



SAQs Team

# CASE 4

## Case Scenario:

A 77-year-old obese woman was cooking in the kitchen and she collapsed on to the floor. Her daughter called an ambulance and the woman was taken to the emergency room. She had suffered from paralysis in the right arm and leg, loss of sensation to touch on the right arm and leg. They noticed that she is unable to answer questions, but she can understand, and the ability to write her thoughts is easier than speaking.

History:

She has uncontrolled hypertension & diabetes with high blood cholesterol.

Medical history:

1- metformin & glibenclamide → type 2 diabetes

2- lisinopril → hypertension

## Regarding the case:

Q1 List 2 differential diagnosis:

- 1-Systemic infection
- 2-Brain tumor

Q2 What is the artery affected ?

Left middle cerebral artery

Q3 Why was she unable to answer questions but was able to understand?

Damage in broca's area which is responsible for motor control of talking while wernicke's is intact.

Q5 What investigations are needed to confirm the diagnosis?

- 1-C.T scan.
- 2-MRI.

Q6 List 2 causes of embolic stroke, and 2 common sites of thrombotic stroke?

causes of embolic stroke:

- 1-Cardiac mural thrombi.
- 2-paradoxical emboli.

common site of thrombotic:

- 1-Carotid bifurcation
- 2-Origin of middle CA.

Q7 What is the management of the disease?

Control the risk factors in normal range.

Diagnosis:

Cerebral stroke.

Risk Factors:

**Risk factors that you cannot control:**

Age, gender, family history.

**Risk factors that you can control:**

High blood pressure, High Cholesterol, Cigarette smoking, Obesity, alcohol and high blood glucose.

## Types of stroke :

Ischemic (thrombotic/embolic) and hemorrhagic.

## Treatment:

Tissue plasminogen activator. (instantly)

For hypertension: Ca channel blocker (amlodipine.)

For hypercholesterolemia: simvastatin.

## General Questions :

- 1- What are the arterial systems that supply the brain?
  - a- Vertebro-basilar system ( 20%) ( posterior portion of brain.)
  - b- Internal carotid system ( 80%) ( anterior portion of brain.)
  
- 2- What are the major branches of the above systems?

Anterior, middle and posterior cerebral arteries.
  
- 3- Which arteries form circle of Willis ?
  - a- Two anterior cerebral arteries.
  - b- Two posterior cerebral arteries.
  - c- Two internal carotid arteries.
  - d- Two posterior communicating arteries.
  - e- one anterior communicating artery.
  
- 4- Give examples on how the brain could be deprived of oxygen?
  - a- Functional hypoxia, include:
    - 1- Low partial pressure of O<sub>2</sub> ( high altitude)
    - 2- Impaired O<sub>2</sub> carrying capacity ( CO toxicity )
    - 3- Inhibition of oxygen by tissue ( cyanide poisoning)
  
  - b- Ischemia, include:
    - 1- Hypotension.
    - 2- Vascular occlusion.

5- We have thrombotic and embolic stroke, give an example of a cause for each one of them :-

- a- Thrombotic: atherosclerosis
- b- Embolic: mural cardiac emboli ( valvular disease and atrial fibrillation)

6- What are the most common sites for the two types of infarctions above?

- a- Thrombotic : carotid bifurcation,origin of middle cerebral artery and either end of basilar artery
- b- Embolic; Middle Cerebral Artery (because it is a direct continuation of internal carotid.)

7- What are the most likely histopathological findings within 12-24 hours following a cerebral ischemic insult (stroke)?

Red neurons with microvacuolation (eosinophilic cytoplasm, and later nuclear pyknosis > karyorrhexis > karyolysis.)

8- Which type of necrosis occurs in the brain?  
Liquefactive necrosis..

9- In regard to subarachnoid hemorrhage, give two causes including the most common cause ?

- a- Rupture of saccular (berry) aneurysm (**most common**)
- b- Trauma, vascular malformation, or tumors.

10- Mention the two types of stroke that can be caused by vasculitis?

- a- Infectious arteritis ( CMV, aspergillosis.)
- b- Primary angiitis of the CNS.

11- The cerebral blood flow is autoregulated by three metabolic mechanisms, what are they?

Increased CO<sub>2</sub>.

Increased H<sup>+</sup>.

Decreased O<sub>2</sub> concentrations.

12- The autoregulation of CBF (cerebral blood flow) operate in a range of mean arterial pressure, what is it?

Between 60 and 140 mmHg.

13- What will happen if infarction is in these areas?

a- Wernick's area: sensory ( fluent ) aphasia

b- Broca's area: motor ( nonfluent ) aphasia

c- Motor area 4: contralateral monoplegia.

d- Postcentral gyrus: loss of sensation in contralateral side of the body.

e- Brodmann's area 17 : loss of vision.

f- Brodmann's area 41 & 42 : loss of audition.

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