

Question 0001

A 64-year-old man is brought to the emergency department 45 minutes after sudden onset of right-sided weakness and difficulty speaking. Shortly after the symptoms began, he developed a severe headache and vomited. He has hypertension and has not taken his prescribed medications for 3 months. His temperature is 36.8°C (98.2°F), pulse is 86/min and regular, respirations are 18/min, and blood pressure is 216/114 mm Hg. He is drowsy but opens his eyes when spoken to and follows simple commands. Examination shows a leftward gaze preference and weakness of the right lower face. Muscle strength is 2/5 in the right upper and lower extremities and 5/5 on the left. The right plantar response is extensor. Point-of-care blood glucose concentration is 112 mg/dL. Which of the following is the best next step in management?

Answer choices

- A. Carotid Doppler ultrasonography
- B. Electroencephalography
- C. Lumbar puncture
- D. Noncontrast head CT
- E. Transthoracic echocardiography

Correct answer: D. Noncontrast head CT

Overall topic explanation

This patient has an acute stroke syndrome. Severe uncontrolled hypertension, headache, vomiting, and depressed consciousness raise concern for intracerebral hemorrhage, while gaze deviation and unilateral weakness indicate a focal brain lesion. These findings do not establish the stroke subtype; urgent brain imaging is necessary.

Noncontrast head CT rapidly identifies acute intracranial blood and distinguishes hemorrhage from an ischemic presentation. Acute intraparenchymal blood appears hyperdense. CT is widely used for this initial assessment because it is rapid, readily available, and diagnostically accurate. AHA/ASA intracerebral hemorrhage guideline.

Your notes describe hypertensive intracerebral hemorrhage arising from small penetrating arteries in the pons, midbrain, thalamus, putamen, caudate, or cerebellum. Findings depend on the site and can include hemiparesis, sensory loss, gaze abnormalities, dysarthria, aphasia, or cerebellar dysfunction.

Explanation of each answer choice

A. Carotid Doppler ultrasonography - Incorrect.

This evaluates carotid atherosclerosis or stenosis as a potential ischemic source. It is appropriate during the etiologic evaluation of a TIA or ischemic stroke, but it does not determine whether this patient has acute intracranial hemorrhage. Brain imaging comes first.

B. Electroencephalography - Incorrect.

EEG evaluates suspected seizure activity. Seizures can produce gaze deviation and altered consciousness, but this patient's new persistent focal deficits require urgent structural brain imaging. EEG does not establish whether an acute hemorrhage is present.

C. Lumbar puncture - Incorrect.

Your notes describe lumbar puncture for suspected meningitis and for selected patients with persistent suspicion for subarachnoid hemorrhage after a negative CT. This patient has not undergone brain imaging. Focal deficits and depressed consciousness make lumbar puncture an inappropriate first diagnostic study.

D. Noncontrast head CT - Correct.

This is the immediate study needed to identify acute blood and determine the stroke subtype. Even if the eventual diagnosis is ischemic stroke, hemorrhage must first be assessed before selecting subsequent treatment.

E. Transthoracic echocardiography - Incorrect.

Echocardiography evaluates potential cardiac embolic sources, such as a ventricular thrombus after myocardial infarction. It may become relevant during a subsequent ischemic stroke evaluation, but it does not answer the immediate question of whether the intracranial event is hemorrhagic.

Educational objective

In a patient with acute persistent focal neurologic deficits, obtain urgent brain imaging. In this emergency department scenario, choose noncontrast head CT before investigating carotid or cardiac embolic sources. Severe hypertension and associated symptoms suggest hemorrhage; imaging establishes the distinction.