

SCRIPT

INTRACRANIAL HEMORRHAGE WITH VITAMIN K ANTAGONIST



SCENARIO

#68

NAME

BRIDGETTE THATCHER

SPECIALTY

Neurology

DIFFICULTY LEVEL

ADVANCED

SIMULATION ENVIRONMENT

INTRA HOSPITAL - EMERGENCY ROOM

BODY INTERACT™
VIRTUAL PATIENTS

This patient is not a real patient, and the clinical scenario, while clinically plausible, is fictional.

Scenario

General description of the scenario info. Corresponds to the initial information presented to the trainee when selecting this scenario.

Title

Intracranial hemorrhage with vitamin K antagonist

Context

Bridgette was at home, talking to relatives, when suddenly she began exhibiting slurred speech, facial asymmetry, and difficulty moving her left arm.

Briefing

Female patient, age 78, was just admitted to the emergency room due to a sudden onset of slurred speech and motor impairment in the left arm. The symptoms started two hours ago.

General learning objective

Management of coagulation in a VKA-treated patient with intracranial hemorrhage.

Specific learning objectives

Recognize a hemorrhagic stroke

Administer treatment adequate for a hemorrhagic stroke in a patient treated with VKA

Pre-simulation notes

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Environment

Intra Hospital - Emergency Room

Specialty

Neurology

Difficulty Level

Advanced

Reviewers

Angels Initiative

Patient characteristics

Characterization of the patient's demographic, habits, behavior and specific status effects.

Avatar



Patient Name

Bridgette Thatcher

Age

78 years

Race/Ethnicity

European/Caucasian

Smoker

No

Sedated

No

Agitated

No

Facial palsy

-100

Eyelid closure

0

Gender

Female

Eye color

Brown

Conscious

Yes

Confused

No

Last meal over 2h

No

Speech impairment

No

Renal metabolic compensation

Auto

Patient parameters

These parameter values are used by the simulator to initialize this scenario and correspond to a pre-treatment baseline.

Systolic arterial blood pressure (mmHg)

210

Heart rate (bpm)

119

Respiratory rate (/min)

12

Temperature (°C)

36.5

Urinary output (mL/kg/h)

0.7

Height (cm)

160

Diastolic arterial blood pressure (mmHg)

120

O2 saturation (%)

99

Blood glucose (mg/dL)

131

Hemoglobin (g/dL)

14.3

Weight (kg)

80

BMI

31.3

Potassium (mEq/L)

4.1

Sodium (mEq/L)

139

Physical examination

The items below characterize the patient's physical examination and monitoring findings on admission.

Airway

Airway inspection

1st Priority

Clear airway. Normal oropharynx. No readily audible abnormal breath sounds.

Breathing

Chest palpation

2nd Priority

Left: 1L- resonance; 2L- resonance; 3L- superficial cardiac dullness; 4L- superficial cardiac dullness; 5L- resonance.

Chest percussion

2nd Priority

Right: 1R- resonance; 2R- resonance; 3R- resonance; 4R- resonance; 5R - dullness.

O2 Sat (%)

1st Priority

99

Pulmonary auscultation

2nd Priority

Clear to auscultation, with normal vesicular murmurs in all sites.

Respiratory rate (/min)

1st Priority

12

Circulation

Blood pressure (mmHg)

1st Priority

2110/120

Capillary refill time (s)

1st Priority

1.3

Cardiac auscultation

2nd Priority

Irregular heart rate due to atrial fibrillation

Extremities to touch

1st Priority

Pink and warm

Heart rate (bpm)

1st Priority

119

Pulse palpation

1st Priority

Carotid- Amplitude: strong; Rhythm: arrhythmic;
Radial- Amplitude: strong; Rhythm: arrhythmic, equal on both sides;
Femoral- Amplitude: strong; Rhythm: arrhythmic, equal on both sides;
Dorsalis pedis- Amplitude: strong;

Urinary output (mL/kg/h)	2nd Priority	Rhythm: arrhythmic, equal on both sides 0.7
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Disability

Blood glucose (mg/dL)	1st Priority	
Glasgow Coma Scale	1st Priority	15 (E4-V5-M6)
Pupil light reflex	1st Priority	Diminished corneal reflex

Exposure

Abdominal auscultation	Not a priority	Normal hydro-aerial sounds without abdominal murmurs.
Abdominal palpation	2nd Priority	No visceromegaly.
Abdominal percussion	2nd Priority	6R- tympanic; 7R- tympanic; 6L- tympanic; 7L- tympanic
Rectal examination	Not a priority	
Temperature (°C)	1st Priority	

Dialogues

This is a complete list of all possible dialogue questions (on the left) and the corresponding responses (on the right).

History Taking

Chief Complaint

01. Currently, how do you feel?	1st Priority	Boo... streen... Patient has severe consciousness impairment. I am not feeling well because my voice is strange and I have difficulty moving my left arm.
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History of Present Illness

02. Are you in pain at all?	2nd Priority	Remeen... leeff... Patient has severe consciousness impairment.
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No.

03. What were you doing when you felt ill?

Not a priority

Remeen... leeff...

Patient has severe consciousness impairment.

I was talking with my family.

04. When was the last time you had something to eat?

Not a priority

Haavv... laa...

Patient has severe consciousness impairment.

I dined just an hour ago.

Past Medical/Surgical History

05. Do you have any other health problems?

1st Priority

Diabee...know..

Patient has severe consciousness impairment.

I have a heart condition and also arthritis.

06. Have you ever had any cardiovascular disease?

1st Priority

Boo... streen...

Patient has severe consciousness impairment.

My heart condition, it is called atrial fibrillation.

07. Do you have high blood pressure?

2nd Priority

Boo... streen...

Patient has severe consciousness impairment.

Yes.

08. How long have you had this heart condition?

2nd Priority

Stree... boo...

Patient has severe consciousness impairment.

For some years now, I can't say for sure.

09. Do you have high

Remeen... leeff...

cholesterol?

Not a priority

Patient has severe consciousness impairment.

No.

10. Have you had any severe illnesses or injuries before?

2nd Priority

Haavv... laa...

Patient has severe consciousness impairment.

Besides what happened to me now, not really.

Medications and Allergies

11. Are you currently taking any medication?

1st Priority

Diabee...knoow..

Patient has severe consciousness impairment.

Warfarin, as directed by my doctor.
Amlodipine 5 mg daily, bisoprolol 5 mg daily, indapamide 1.5 mg daily.

12. Have you taken exactly the same doses that your doctor instructed you to take?

1st Priority

Remeen... leeff...

Patient has severe consciousness impairment.

Yesterday I forgot to take one, so today I took it twice.

13. Have you had any side effects from your medication?

Not a priority

Stree... boo...

Patient has severe consciousness impairment.

No.

14. Are you taking any supplements?

Not a priority

Diabee...knoow..

Patient has severe consciousness impairment.

No, I don't take supplements.

Social History

15. Can you please tell me

Haavv... laa...

what you usually eat?

Not a priority

Patient has severe consciousness impairment.

I eat more or less everything. I'm not picky.

16. Do you exercise?

Not a priority

Boo... streen...

Patient has severe consciousness impairment.

Well, I'm not very active. For example, I only go for a walk very occasionally.

17. What do you do?

Not a priority

Diabee...know..

Patient has severe consciousness impairment.

I am retired.

18. How many meals do you have a day?

Not a priority

Boo... streen...

Patient has severe consciousness impairment.

I have three meals a day.

19. Have you been under any stress lately?

Not a priority

Stree... boo...

Patient has severe consciousness impairment.

No.

20. Do you eat snacks between meals?

Not a priority

Remeen... leeff...

Patient has severe consciousness impairment.

No. I don't usually eat snacks.

21. How often do you consume alcohol?

Not a priority

Haavv... laa...

Patient has severe consciousness impairment.

I don't drink alcohol at all.

22. Have you felt any changes to your appetite?

Stree... boo...

Patient has severe consciousness

	Not a priority	impairment. I think my appetite has been the same.
23. Do you smoke?		Haavv... laa...
	Not a priority	Patient has severe consciousness impairment. No, I've never smoked in my life.
24. Any recent weight changes?		Boo... streen...
	Not a priority	Patient has severe consciousness impairment. No.

Medical Tests

The items below describe the possible test results in this scenario, including rules that may affect those results.

Bacteriological examinations

Blood cultures	Not a priority	Negative blood cultures.
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Decision aids

Stroke scale (NIHSS)	1st Priority	7 - Moderate stroke [Default (seen on admission)] 30 - Severe stroke (Health condition(s) active: SevereConsciousnessImpairment) 11 - Moderate stroke (Intervention performed: Neurosurgery)
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Electrophysiology

12-Lead ECG	Not a priority	Atrial fibrillation
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Imaging

Abdominal CT	Not a priority	Liver: normal. Bile ducts: normal. Gallbladder: no calcified gallstones. Normal caliber wall. Pancreas: normal. Spleen: normal. Adrenals: normal. Kidneys: normal. Bowel: normal caliber. Mesenteric lymph nodes: no enlarged mesenteric lymph nodes. Peritoneum: no ascites or free air; no fluid collection.
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		Vessels: normal. Retroperitoneum: normal. Abdominal wall: normal. Bones: normal.
Cerebral CT angiography	2nd Priority	
Chest X-Ray	Not a priority	No visible alterations.
Head CT	1st Priority	A small acute intracerebral hemorrhage is visible in the right parietal lobe. It does not cause significant mass effect or edema. No midline shift is visible. No other acute lesions are visible. There are no signs of head trauma ou fractures. (Right intracerebral hemorrhage) A large acute intracerebral hemorrhage is visible in the right hemisphere, including temporal, parietal and frontal lobes. It has significant surrounding edema causing mass effect, midline shift, transtentorial and subfalciform herniation, with brainstem compression. No other acute lesions are visible. There are no signs of head trauma ou fractures. (Deterioration to coma) In the current exam, a significant reduction of the hematoma previously documented in the right hemisphere is visible. It still has significant surrounding edema, causing midline shift, transtentorial and subfalciform herniation. Although, these signs are now less prominent, with reduced brainstem compression. Signs of right hemisphere craniotomy are visible. No other acute lesions are visible. There are no signs of head trauma ou fractures. (After neurosurgery)
Lower limbs CT	Not a priority	No significant alterations.
Neck Doppler ultrasound	Not a priority	Normal carotid artery flow.
Transesophageal echocardiogram	Not a priority	Irregular atrial contraction; ejection fraction: 45%
Transthoracic echocardiogram	Not a priority	Irregular atrial contraction.

Lab tests

Arterial blood gas	Not a priority	Blood pH - 7.39 PaCO ₂ (mmHg) - 42 HCO ₃ ⁻ (mEq/L) - 24.6 BE (mEq/L) - 0.02 Cl ⁻ (mEq/L) - 102 Lactate (mg/dL) - 9.0 Due to simulation of test imprecision, there may be slight differences in the actual results.
Biochemistry	1st Priority	BUN (mg/dL) - 19 Na ⁺ (mEq/L) - 139 K ⁺ (mEq/L) - 4.1 AST (IU/L) - 21 ALT (IU/L) - 32 AP (IU/L) - 78 CK (IU/L) - 113 CRP (mg/L) - 2.3 Due to simulation of test imprecision, there may be slight differences in the actual results.
Cardiac biomarkers	Not a priority	CK-MB Mass (ng/mL) - 2 Troponin I (ng/mL) - 0.01 Myoglobin (ng/mL) - 17
Coagulation tests	1st Priority	All normal except Increased INR of 3.5
Complete blood count	2nd Priority	Leukocytes (/uL) - 8500 Neutrophils (/uL) - 4500 (53%)

		Lymphocytes (/uL) - 3200 (38%)
		Monocytes (/uL) - 410 (5%)
		Eosinophils (/uL) - 280 (3%)
		Basophils (/uL) - 110 (1%)
		Immature granulocytes (/uL) - 0 (0%)
		Erythrocytes ($\times 10^6/\mu\text{L}$) - 4.8
		Hemoglobin (g/dL) - 14.9
		Hematocrit (%) - 44
		MCV (μm^3) - 92
		MCH (pg/cell) - 30
		MCHC (g/dL) - 35
		RDW (%) - 12.0
		Platelets ($\times 10^3/\mu\text{L}$) - 222
Lipid profile	Not a priority	Total cholesterol (mg/dL) - 171
		Triglycerides (mg/dL) - 145
		HDL cholesterol (mg/dL) - 69
		LDL cholesterol (mg/dL) - 73
		Cholesterol ratio (Tchol/HDL-C) - 2.5
Urinalysis	Not a priority	Specific Gravity - 1.024
		pH - 6.0
		Urine color - Yellow
		Appearance - Clear
		WBC Esterase - Negative
		Protein - Negative

Albumin - Negative

Glucose - Negative

Ketones - Negative

Erythrocytes - Negative

Bilirubin - Negative

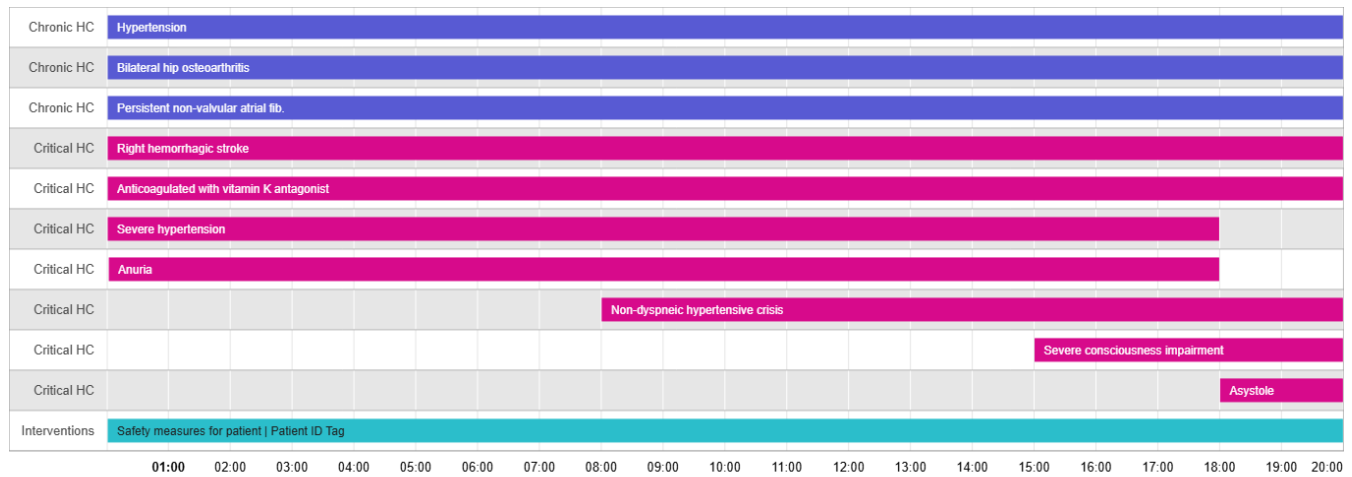
Urobilinogen, Semi-Qn - 0.0

Nitrite, Urine - Negative

Intoxicants - Negative

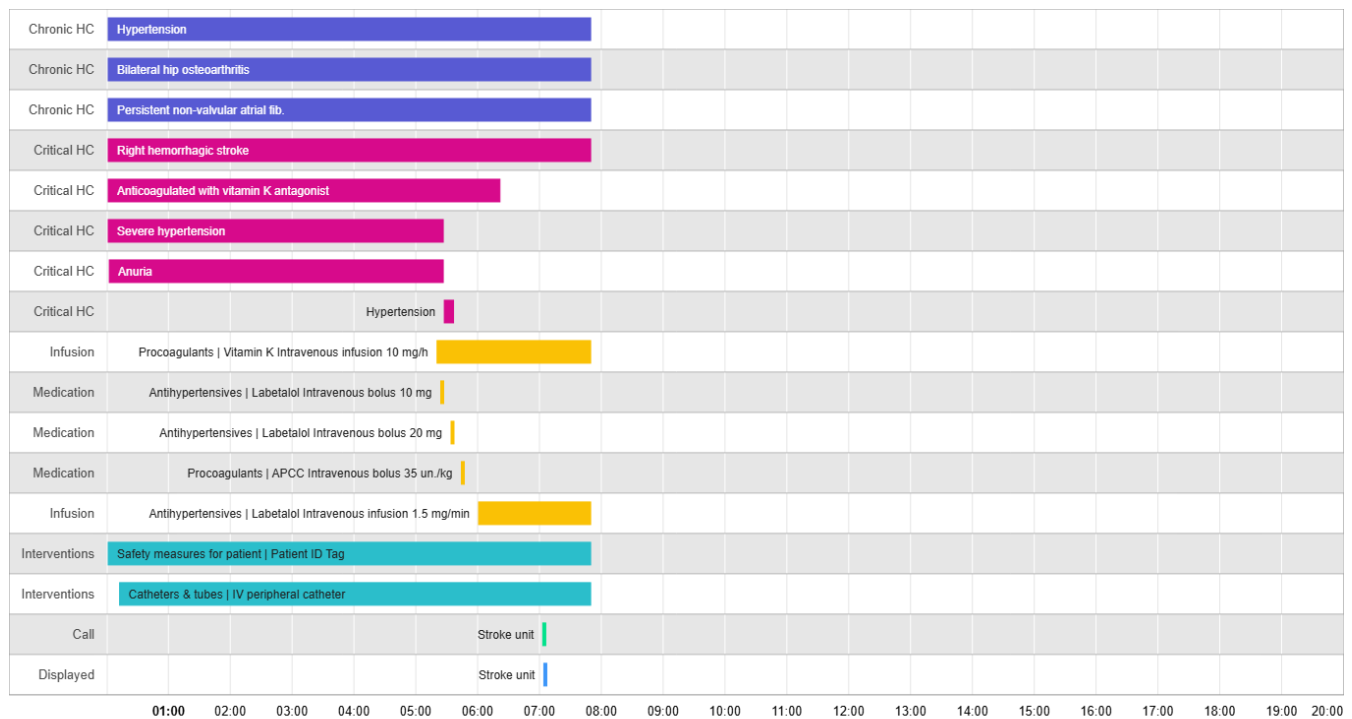
Baseline

This section is automatically generated and predicts scenario behavior assuming no actions by the trainee, which usually represents the worst-case scenario.



Optimal clinical approach

This section previews how the optimal approach resolves the scenario successfully. Comparison with Baseline may be useful to understand the scenario behavior.



Management

The items below represent management actions relevant to solving this clinical scenario. Notes: 1st Priority – Mandatory items required for a successful outcome. 2nd Priority – Optional items considered adequate but not essential. Not a Priority – Unnecessary items that are inadequate or a waste of time.

i.1 - Place an IV peripheral catheter

1st Priority

Interventions | Catheters & tubes | IV peripheral catheter

i.2 - If SBP $\geq$ 140, administer an antihypertensive

1st Priority

Medications | Antihypertensives | Labetalol
Intravenous bolus $\geq$ 10 mg

Labetalol
Initial dose: IV bolus of 10 mg labetalol administered over

Medications | Antihypertensives | Labetalol
Intravenous bolus $\leq$ 20 mg

10–20 mg IV bolus every 5 min until SBP $<$ 140 mmHg or HR $<$ 55 BPM

Medications | Antihypertensives | Labetalol
Intravenous infusion $\geq$ 1 mg/min

Perfusion: 1-2 mg/min as continuous IV infusion

Medications | Antihypertensives | Labetalol
Intravenous infusion $\leq$ 2 mg/min

Note: avoid labetalol if HR $<$ 55 BPM

Medications | Antihypertensives | Urapidil
Intravenous bolus = 25 mg

Urapidil
IV bolus of 25 mg urapidil administered over 1 min
If SBP $\geq$ 140 mmHg, repeat 25 mg bolus in 5 min.

Medications | Antihypertensives | Urapidil
Intravenous infusion

Medications | Antihypertensives | Clevidipine

i.3 - Administer a procoagulant

1st Priority

Medications | Procoagulants |
APCC

Medications | Procoagulants |
PCC

i.4 - Administer plasma

2nd Priority

Medications | Procoagulants |
Plasma

i.5 - Administer vitamin K

1st Priority

Vitamin K and a reversal agent must be administered (Activated prothrombin complex concentrate, Prothrombin complex concentrate or Fresh Frozen Plasma are acceptable). If no reversal agent is used OR the blood pressure is not controlled (systolic blood pressure under 140 mmHg) the patient will deteriorate into coma and need neurosurgical intervention.

Medications | Procoagulants |
Vitamin K

i.6 - Consult stroke unit

1st Priority

Call | Stroke unit

[Uncontrolled BP and anticoagulation status not reversed]
Please address the patient's coagulation and blood pressure. Only after addressing the patient's coagulation and blood pressure can the patient be admitted.

[Deteriorated to coma]
The Stroke Unit has been notified.

[BP controlled and anticoagulation status reversed]
Thank you for calling. The patient can be admitted to the Stroke Unit.

i.7 - Consult Neurosurgery

1st Priority

[Deteriorated to coma and Uncontrolled BP and anticoagulation status not reversed] Please address the patient's coagulation and blood pressure. I cannot operate on the patient under these conditions. Please address coagulation status and blood pressure.
[Deteriorated to coma and

Call | Neurosurgery

Anticoagulation status not reversed]
Please address the patient's
coagulation. I cannot operate on the
patient in this condition. Please address
the coagulation status.
[Uncontrolled BP] Please address
patient's blood pressure. I cannot
operate the patient on this condition.
Please address blood pressure status.
[Deteriorated to coma and BP
controlled and anticoagulation status
reversed] Neurosurgery Indicated. The
patient has an indication and is ready
for urgent neurosurgery. Please send
the patient to the operating room.
[Neurosurgery already performed or
blood pressure and coagulation
reversed without deterioration to
coma] Neurosurgery not indicated. The
patient is fully awake and neurologically
stable. Therefore, at this stage, there is
no indication for neurosurgery.

**i.8 - Surgery team activation
is only required if the patient
deteriorates to coma**

2nd Priority

Call | Perform neurosurgery

Neurosurgery was successful. No
complications occurred during
procedure.

i.40

2nd Priority

Patient actions | Supine on the
bed with pillow

Question(s) during the simulation

Questions presented to the trainee in order to have a more detailed evaluation of the use of the clinical scenario.

Head CT question:

Question

Based on the patient's clinical
assessment and the head CT
findings, select the most likely
diagnosis:

Correct answer

Hemorrhagic stroke

2 Incorrect answer(s)

Acute ischemic stroke

Subarachnoid hemorrhage

Head CT question:

Question

Does this CT show any signs of intracranial hemorrhage?

Correct answer

Yes

1 Incorrect answer(s)

No

Head CT question:

Question

Based on the neurological assessment, please rate the stroke severity:

Correct answer

Severe stroke

2 Incorrect answer(s)

Moderate stroke

Minor stroke

Head CT question:

Question

Are there any contraindications for thrombolysis?

Correct answer

Yes

1 Incorrect answer(s)

No

Coagulation tests question:

Question

Is it mandatory to reverse coagulation in this patient?

Correct answer

Yes

1 Incorrect answer(s)

No

Cerebral CT angiography question:

Question

Which vascular lesion is visible?

Correct answer

No occlusion nor vascular malformations are visible

2 Incorrect answer(s)

Occlusion of the right MCA

Arterio-venous malformation in the right cerebral hemisphere

Cerebral CT angiography question:

Question

Does this patient have an indication for thrombectomy?

Correct answer

No

1 Incorrect answer(s)

Yes

Question(s) after simulation

Questions presented to the trainee in order to have a more detailed evaluation of the use of the clinical scenario.

Summative Multiple Choice Question:

Question

What is the most likely diagnosis?

Correct answer

Intracerebral hemorrhage

3 Incorrect answer(s)

Cerebral venous thrombosis

Acute ischemic stroke

Cerebral abscess

Formative Multiple Choice

Question:

Question

At what level of INR is it mandatory to reverse coagulation?

Correct answer

1,7

2 Incorrect answer(s)

1,0

2,5

**Formative Multiple Choice
Question:**

Question

What is the maximum accepted level of systolic BP in patients with acute intracerebral hemorrhage?

Correct answer

140 mmHg

2 Incorrect answer(s)

185 mmHg

220 mmHg

**Formative Multiple Choice
Question:**

Question

In which hospital department is it recommended that this patient be admitted?

Correct answer

Stroke Unit or Intensive Care Unit

2 Incorrect answer(s)

Medical Ward or Stroke Unit

Medical Ward

Handoff question

Question presented to the trainee to assess their ability to effectively communicate patient information during a transition of care. This question is optional.

Question

Summarize this Body Interact scenario using a structured handoff pattern.

Review handoff pattern

SBAR (Situation, Background, Assessment, Recommendation): Includes current condition and reason for handoff, relevant history and context, assessment details, and recommended actions.

SOAP (Subjective, Objective, Assessment, Plan): Covers patient-reported symptoms and history, measurable data and findings, clinical impressions and diagnoses, and the treatment plan.

I-PASS (Illness Severity, Patient Summary, Action List, Situation Awareness and Contingency Planning, Synthesis by Receiver): Encompasses illness status, patient background, tasks and actions, potential changes and plans, and confirmation of understanding.

AT-MIST (Age, Time of incident or onset of symptoms, Mechanism of injury/Medical Complaint, Injuries or Inspections head-to-toe, vital Signs, and Treatments): Describes the cause of injury or medical complaint, findings from head-to-toe inspection, vital signs, and treatments provided.

Simulation Ending Messages

Feedback messages shown to the user based on specific successful or unsuccessful approaches, triggered by defined conditional rules.

Title	Type	Message	Conditional
Hypertension not treated within the first 7 minutes	Failure	Blood pressure was not controlled within the critical early window. Next time, target systolic BP <140 mmHg from the first minutes, alongside your reversal protocol.	
Success	Success	Excellent work! You gathered the full clinical history and ensured comprehensive patient care. This thorough approach guarantees safe and accurate management, allowing you to better meet your patient's needs. Keep it up!	All health conditions have been removed, except RightIntracerebralHemorrhage NonDyspneicHypertensiveCrisis Bradycardia (case will end after 45 sec)
Partial success	Success	Although you have stabilized the patient, her main condition was not controlled within the critical early window. Next time, quickly address the patient's hemodynamic status alongside your reversal protocol.	

References

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