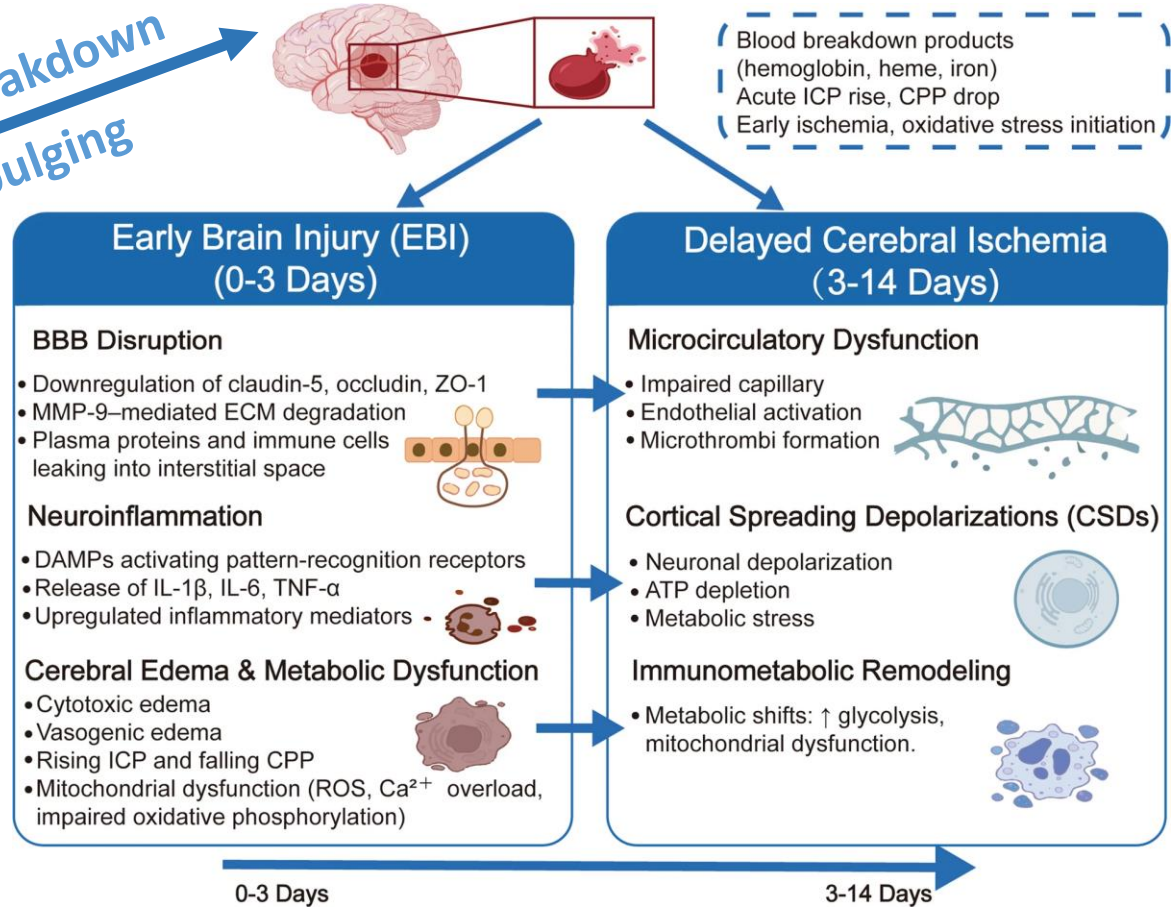
→ confirmed an **aneurysm** in **a branch of left vertebral artery**.

Pathophysiology of Spontaneous SAH

Etiology

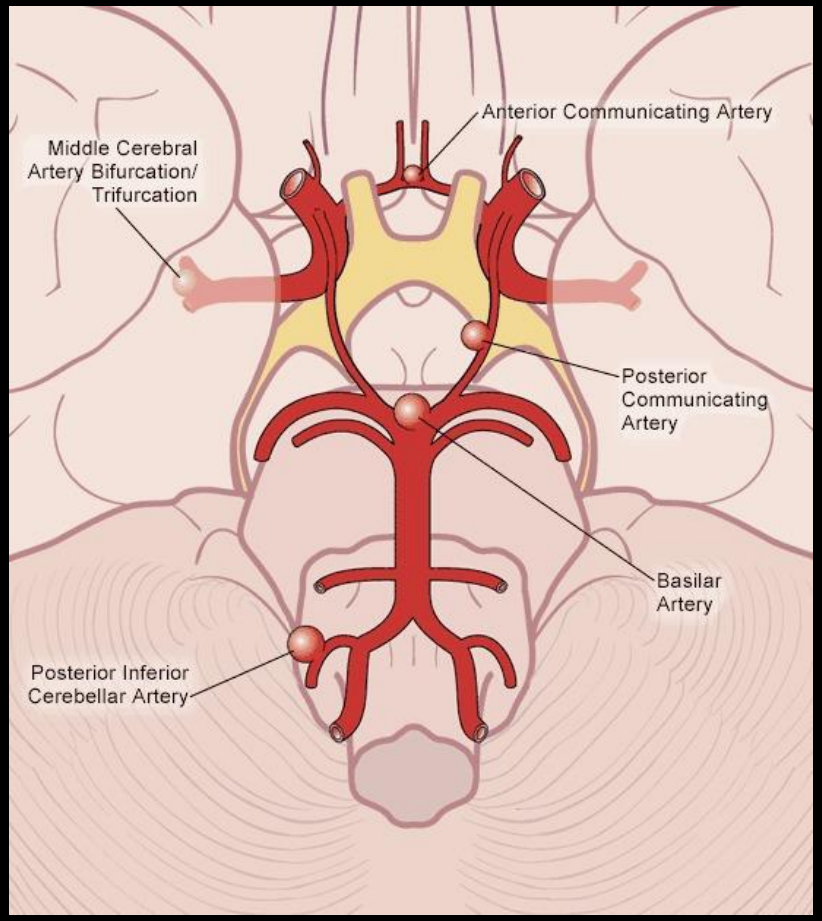
- **Aneurysm** (major)
- Arteriovenous malformation
- Vasculitis
- Intracranial arteriosclerosis

Elastic lamina breakdown
Arterial wall bulging



Shen, H., Yan, X., Zhao, M. *et al.* Subarachnoid hemorrhage: epidemiology, risk factors, pathogenesis, and clinical therapies. *Mol Biomed* **7**, 59 (2026).

Common Locations of Aneurysms



Near the **Suprasellar cistern**:

- ACoA (35%)
- ICA/PCoA (35%)
- Tip of BA (4%)

Near the **Sylvian fissure**:

- MCA bifurcation (20%)

Other (rare):

Our case (foramen magnum)

- VA and its branches (eg. PICA)

References

- WC Shen: 神經放射診斷學 2020 力大
- Richmond J, Quarles J, Talati S ... Educational Case: Mechanism and locations of intracranial hypertensive hemorrhage leading to stroke Academic Pathology, 2025; 12
- Shen, H., Yan, X., Zhao, M. *et al.* Subarachnoid hemorrhage: epidemiology, risk factors, pathogenesis, and clinical therapies. *Mol Biomed* **7**, 59 (2026).

