



Please note – this learning resource has been produced by the GUMS Academic Team. It is possible that there are some minor errors in the questions/answers, and other possible answers that are not included below. Make sure to check with other resources.

**N.B.**

Blue is extra information/narrative relevant to this case - please read to group

**Key elements of the answers are bolded. Everything else is important but not the focus of BMB.**

**CASE 1 - Stroke**

A 65 year old gentleman, Mr Thom Lysis, presents to ED with his wife at 7pm following new onset weakness in his face and arm on the right side of his body.

1. What do you immediately do?

- Call a code stroke.
- Check airways, stabilise breathing if required
- **Start wheeling the patient to the CT scanner whilst doing a brief history and examination.**
- Do investigations - ECG, FBC, Chem20, glucose, coag profile, blood gas
- Cannulate the patient.
- Give aspirin if appropriate (*\*\*A swallowing assessment is mandatory in every stroke presentation prior to any oral therapy\*\* risk of aspiration*)
  - Do not give aspirin for 24 hours if patient is undergoing thrombolysis
  - Do not give aspirin until brain imaging excludes intracranial haemorrhage

\*\*\* see flowchart at end of questions\*\*\*\*

2. What is the rationale for doing an ECG in acute stroke?

- To check for atrial fibrillation

3. List some differential diagnoses

- TIA
- Tumour
- Subdural haematoma
- Migraine
- Seizures
- Hypoglycemia



4. Take a brief history of the patient and his wife and state what you would examine.

Get the group to take a brief history and provide the following answers in relation:

- **Time Course:** Mr Lysis had sudden onset weakness on right side of body whilst walking his dog with his wife. His wife was immediately worried and drove him to ED. (assume came within 1 hour of symptoms starting)
- **Limbs affected:** Right arm affected, not leg. Both motor (weakness) and sensory (deficit in all sensations)
- **Face:** Wife notices that the right side of his mouth is drooping
- **Speech:** His wife says he is frustrated because he 'just can't get his words out' – (expressive aphasia)
- **Eyes:** Has right gaze preference (is looking to the right)
- **Past Medical hx:** CT angiogram for his heart in the past with no complications i.e. no allergy. Hypertension for past 15 years
- **Medications:** No contraindications to thrombolysis e.g. no anticoagulants. Only on perindopril for hypertension.

- Key elements of the history
  - **time course; sudden onset weakness.**
  - **Location of weakness and ask some specifics e.g. speech, limbs, eyes etc.**
  - Check if allergy to contrast for CT and briefly if any contraindications to thrombolysis, **especially medications.**

5. Based on this information, state the most likely affected artery.

- **Left MCA is affected**
- The examination done is based on the 'NIHSS score'. Briefly look this up to see what examinations are done.

6. What is the specific scan you NEXT order and what is the SINGLE most important reason for this scan?

- **Non contrast head CT. This is to rule out haemorrhage - absolute contraindication to thrombolysis**



7. Comment on the findings in the CT and state what you would look for in the plain CT.

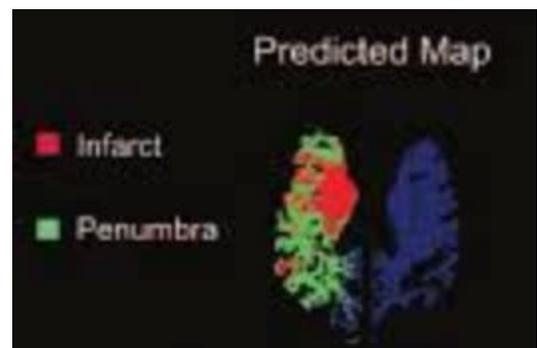
- Normal!
- Look for ischaemia
- hypodensity = dark – cerebral infarction and tissue loss
- hyperdense = more white – cerebral oedema, occluded vessel
- loss of grey white differentiation e.g. in the insula ribbon,
- previous infarctions.
- Make sure there is no haemorrhage!

**\*\*see amboss - ischemic stroke (diagnostics) for some more interpretation with images\*\***



8. The next part is for interest, what further imaging would you perform? An example is shown below.

- Do a CT angiogram and a perfusion scan (summarise - you do 3 scans - plain, angiogram, perfusion).
- Looking for a filling defect in angiogram
- The CT perfusion scan is shown. Its purpose is to differentiate the penumbra (salvageable ischaemic tissue) from the core (necrotic tissue). Here is an example (not important to interpret, just the purpose and that you have to order it):



**NOTE:** it always happens as part of the work up for stroke, but would unlikely be tested in BMB papers:

The CT angiogram shows a left sided filling defect in the MCA.

The patient's CT perfusion scan shows a small core with a large penumbra



9. If the patient's scan had evidence of mostly necrosed tissue, would you lyse them?

- **If it's all 'core' then why lyse them - that will only cause more harm! - (increases risk of hemorrhagic transformation)**

10. Which of the following is NOT a contraindication for thrombolysis

- Intracranial haemorrhage on imaging
- Previous stroke within last 3 months
- Active bleeding
- Uncontrolled Hypertension of 150/90 mmHg – ANSWER - only contraindicated if above 180/110 mmHg if so reduce below 180/110 if possible and then thrombolysis**
- Hypoglycemia

Thrombolysis is done, but the intern who did it was from UQ and accidentally gave them heparin instead. They infarct.

To summarise, their signs are:

- Paralysis of right face and arm but not leg
- Can't look right (looks towards the side of the lesion i.e. can only look left, but not right)
- Can't get words out but understands commands

11. Name the precise MCA branch involved.

- **Left MCA superior division**

12. What structures have been affected? What else does the examiner have to look for (although given that he has aphasia, he can't tell you this sign!) - assuming the left hemisphere is his dominant

- **Contralateral sensory loss**
- **Contralateral weakness in the arms, lower half of the face and lower limbs (not as pronounced)**
- **Gaze deviation toward the side of the infarction**
- **Contralateral homonymous hemianopia without macular sparing .**
- **Broca's aphasia - expressive**

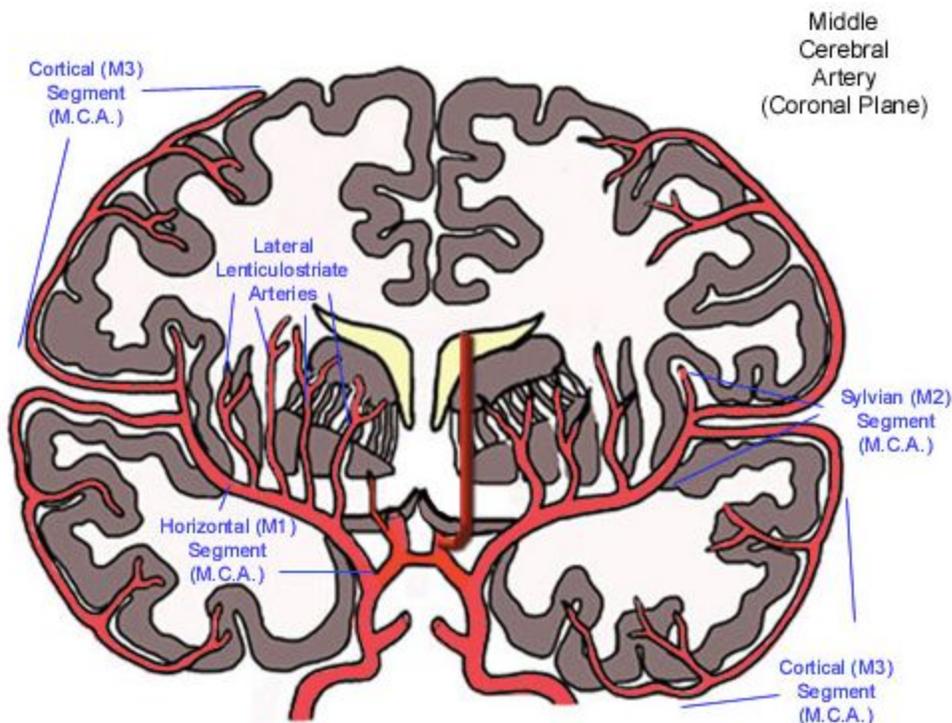


13. If it was an inferior division infarct, what structures and signs could have been involved/seen? How about M1 infarct?

- **Wernicke's area - receptive aphasia.**
- **Meyer's loop - superior quadrantanopia.**
- **Conduction Aphasia - lesion to supramarginal gyrus**
  
- **M1 = leg also involved, because it affects the internal capsule.**

14. State the main difference in M1 from M3 infarcts (5-10 words)

- **M1 is a subcortical infarct, M3 is purely cortical!**





**WHAT IF'S .....**

15. **What if** the patient had evidence of swelling and ipsilateral mydriasis? What other signs could they develop if this was not treated?

- Likely they have an **uncal herniation**: stroke → inflammation → swelling → increased supra-tentorial pressure → brain herniates down because of the Monro-Keille hypothesis → the part that herniates is the uncus, because it is closest to the tentorium → compresses the **ipsilateral oculomotor nerve** → **causes mydriasis**.
- **If prolonged, will also have down and out gaze and complete ptosis (late signs in compressive CNIII palsy)**

16. **What if** Mr Thom Lysis came in with a headache that was worsening within minutes and he was also vomiting? [Get the group to List the other signs of hemorrhagic stroke](#)

- **Hemorrhagic stroke -**

**other symptoms**

- **Worst headache they have ever experienced**
- **Thunderclap headache - sudden onset**
- **Vomiting**
- **Decreased level of consciousness**
- **Neck stiffness**

a. **What risk factor does Mr Lysis have for this? - Hypertension**

b. **List other possible causes**

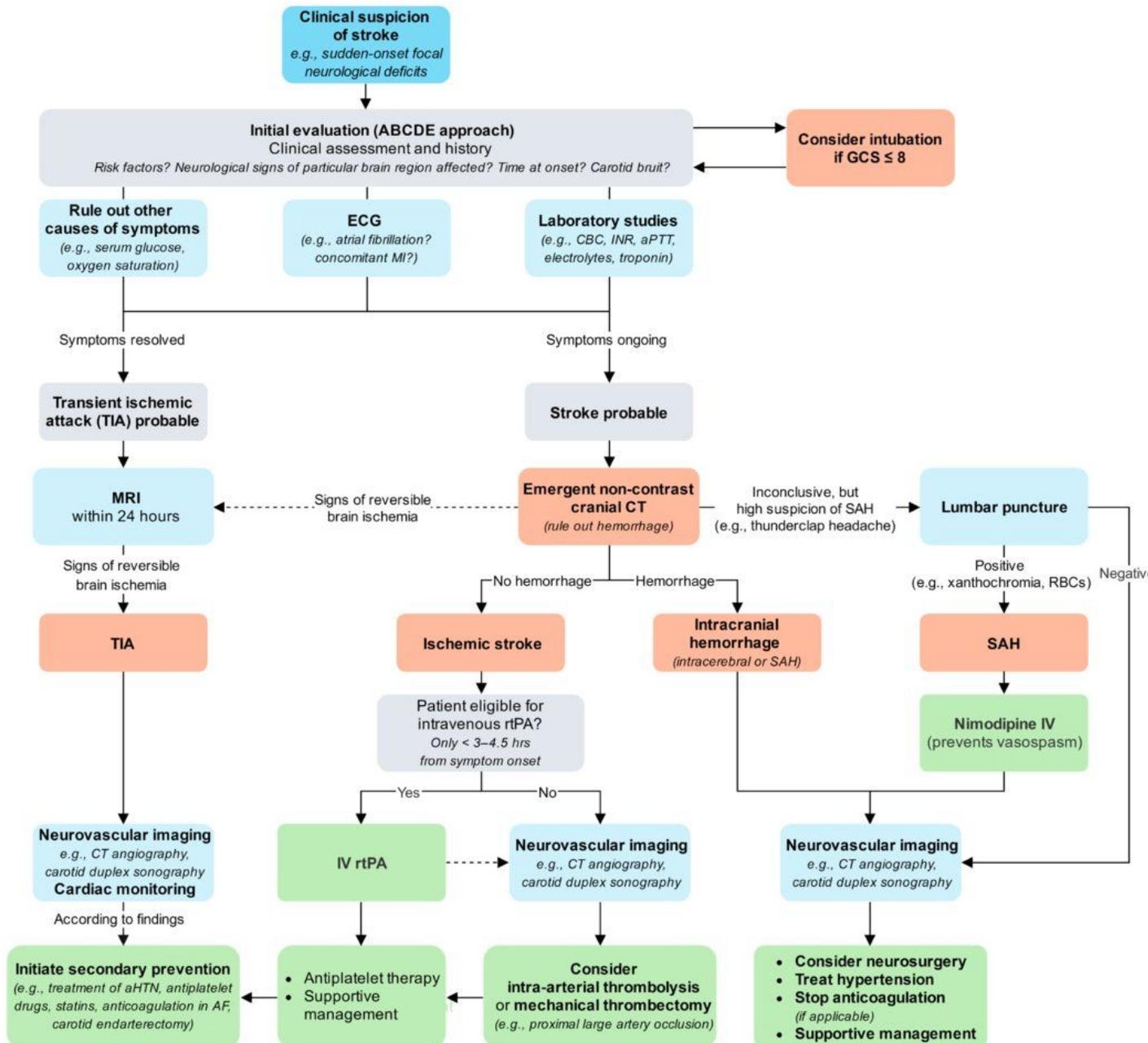
- **Trauma**
- **Cerebral amyloid angiopathy (particularly if above 60 years old)**
- **Vasculitis**
- **Neoplasms**
- **Ischemic stroke (due to reperfusion injury - “haemorrhagic transformation”)**
- **Coagulopathies (e.g. hemophilia, anticoagulant use)**
- **Stimulant use (e.g. cocaine and amphetamines)**

17. **What if** it was an ACA stroke? List clinical features.



- **Contralateral weakness and sensory in the Lower limbs** >> upper limbs
- **Abulia** - an absence of willpower or inability to act decisively
- **Urinary incontinence** - more likely in a bilateral infarction
- **Dysarthria**

\*\*\*Flow chart for question 1\*\*\* Sourced from Amboss Ischemic stroke





### **CASE 2 - Head Injuries**

24 year old Rona Vires is brought into the ED after getting into a fight over toilet paper outside his local woolworths. He appears to be disoriented, and there are cuts and bruises all over his face and he is bleeding. The Paramedics give you a handover which reveals he was punched in the jaw several times before he fell onto the cement face first.

#### **18. What are the first steps in managing this patient?**

- **Acute stabilization and measure of life support should ALWAYS take precedence over diagnostic investigations**
- **Cranial CT**
- **Glasgow coma Scale for evaluation of consciousness**
- **Full medical and neurological examination**
  - **Testing of vital signs, pupillary reflexes and evaluation of cranial nerves is particularly important**

#### **19. What are you looking for in a cranial CT in head traumas?**

- **Skull fractures**
- **Rupture of dura mater**
- **Midline shift**
- **Haemorrhage and haematomas**
- **Diffuse axonal injury (DAI)**

Rona is taken in for a CT scan (image shown). Upon further physical examination you notice that he has bruising around the eyes (“racoon eyes”), has rhinorrhea and there is a double ring “Halo” sign on the bed sheets.

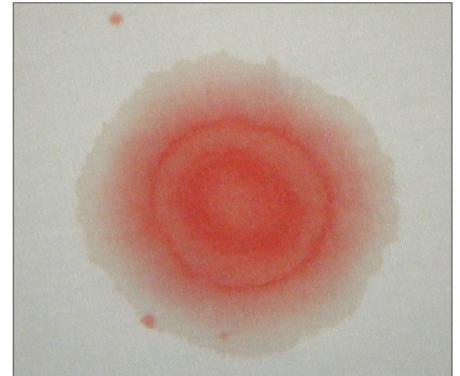




Image from: radiopedia - base of skull fractures

20. What is a double ring “Halo” sign?

- Suggests the **leakage of CSF** in head injuries
- It uses the principle of chromatography: different components of a fluid mixture will separate as they travel through a material, therefore in this case blood and CSF will separate



21. What is the anatomical reason behind him getting the racoon eyes

- **The loose areolar tissue space of the scalp is continuous into the eyelid therefore collection of blood here can track down to the eyelid**

22. What fracture does Rona most likely have?

- **He most likely has a anterior cranial fossa fracture (basilar)**

23. What are simple vs compound fractures

- Simple fractures
  - **Not exposed to the exterior**
- Compound fractures
  - **Exposed to the exterior**
  - **Increased risk of infection**
  - **Can occur with intact scalp/skin (involve air sinuses or petrous bone and middle ear)**

What ifs

24. What if Rona presented with dysphagia, loss of gag reflex, weakness of the sternocleidomastoid and trapezius muscles?

- He is more likely to have a **posterior cranial fossa fracture**
- Cranial nerves VII to XII can be affected
- The dysphagia and loss of gag reflex can be explained CN IX and X (glossopharyngeal and vagus) injury
- The weak sternocleidomastoid and trapezius muscles can be explained by CN XI (accessory) nerve damage
- Can also present with battle's sign and cerebellar signs.



**Griffith University**  
**Medicine Society**  
Gold Coast, Australia

Year 2 Peer Based Learning 2019

Stroke and head injuries

**References used:**

- **Amboss**
- **eTG**
- **Up-to-Date**
- **Radiopedia**

**Please provide feedback for this case at:**

**<https://gums2020.typeform.com/to/e0h7US>**