CT Brain

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North Manchester General Hospital

Questions?

- When should we do a head CT?
- What approach should we take when reading a CT?
- What does a normal CT look like?
- What do abnormalities look like?

Assessment in emergency department

Stabilise airway, breathing and circulation (ABC) before attending to other injuries.

GCS ≤ 8

Involve **anaesthetist or critical care physician** early to provide appropriate airway management and assist with resuscitation

Exclude significant brain injury **before** ascribing depressed conscious level to intoxication

GCS 9–14

Immediately

GCS 15

Within 15 minutes of arrival

Assess risk of clinically important brain injury/cervical spine injury (see pages 8–11)

High risk
Extend assessment to full clinical examination to establish need for imaging of head and/or cervical spine (see pages 8–11)

Low risk
Emergency department clinician should re-examine within a further hour – part of assessment should establish need for CT imaging of head and/or cervical spine (see pages 8–11)

Pain management

- Manage pain effectively and reassure patients.
- Treat significant pain with low dose of intravenous opioids titrated against clinical response and baseline cardiorespiratory measurements.

Training

- All emergency department clinicians involved in assessing patients with head injuries should be able to assess the presence and absence of the risk factors listed on pages 8–11 on selection and urgency for imaging – training should be available as required to ensure this.
- Emergency department (and all in-hospital) observations of patients with head injuries should only be carried out by professionals competent in the assessment of head injury.
- All those involved in the assessment of infants and children with head injury should be trained to detect non-accidental injury.

If patient returns to emergency department within 48 hours of discharge with persistent complaint relating to initial head injury, involve a senior clinician with experience in head injuries and consider CT scan.

GCS < 13 when first assessed in emergency department
GCS < 15 when assessed in emergency department 2 hours after the injury
Suspected open or depressed skull fracture
Sign of fracture at skull base (haemotympanum, 'panda' eyes, cerebrospinal fluid leakage from ears or nose, Battle's sign)
Post-traumatic seizure
Focal neurological deficit
> 1 episode of vomiting

Amnesia of events > 30 minutes before impact

Yes

No

Any amnesia or loss of consciousness since the injury?

Yes

No

Are any of the following present?

- ▲ Age ≥ 65 years
- ❋ Coagulopathy (history of bleeding, clotting disorder, current treatment with warfarin)
- ▲ Dangerous mechanism of injury
  - pedestrian or cyclist struck by a motor vehicle
  - occupant ejected from a motor vehicle
  - fall from > 1 m or 5 stairs

Yes

No

uest CT scan
nmediately

No imaging required now

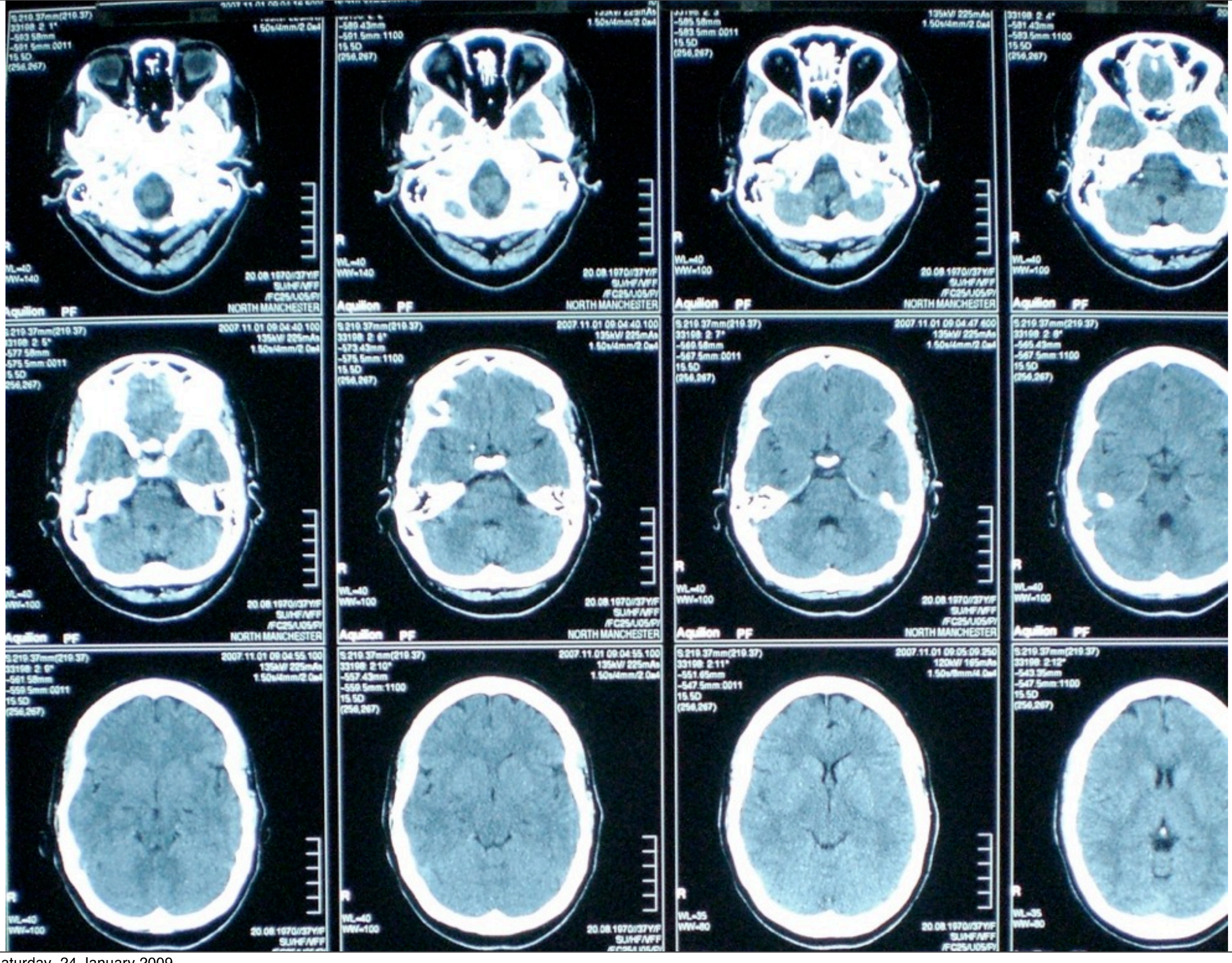
❋ Imaging should be carried out and results analysed within 1 hour of request being received by radiology department

▲ Imaging should be carried out within 8 hours of injury, or immediately if patient presents 8 hours or more after the injury[1]

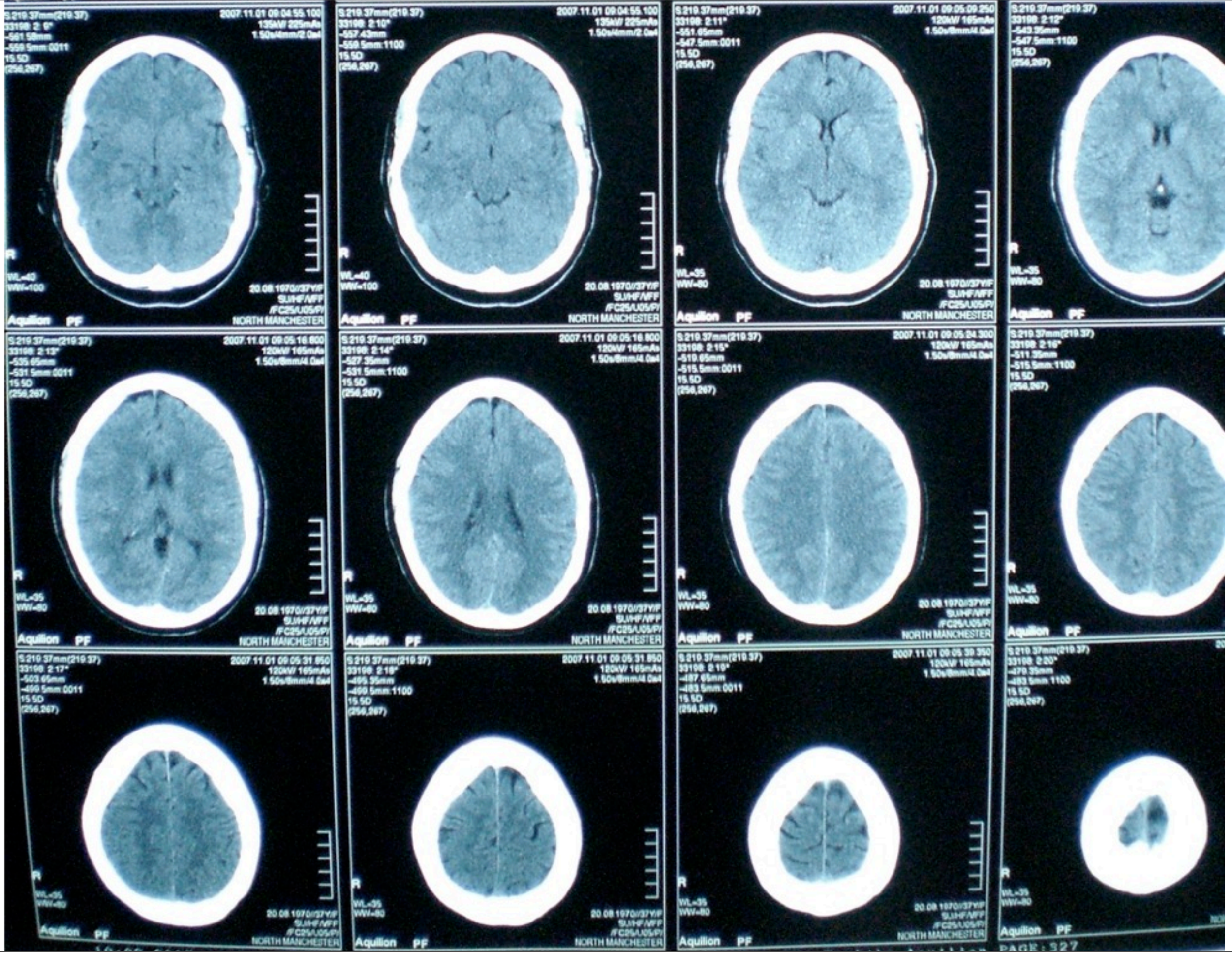
ient presents out of hours and is ≥ 65, has amnesia for events more than 30 minutes before impact or there was a rous mechanism of injury, it is acceptable to admit for overnight observation, with CT imaging the next morning, **s CT result is required within 1 hour because of the presence of additional clinical findings listed above**

Reading brain CT

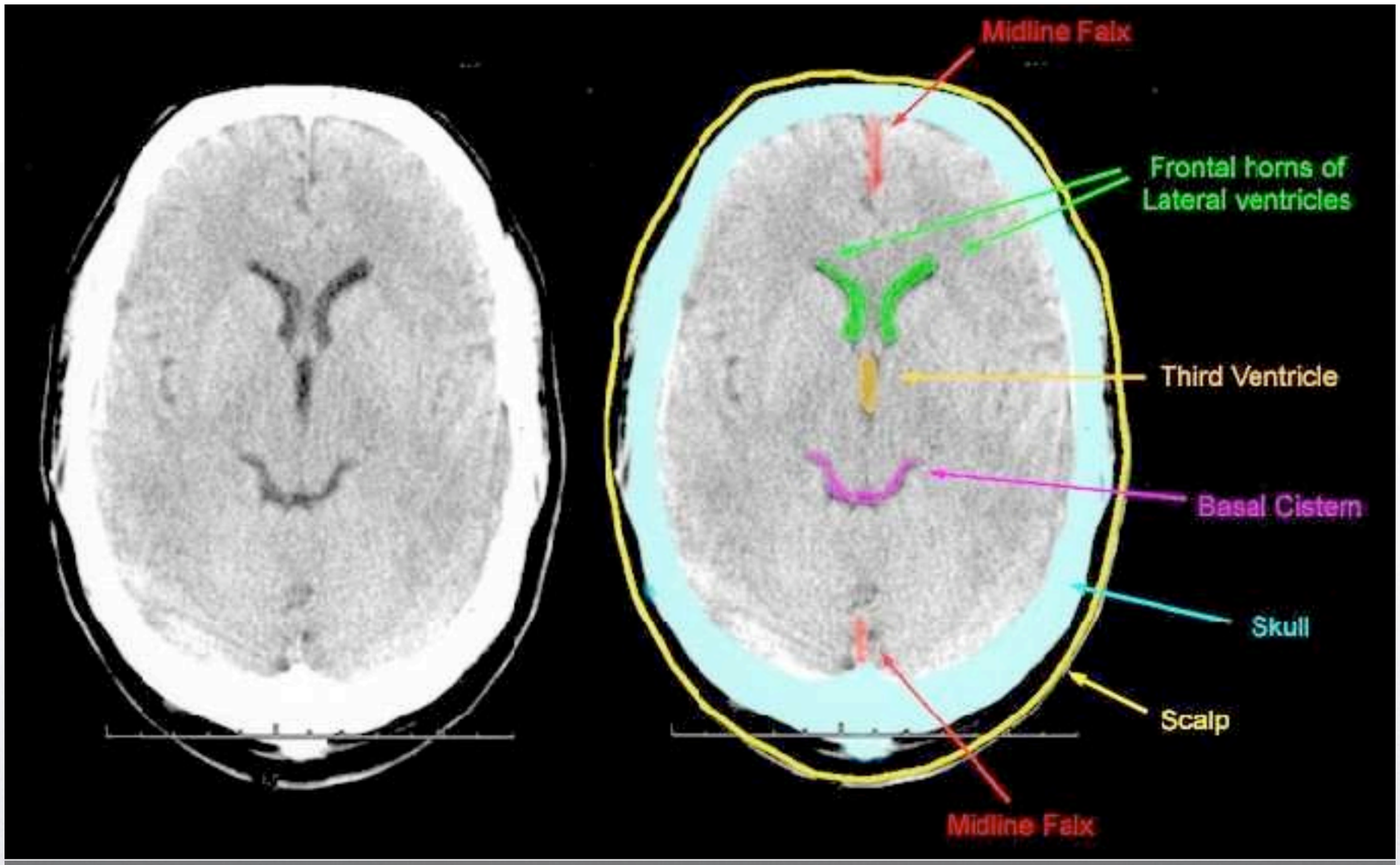
- No contrast for trauma-confuses with blood
- Systematic approach
- Get bearings, bottom to top, front to back
- Soft tissue swelling
- Bony windows
- Fluid in sinuses, air in cranium
- Check gyri/sulci for depth; 'tight' in DAI, 'loose' in atrophy
- Look for Intracranial haematoma
- Check brain substance for changes in density
- Lateral ventricles, third and fourth ventricles; size, position?
- Midline shift
- See here



Saturday, 24 January 2009

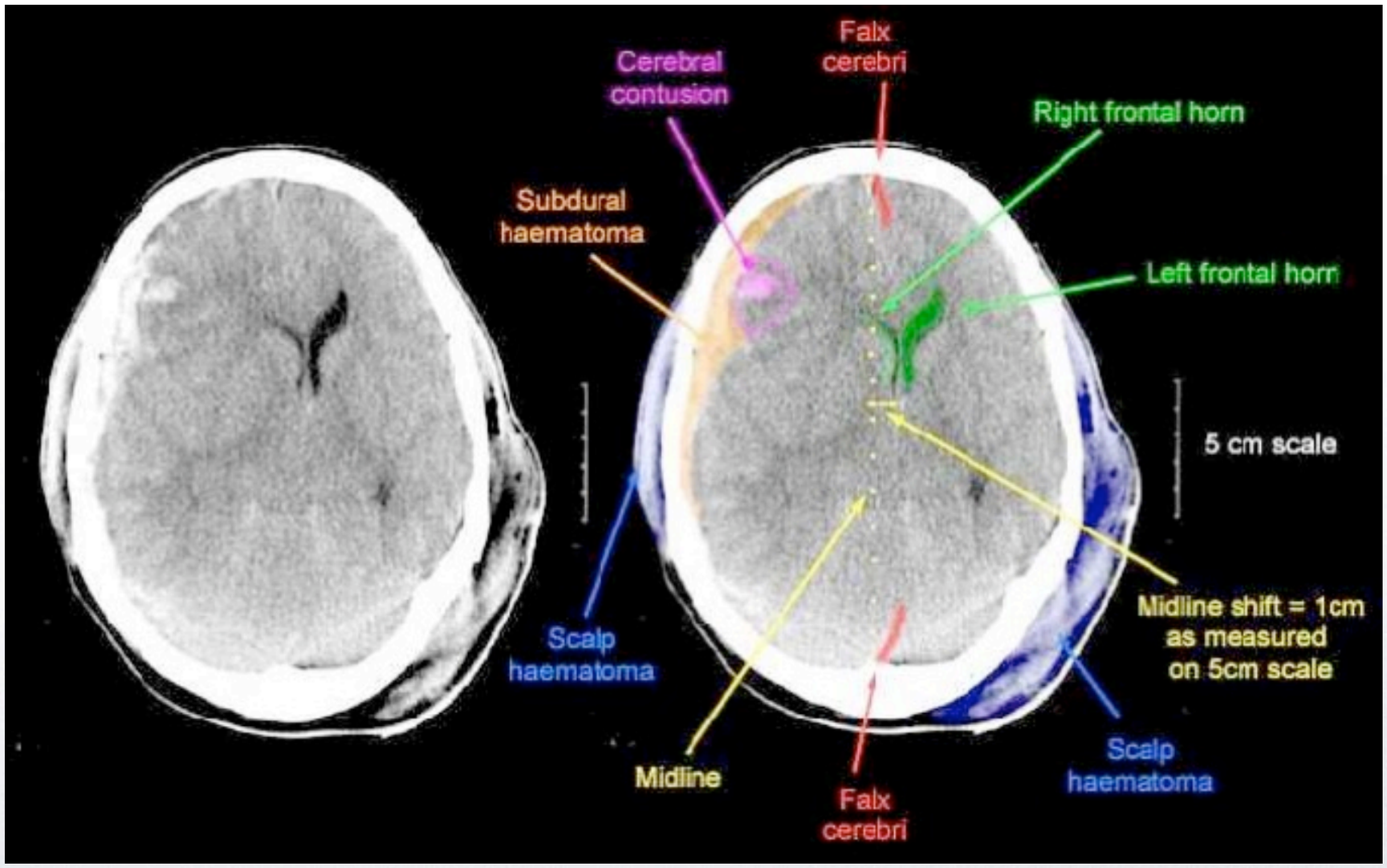

Aquilion PF
NORTH MANCHESTER

Normal CT


Midline Falx
Frontal horns of
Lateral ventricles
Third Ventricle
Basal Cistern
Skull
Scalp
Midline Falx

Acute Subdural

- Elderly/ alcoholics
- Thin edges
- Worse prognosis
- Underlying oedema
- Heterogeneity with chronic subdural



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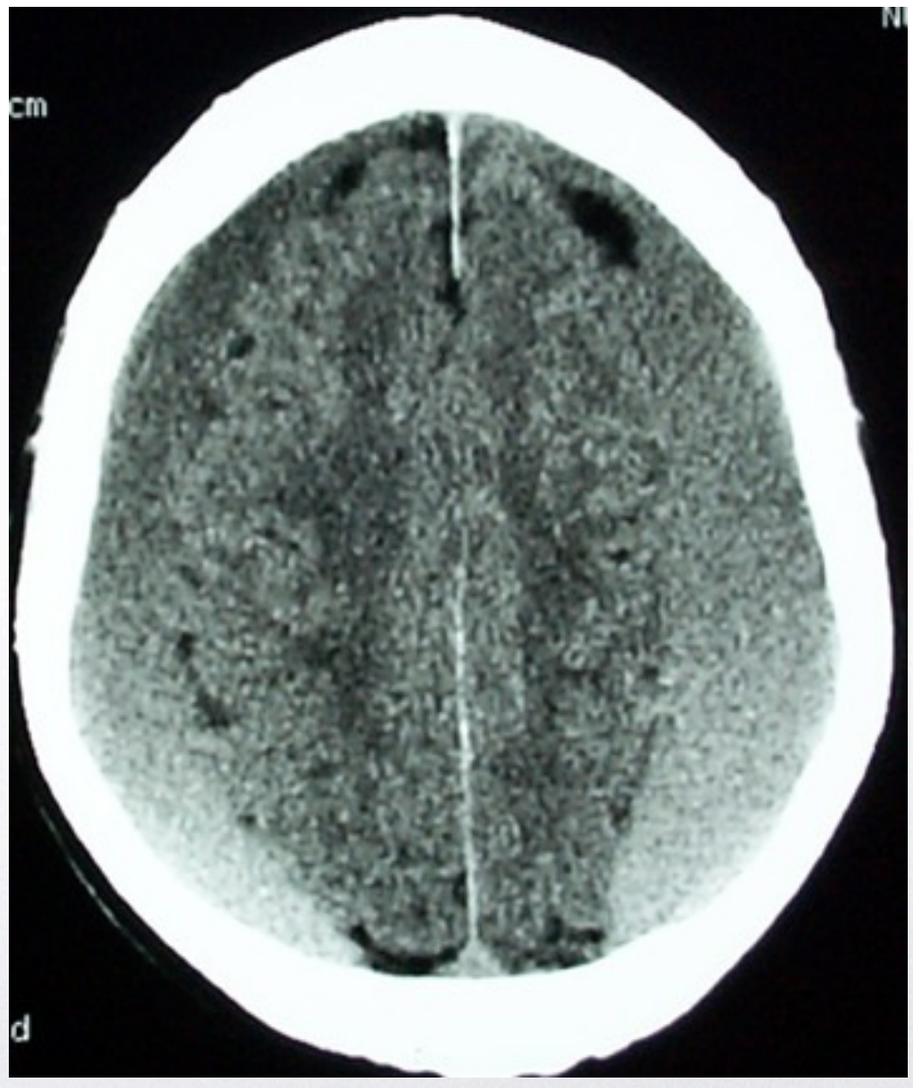

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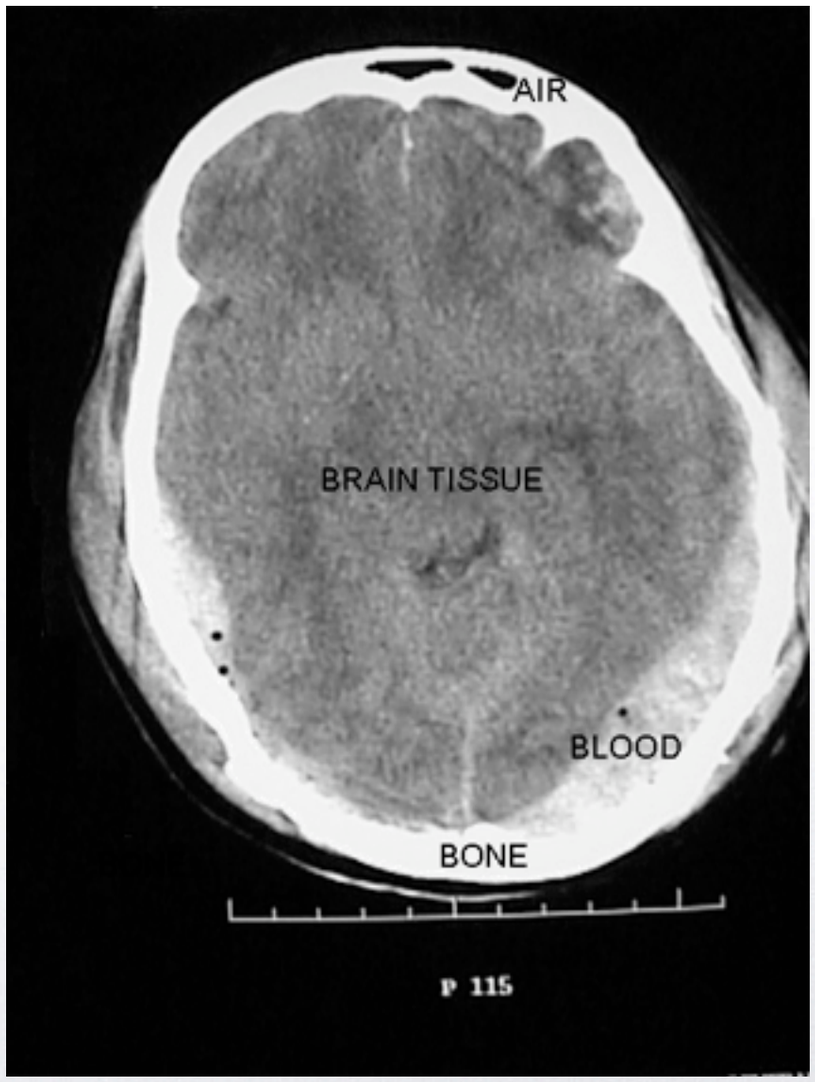

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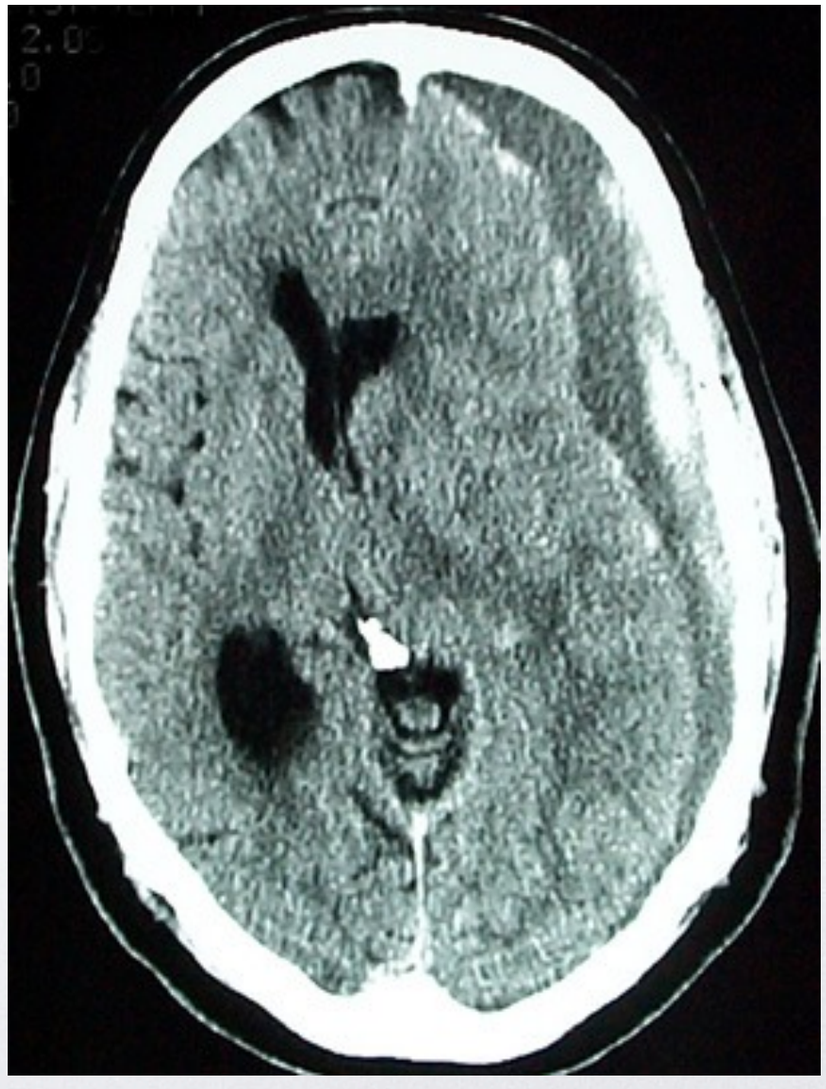

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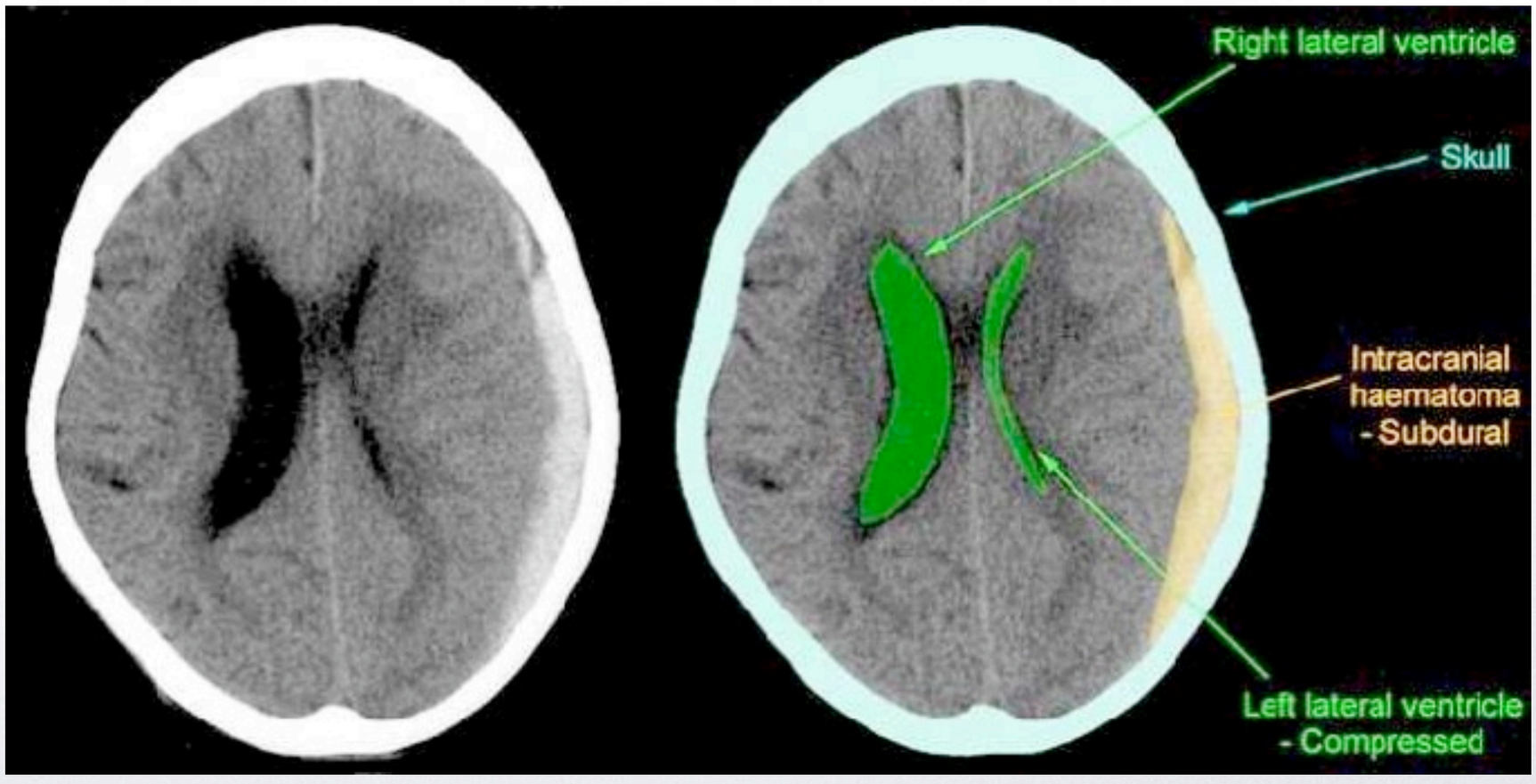
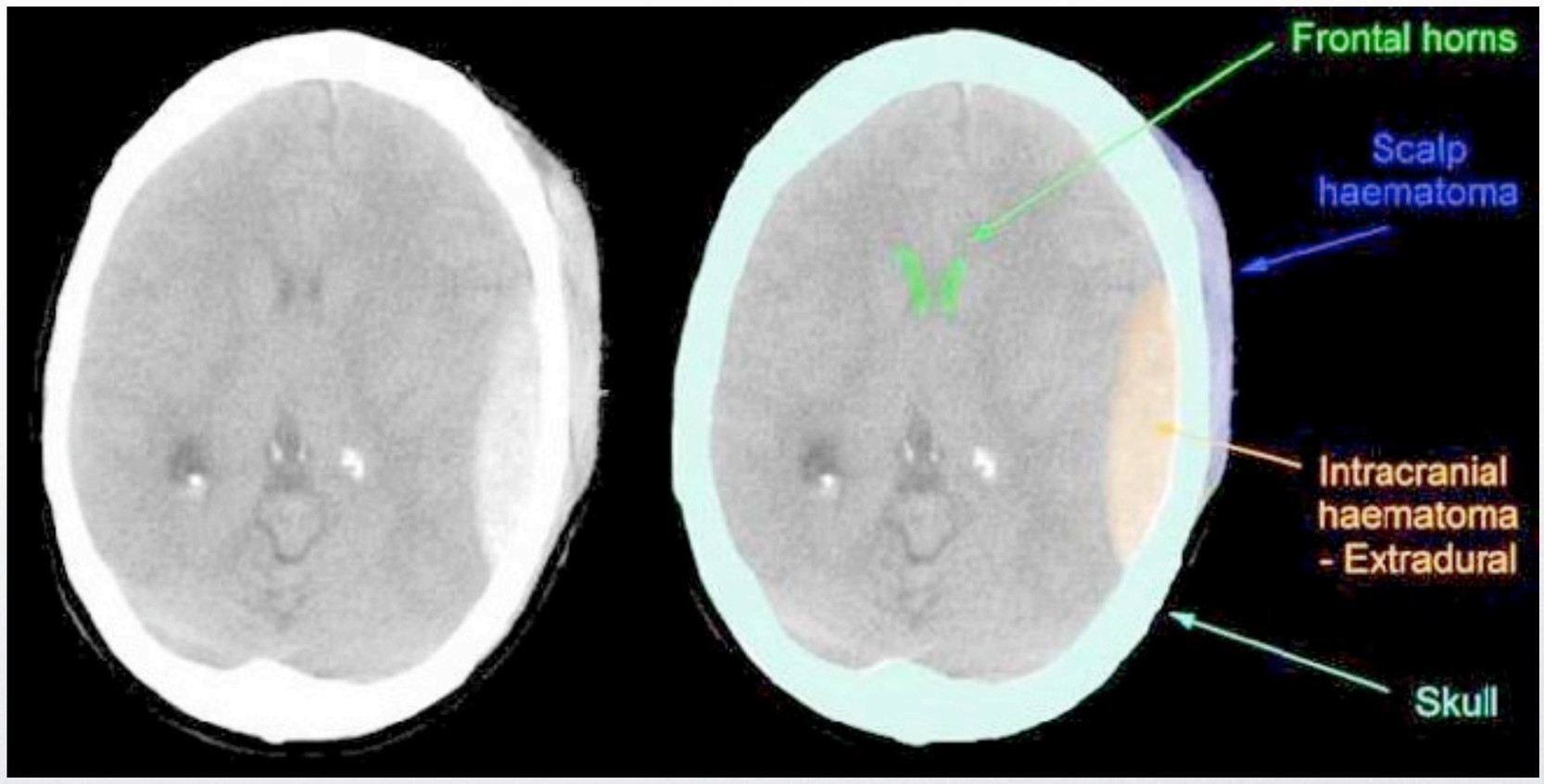


Extradural

- Blunt edges
- Lenticular shape
- ?Mid-line shift
- Better prognosis
- Usually needs draining



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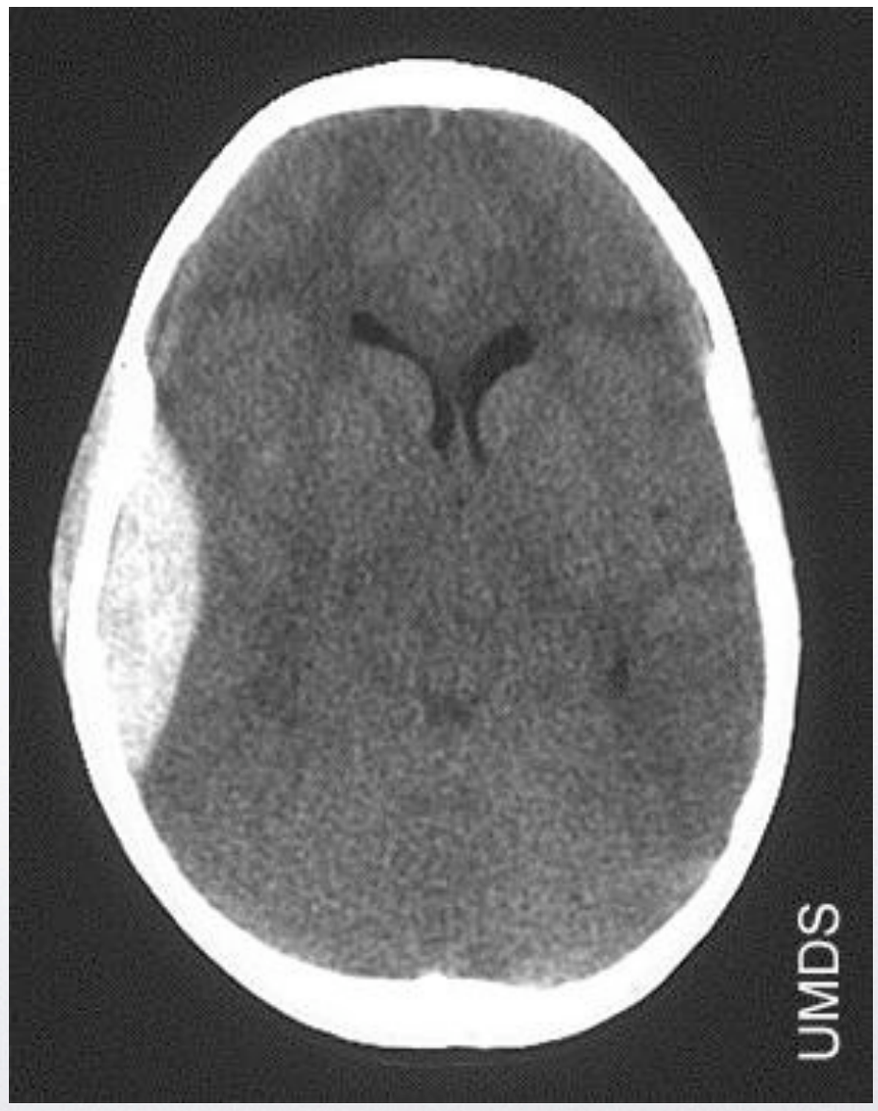

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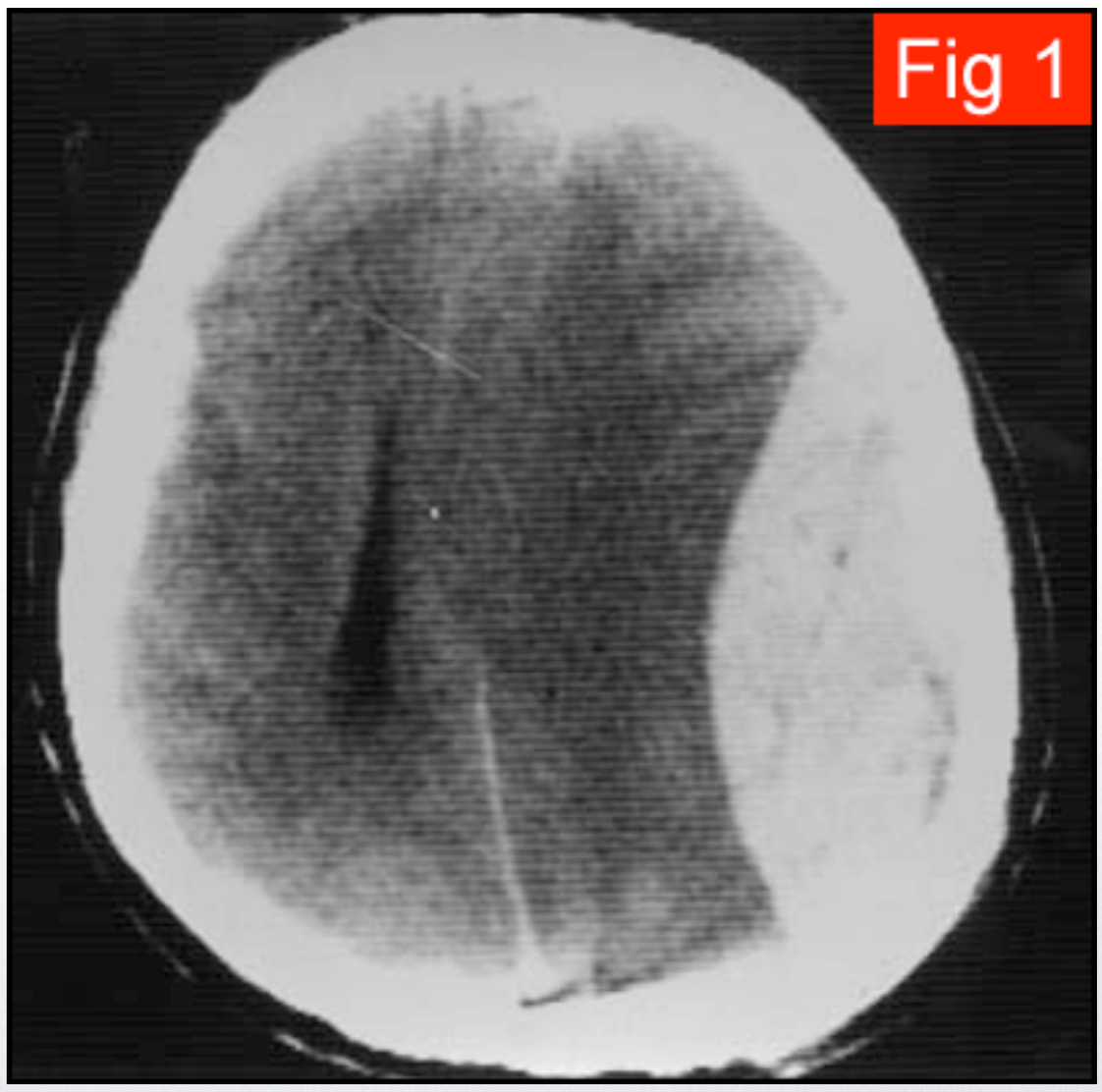
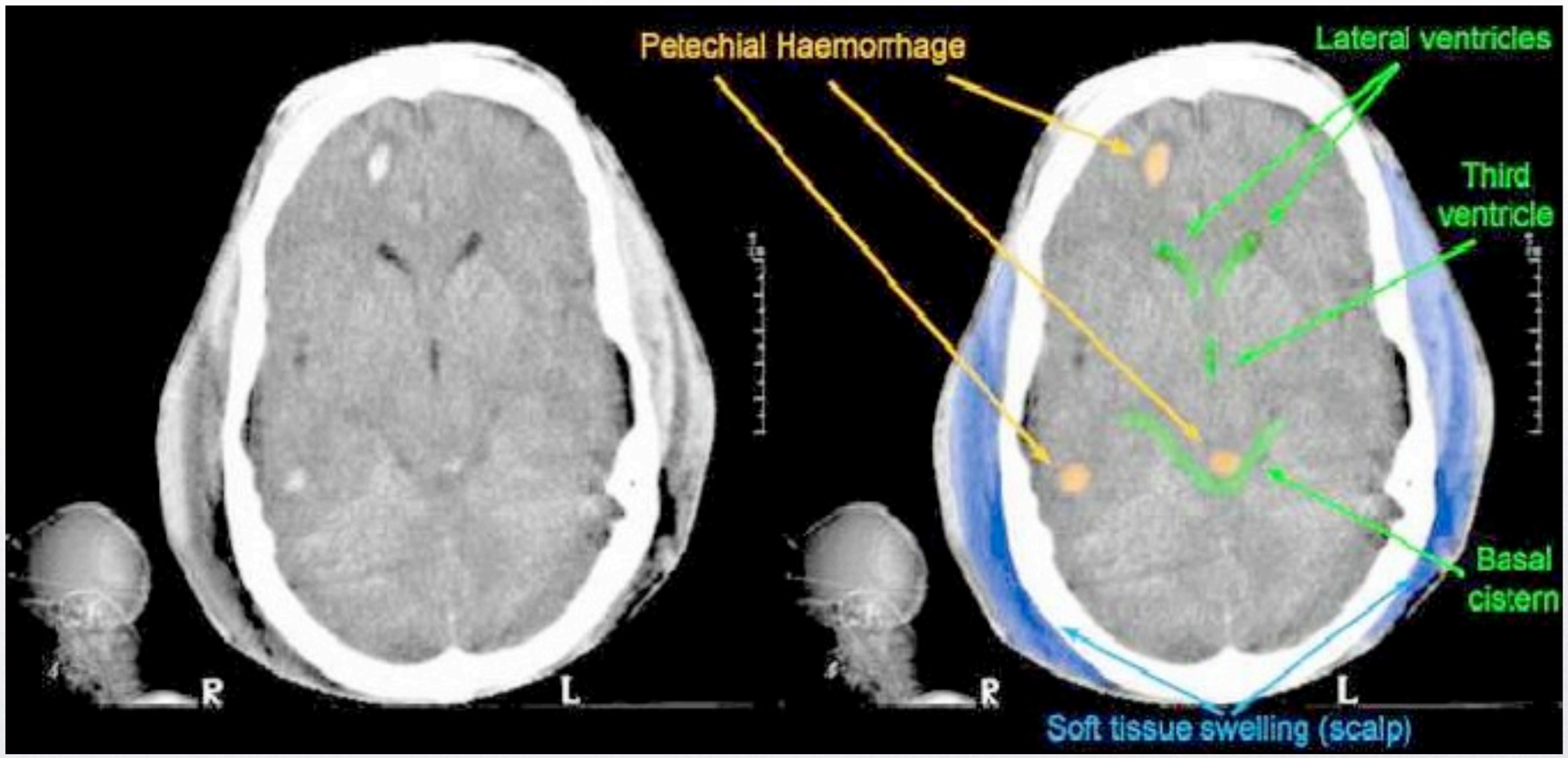


Diffuse Axonal Injury

- Loss of sulci/ gyri detail
- Effacement of ventricles/ cisterns
- May have petechiae



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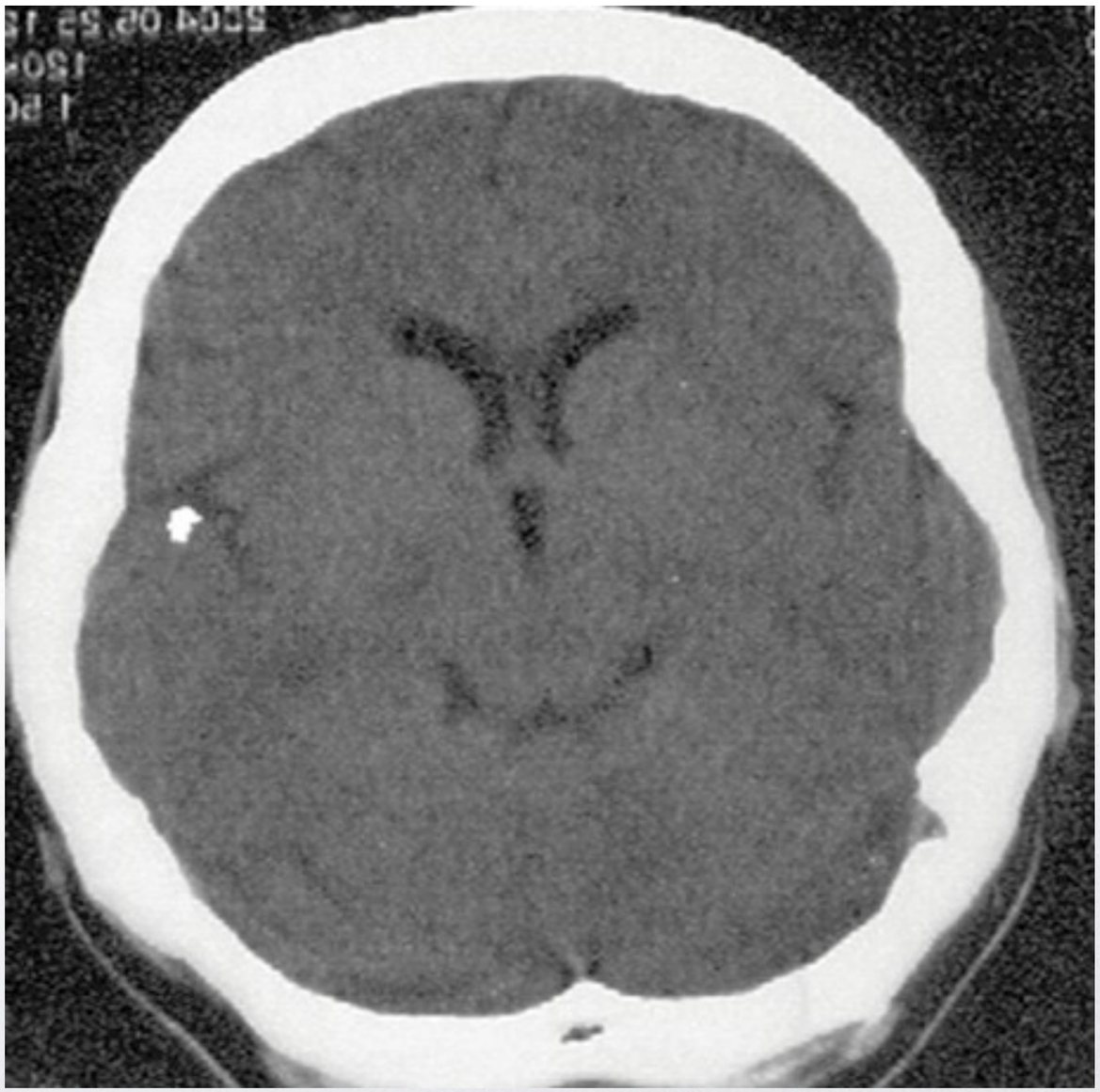
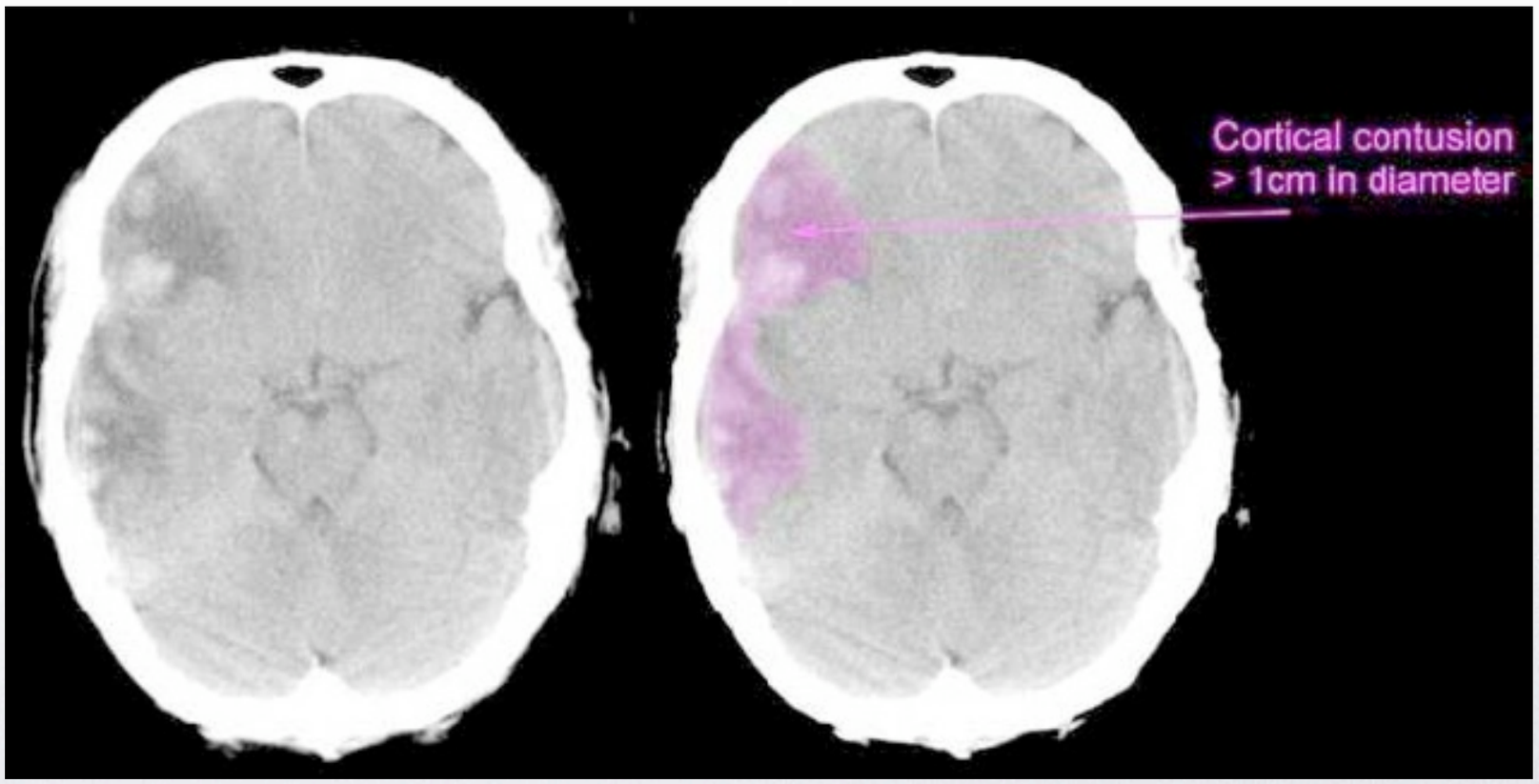


Cortical Contusion

- Hyperdense in brain substance
- Surrounding oedema
- Coup/contre coup



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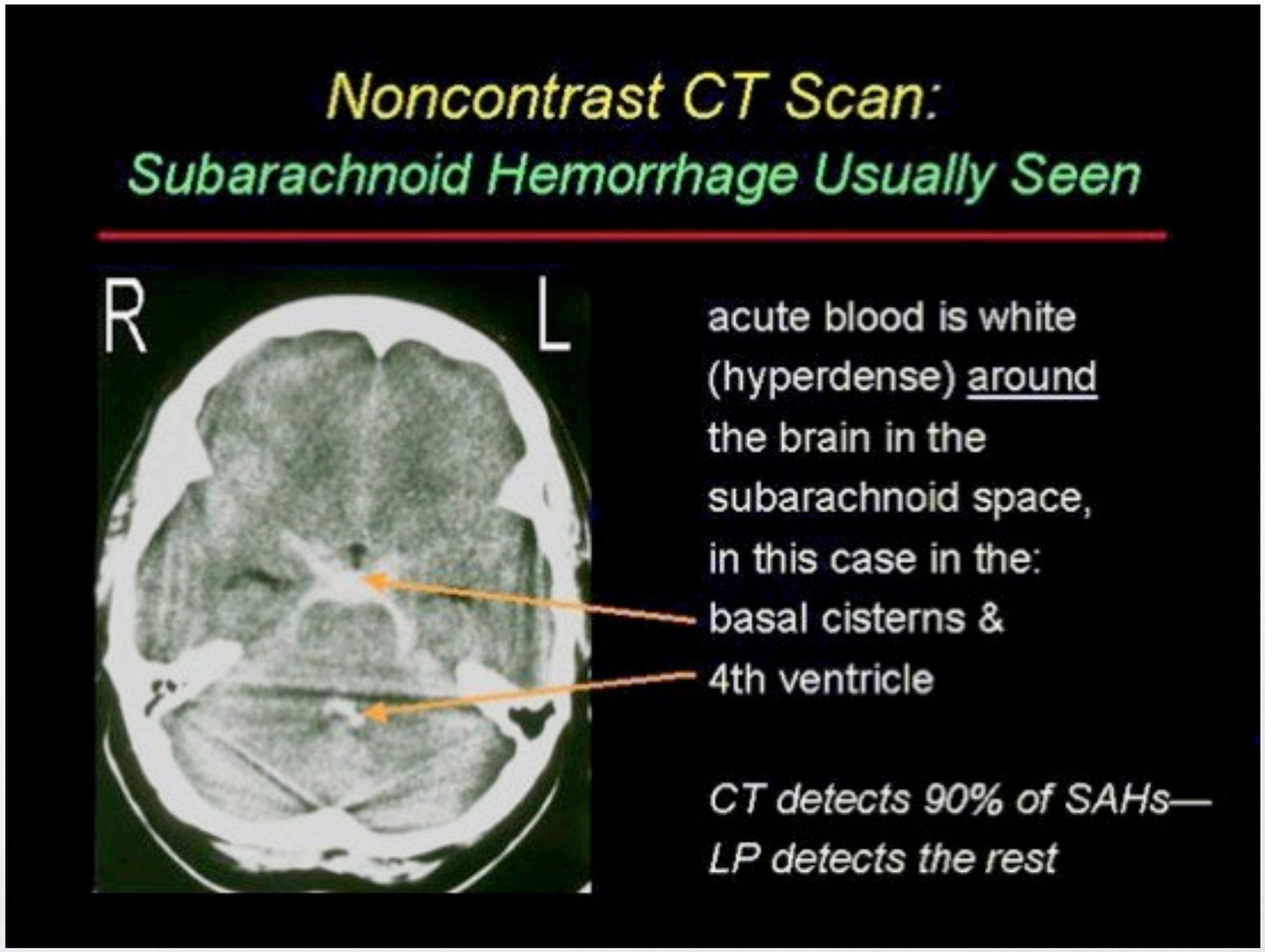
Subarachnoid Haemorrhage

- No contrast
- Best 2-3 days
- Picks up 90% rest LP at 12 hours
- Radiodense in normally 'black' areas: Basal cisterns, ventricles. Sylvian fissure, hemispheric fissure etc



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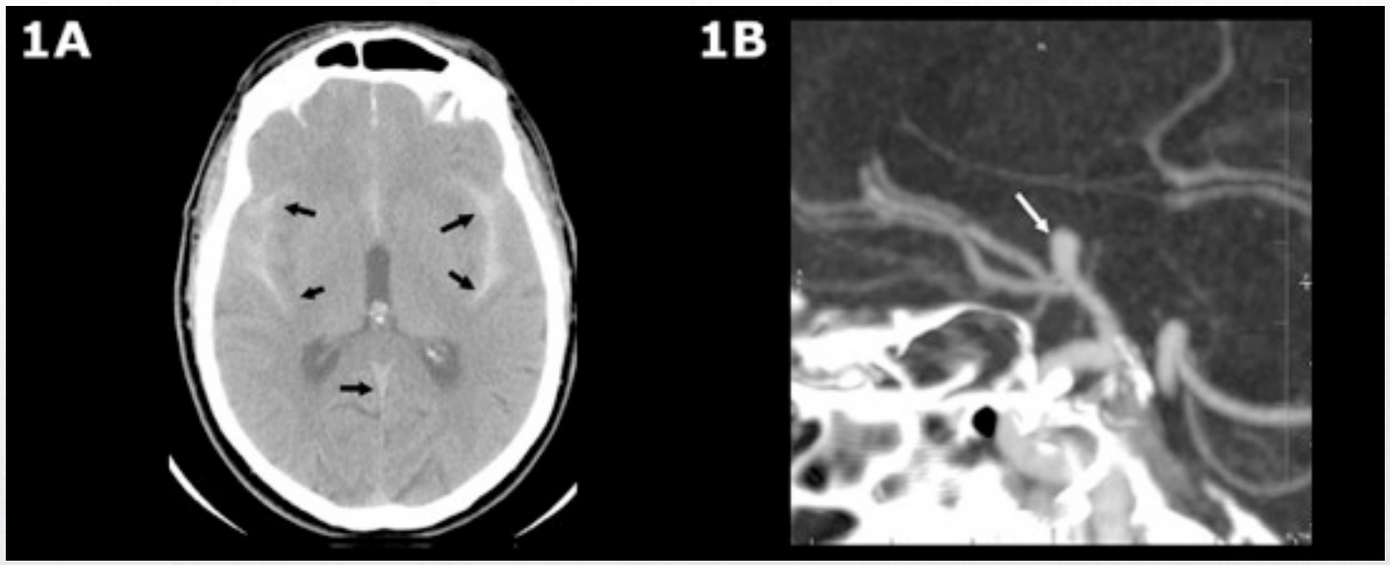

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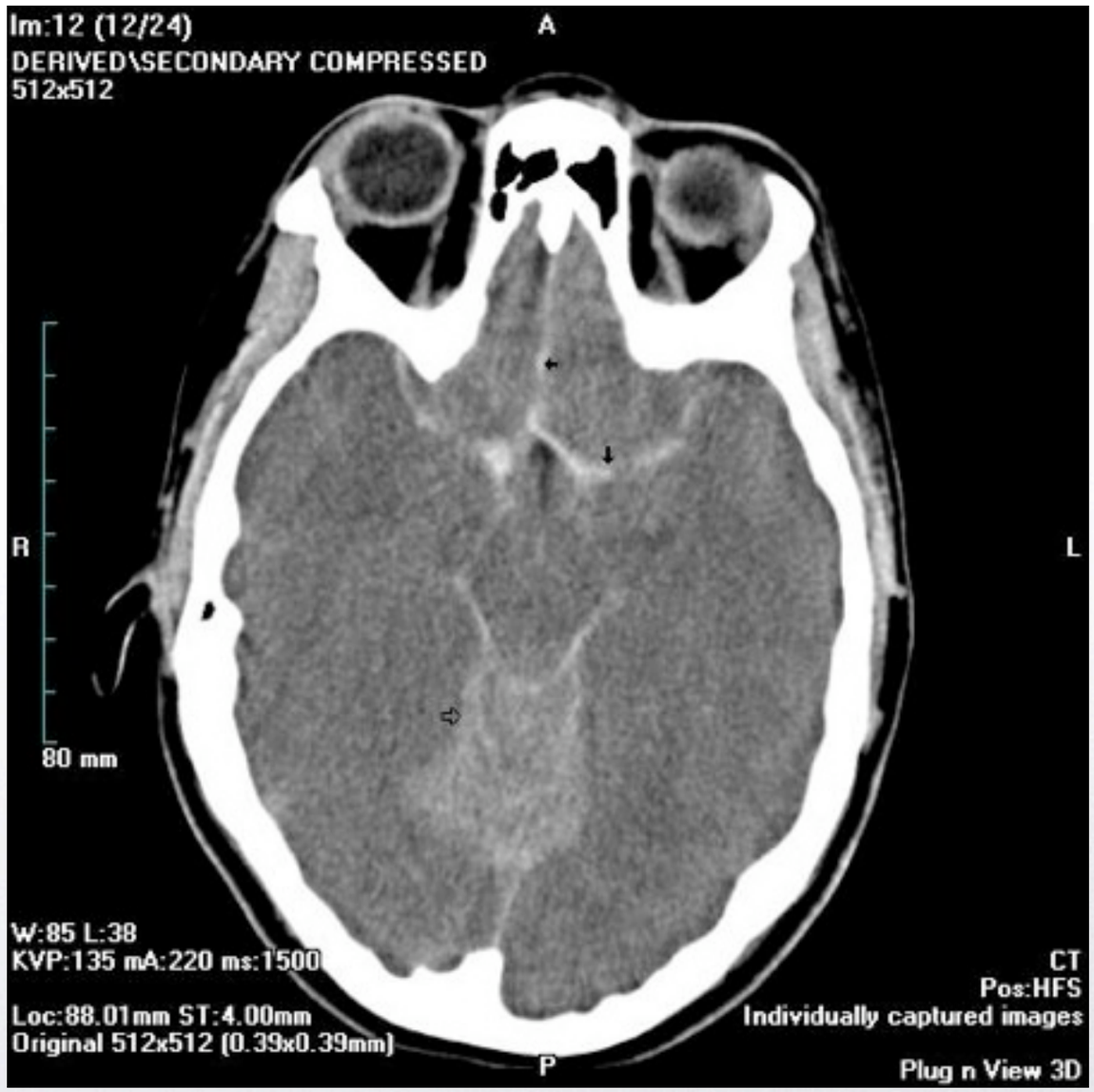
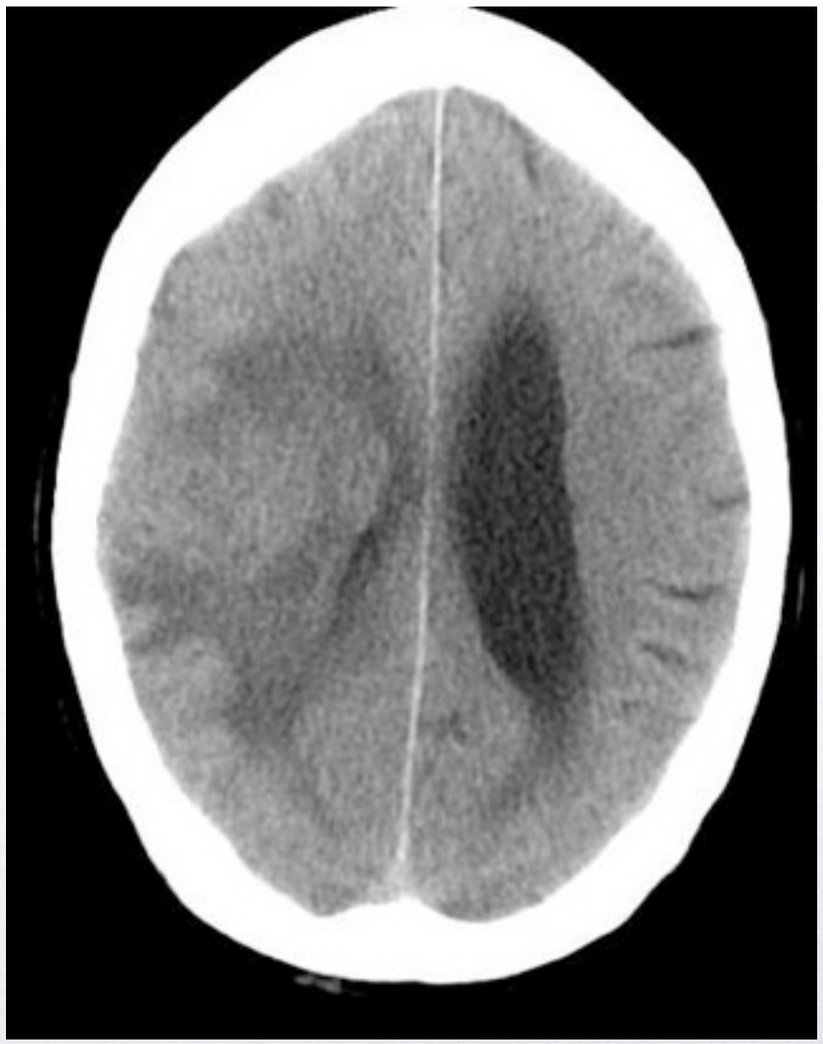


Brain Tumour

- With and without contrast
- May have hint of abnormality before, contrast usually shows it up



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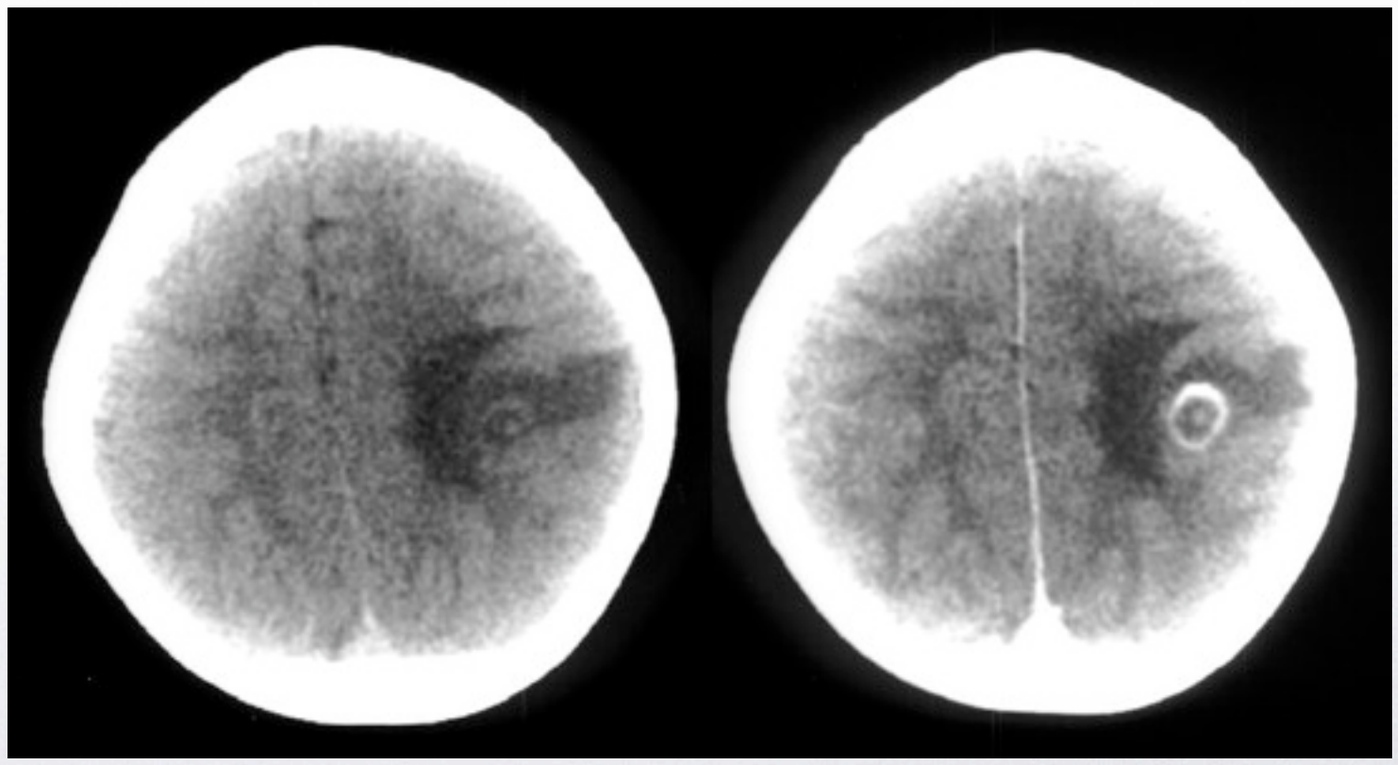
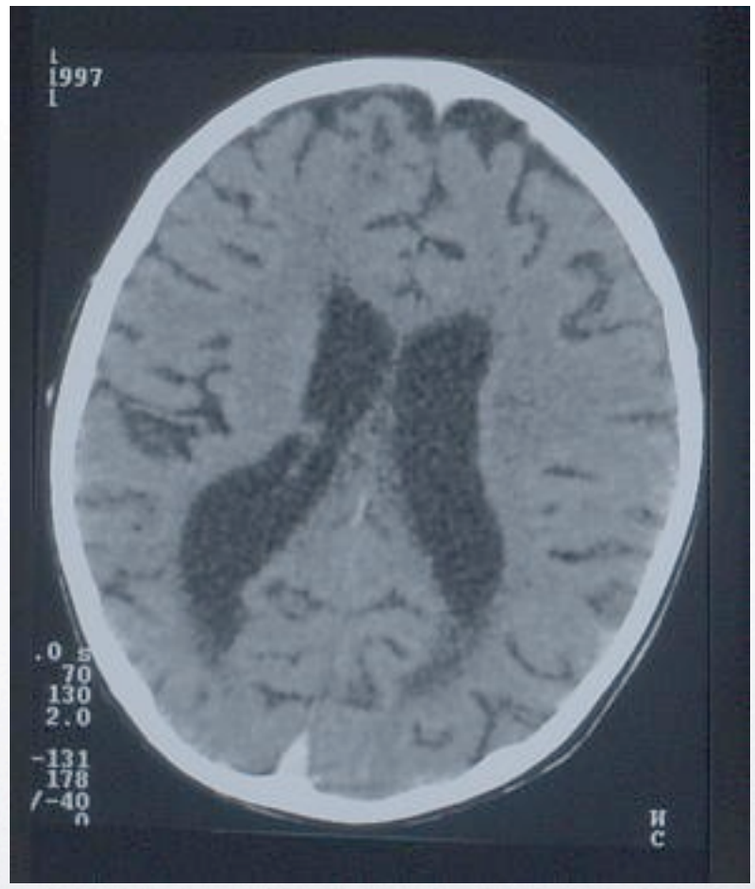


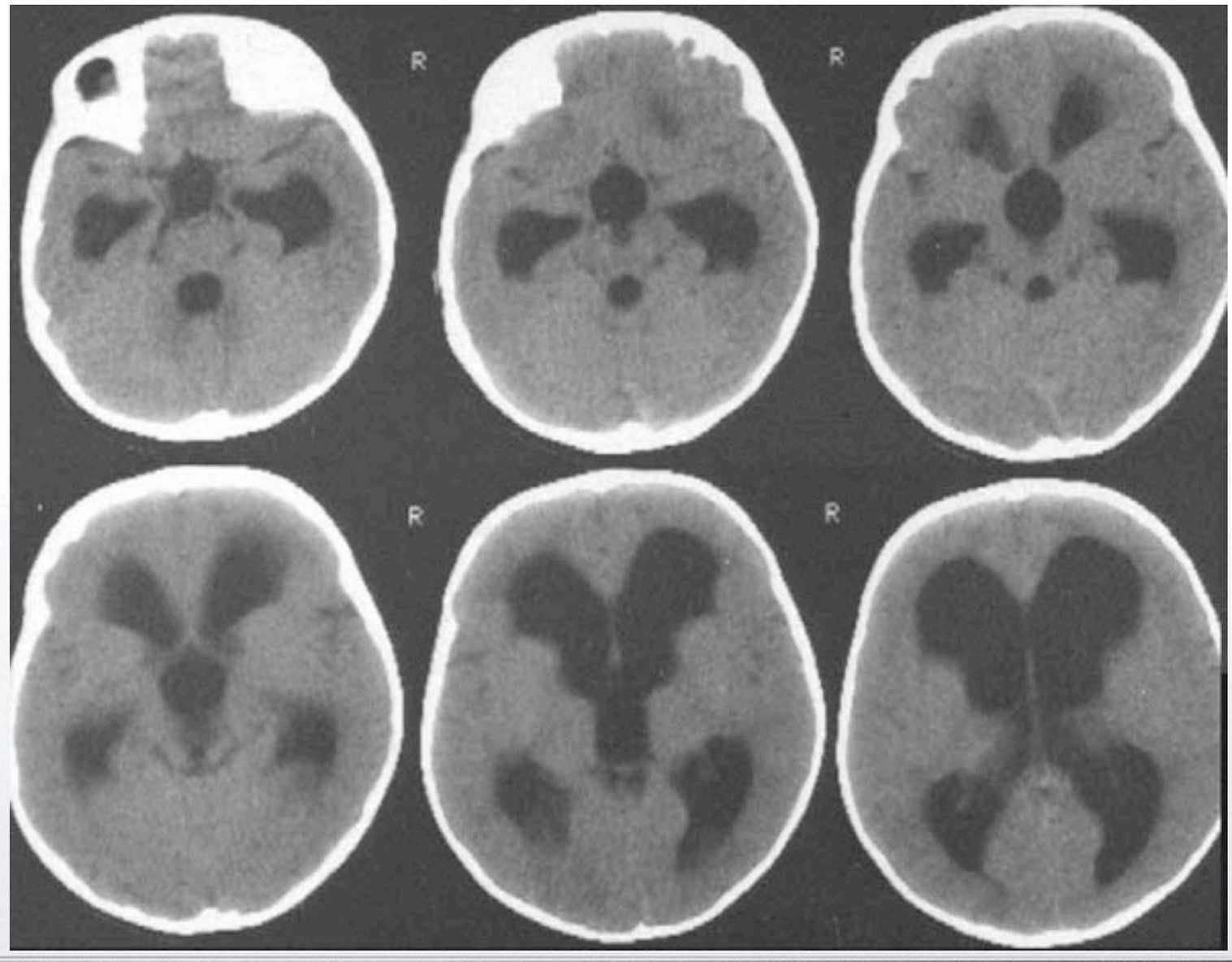
Cerebral Atrophy

- Elderly, dementia, alcoholic
- Increased risk of sub-dural
- Differentiate from hydrocephalus by maintenance of sulci/gyri



Hydrocephalus

- Chronic
- Acute: peri-ventricular oedema



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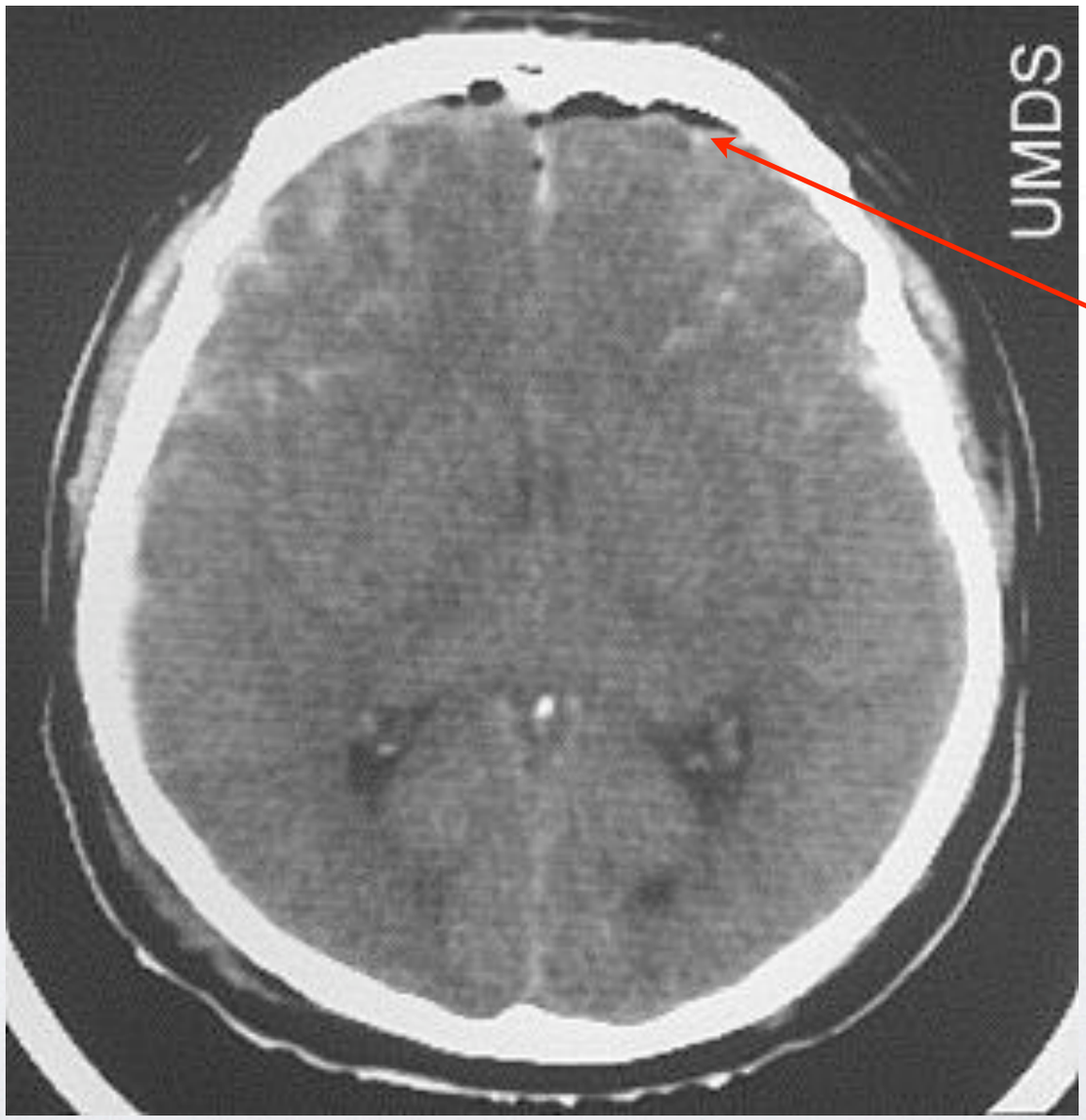
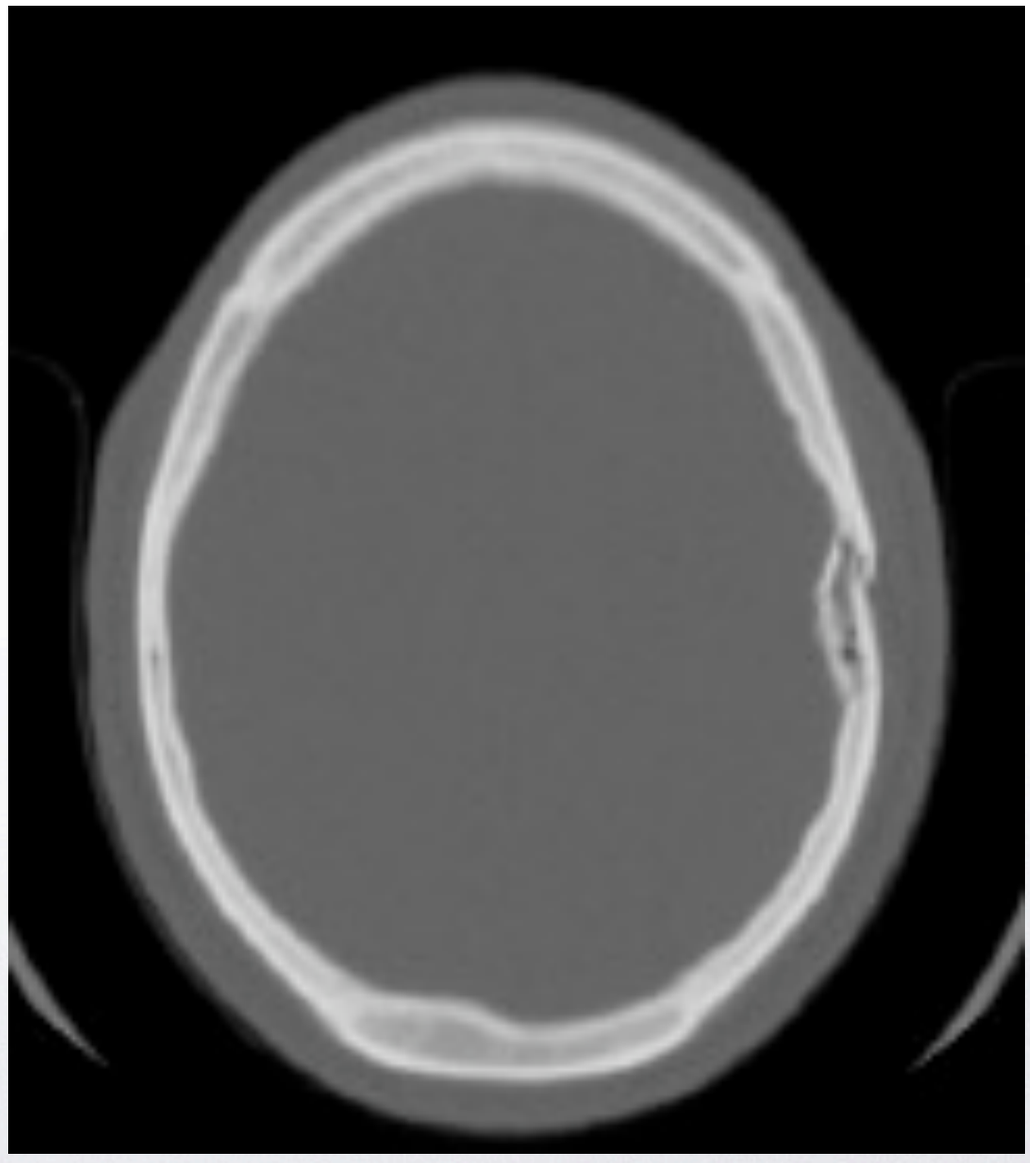
Pneumoencephalus



Bony windows

- Follow cortices all round, look for gaps/dents
- Compare L & R
- If symmetrical ? suture if anatomically appropriate



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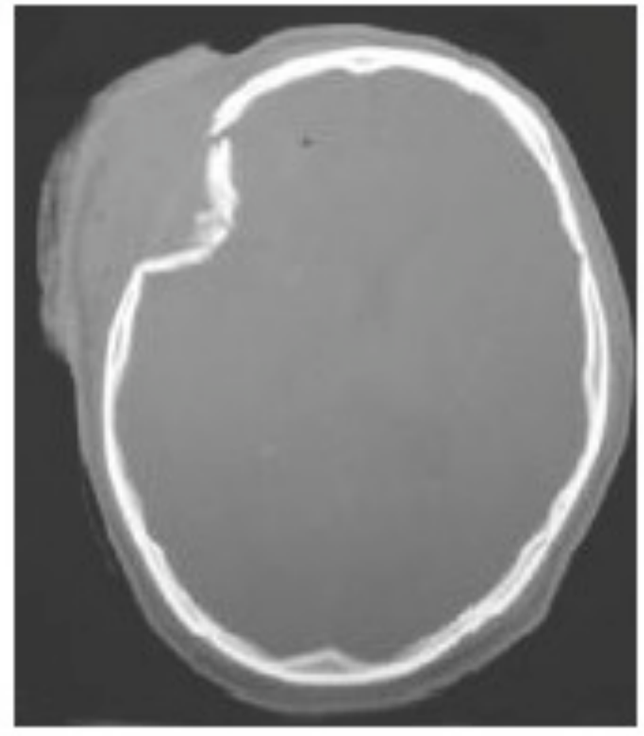

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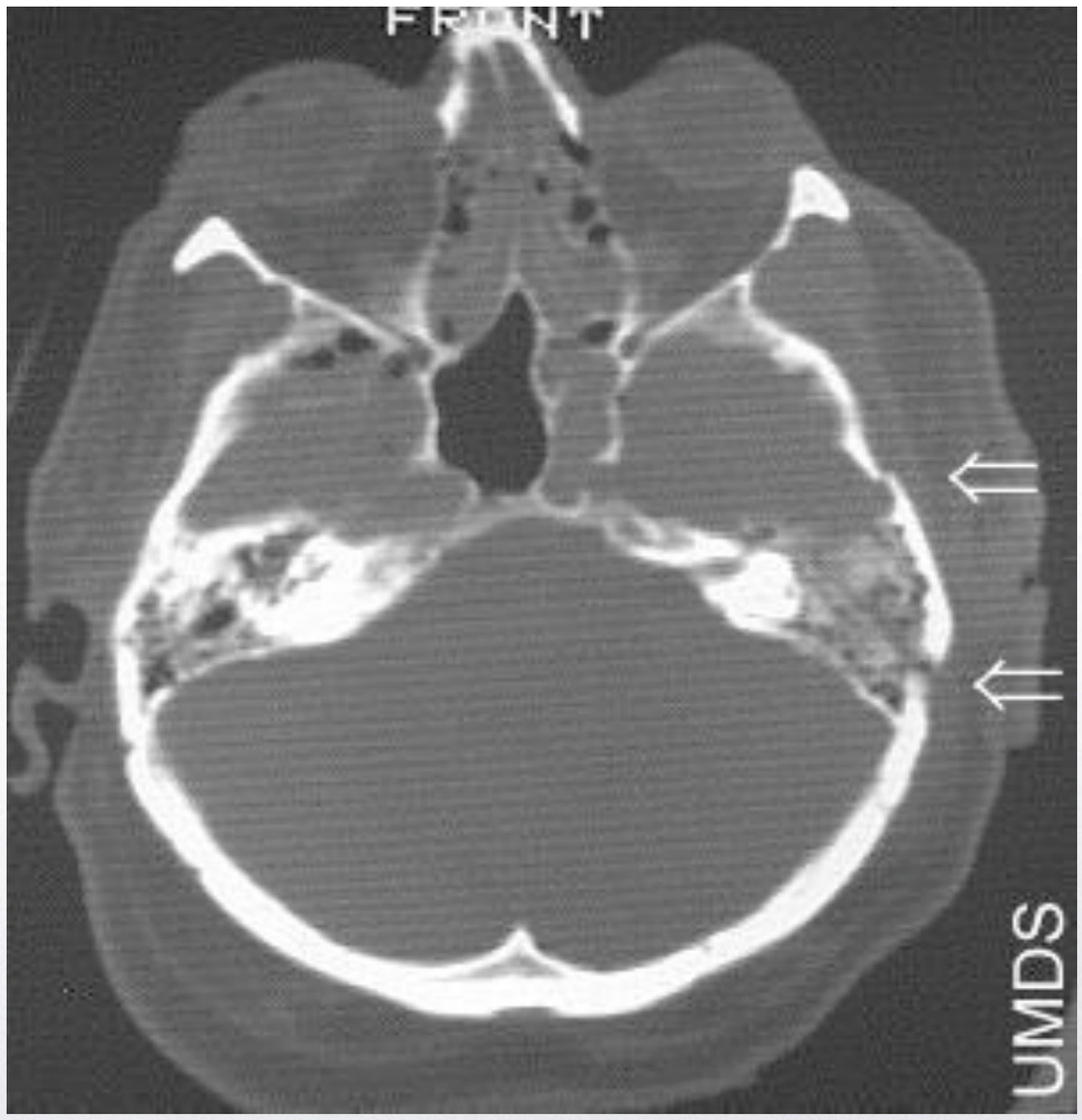
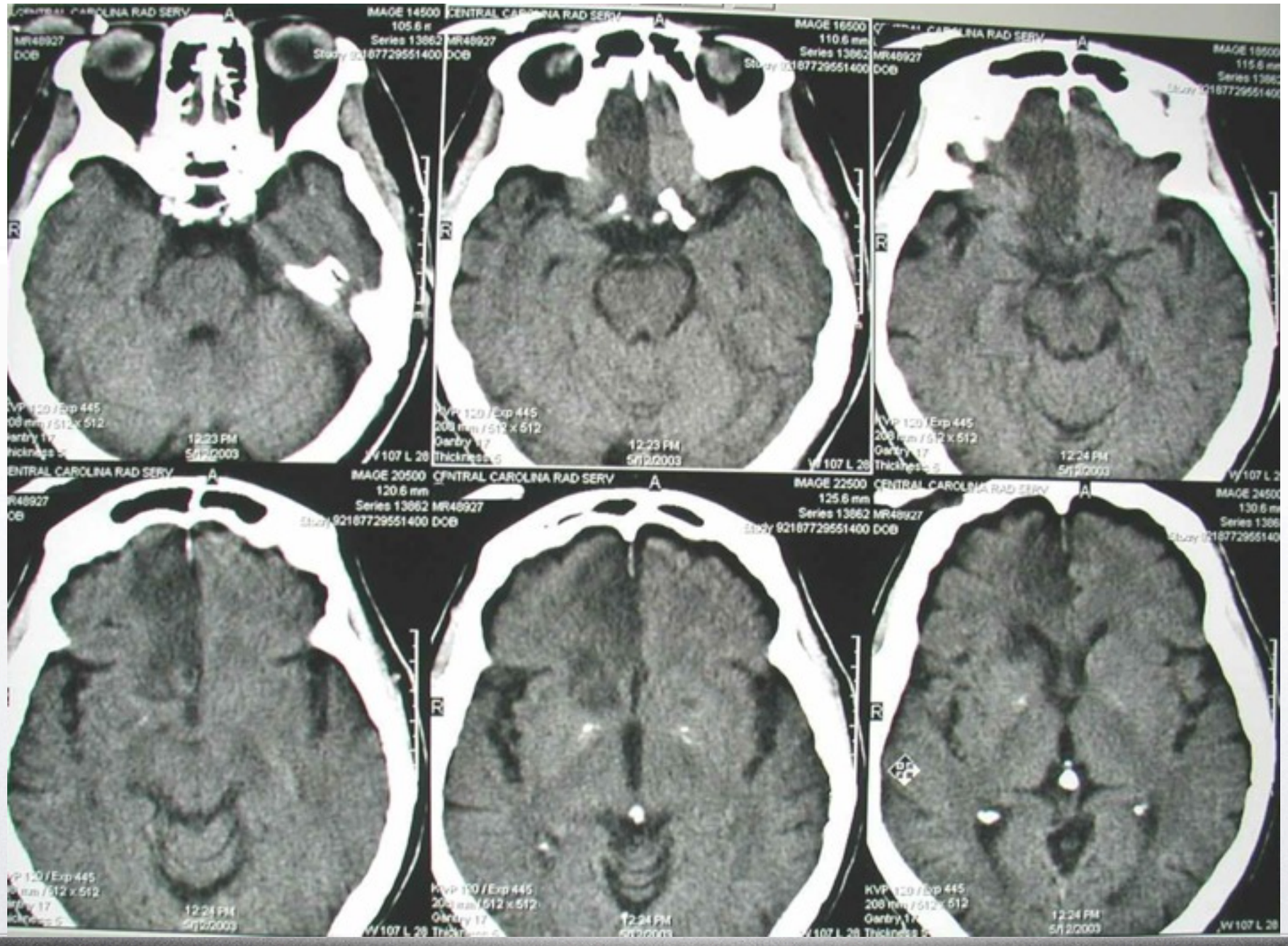
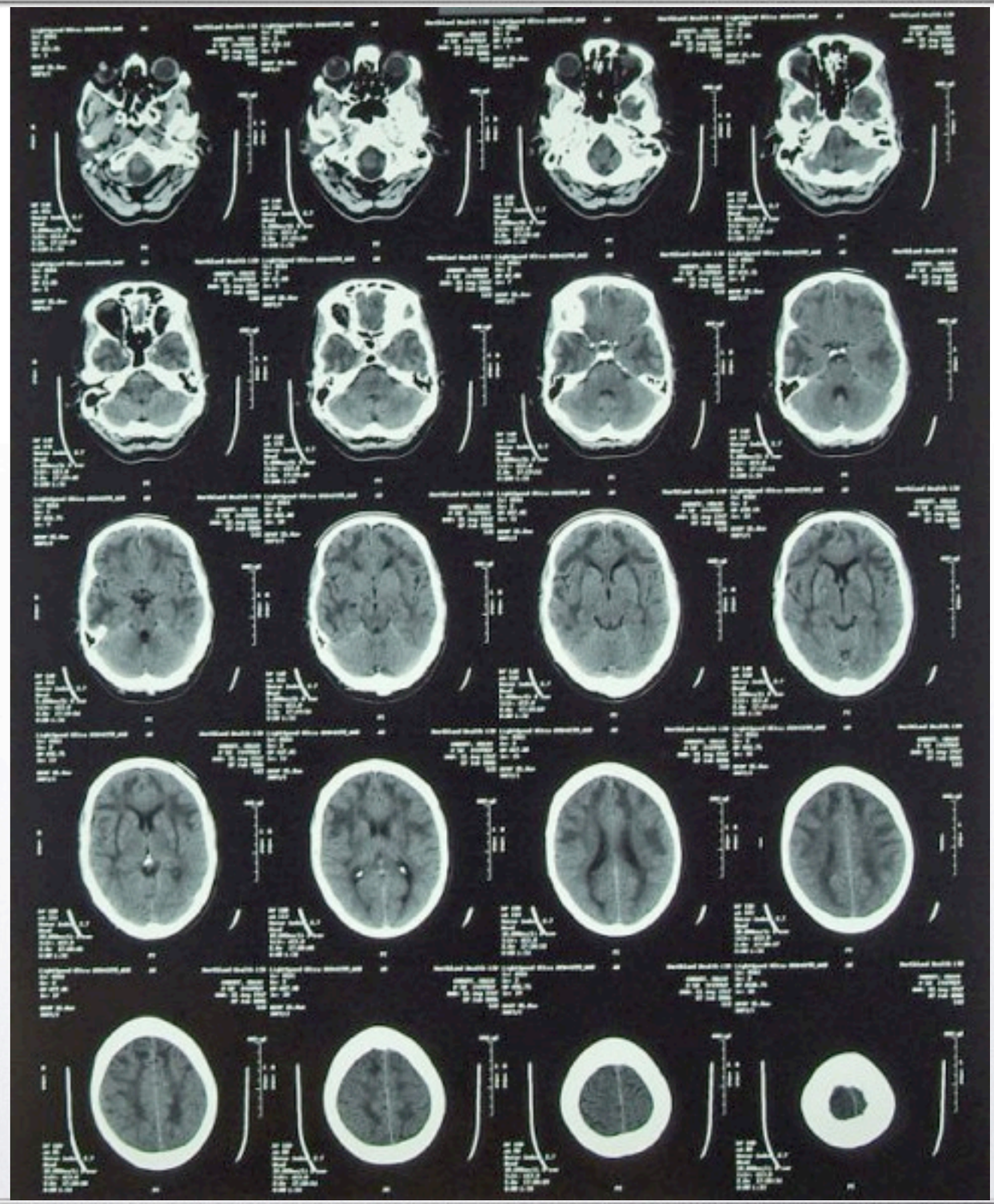


CVA-ischaemia



Leucoencephalopathy



Questions?

Summary

- Follow NICE guidelines for head CT
- Read CTs systematically
- Distinguish the different intra-cranial pathologies seen on CT