

SCRIPT

ENDOVASCULAR ACUTE STROKE



SCENARIO

#70

NAME

BETHANY LARSON

SPECIALTY

Neurology

DIFFICULTY LEVEL

INTERMEDIATE

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

Endovascular acute stroke

Context

Bethany was at home with her relatives when she suddenly felt less strength in her left arm. The relatives called the emergency number and Bethany arrived at the hospital 1.5 hours after the onset of symptoms.

Briefing

Female patient, aged 78, just arrived in the emergency room due to sudden onset of left hemiparesis 2 hours ago.

General learning objective

Recognize acute ischemic stroke.

Specific learning objectives

Knowledge of indications and contraindications to thrombolysis

Knowledge of indications and contraindications to intra-arterial treatments

Management of acute ischemic stroke

Pre-simulation notes

-

Environment

Intra Hospital - Emergency Room

Specialty

Neurology

Difficulty Level

Intermediate

Reviewers

Angels Initiative

Patient characteristics

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

Avatar



Patient Name

Bethany Larson

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.

Systolic arterial blood pressure (mmHg)

170

Heart rate (bpm)

90

Respiratory rate (/min)

13

Temperature (°C)

36

Urinary output (mL/kg/h)

0.6

Height (cm)

160

Diastolic arterial blood pressure (mmHg)

90

O2 saturation (%)

97

Blood glucose (mg/dL)

145

Hemoglobin (g/dL)

13.1

Weight (kg)

68

BMI

26.6

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 observation

1st Priority

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

Breathing

Chest palpation

2nd Priority

Normal: 2L - normal; 2R - normal

Chest percussion

2nd Priority

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

O2 Sat (%)

1st Priority

97

Pulmonary auscultation

1st Priority

Normal vesicular murmurs in all sites

Respiratory rate (/min)

1st Priority

13

Circulation

Blood pressure (mmHg)

1st Priority

170/90

Capillary refill time (s)

1st Priority

1.5

Cardiac auscultation

1st Priority

S1 and S2 normal sounds, no murmurs

Heart rate (bpm)

1st Priority

90

Pulse palpation

1st Priority

Carotid - Amplitude: strong; Rhythm: irregular;
Radial - Amplitude: strong; Rhythm: irregular, equal both sides;
Femoral - Amplitude: strong; Rhythm: irregular, equal both sides;
Dorsalis pedis - Amplitude: strong; Rhythm: irregular, equal both sides.

Urinary output (mL/kg/h)

1st Priority

0.6

Disability

Blood glucose (mg/dL)

1st Priority

145

Glasgow Coma Scale

Not a priority

Pupil light reflex

1st Priority

Right: Size - 4 mm; Right eye light: 2 mm; Left eye light: 2 mm
Left: Size - 4 mm; Right eye light: 2 mm; Left eye light: 2 mm

Exposure

Abdominal auscultation

2nd Priority

Normal hydro-aerial sounds without abdominal murmurs

Abdominal palpation

2nd Priority

No rigidity. No pain. No visceromegaly

Abdominal percussion

2nd Priority

6R - tympanic; 7R - tympanic; 6L - tympanic; 7L - tympanic

Temperature (°C)

1st Priority

36

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. What happened to you?

1st Priority

I suddenly had difficulty moving my left body.

02. Have you had a fall?

2nd Priority

No.

History of Present Illness

03. When did your symptoms start?

Two hours ago.

Available after question 1 is performed.

1st Priority

04. Are you feeling any pain?

No, not really.

2nd Priority

Past Medical/Surgical History

05. Do you have high blood pressure?

Yes, I have high blood pressure.

2nd Priority

06. Have you had any operations recently?

No.

1st Priority

07. Do you have high cholesterol?

Yes, my doctor told me that I have.

2nd Priority

08. Do you have any other diseases?

I have atrial fibrillation.

2nd Priority

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

One year ago I suffered a transient ischemic attack.

2nd Priority

Medications and Allergies

10. Are you currently taking any medication?

Yes, I am taking candesartan 8 mg daily, warfarin daily, pravastatin 40 mg daily, metformin 1000 mg twice daily, and bisoprolol 5 mg daily.

1st Priority

11. Have you been taking your medication properly?

Yes. Well... a week ago I stopped taking warfarin for a tooth extraction, but I have restarted it 6 days ago.

2nd Priority

12. Are you taking any supplements?

No, I don't take supplements.

Not a priority

13. Do you have any allergies?

No.

2nd Priority

Social history

14. Can you please say what you usually eat?

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

Not a priority

15. What do you do?

I am retired.

Not a priority

16. How many meals do you have a day?

I have three meals a day.

Not a priority

17. Have you been under any stress lately?

It depends on the day.

Not a priority

18. Do you eat snacks between meals?

No. I don't usually eat snacks.

Not a priority

19. Have you felt any changes to your appetite?

I think my appetite has been the same.

Not a priority

20. How often do you drink alcohol?

No.

Not a priority

21. Do you smoke?

No, I've never smoked in my life.

Not a priority

Medical Tests

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

Decision aids

Stroke scale (NIHSS)

1st Priority

- Acute right ischemic stroke: Moderate stroke (7 points)
- Severe right acute ischemic stroke: Moderate to severe stroke (19 points)
- Intervention Neuroradiologist is performed: Minor stroke (3 points)
- If thrombolysis is administered: Severe stroke (42 points)

Electrophysiology

12-Lead ECG

Not a priority

Atrial fibrillation

Imaging

Cerebral CT angiography

1st Priority

Occlusion of M1 segment of the right middle cerebral artery. Pial collateral circulation is visible in distal middle cerebral artery branches.

Cerebral perfusion CT

2nd Priority

Large area of cerebral blood flow impairment and increase in mean transit time in the whole territory of the right middle cerebral artery.

Chest CT

Not a priority

Absence of significant changes of pulmonary parenchyma density and pleural effusion.

Chest X-Ray

Not a priority

The lungs are clear. The heart is normal in size. The mediastinum is within normal limits.

Head CT

1st Priority

- Initial: A spontaneous hyperdensity is visible in the whole M1 segment of the right middle cerebral artery suggesting the presence of an intravascular thrombus. No acute lesions are visible. Mild calcifications are visible in the carotid siphons. ASPECTS: 10

- Hemorrhagic Transformation: A large intracerebral hematoma is visible in the right basal ganglia and adjacent insular cortex and corona radiata with nearby subarachnoid hemorrhage in the right frontal and parietal lobes, and tetraventricular hemorrhage. It has significant mass effect over the nearby structures causing midline shift, transtentorial and subfalciform herniation. No other acute lesions are visible.

Neck Doppler ultrasound

Not a priority

Normal carotid artery flow.

Transcranial Doppler

2nd Priority

M1 Right Occlusion

Transesophageal echocardiogram

Not a priority

Irregular atrial contraction; injection fraction: 45%

Transthoracic echocardiogram

Not a priority

Irregular atrial contraction; injection fraction: 45%

Lab tests

Arterial blood gas

Not a priority

Blood pH - 7.40
Hemoglobin (g/dL) - 13.1
PaO2 (mmHg) - 91
PaCO2 (mmHg) - 42
HCO3- (mEq/L) - 24.6
BE (mEq/L) - 0.02
O2 sat (%) - 97
Na+ (mEq/L) - 139
K+ (mEq/L) - 4.1
Cl- (mEq/L) - 102.7
Anion gap (mEq/L) - 10.98
Lactate (conventional) (mg/dL) - 9.0
Lactate (SI) (mmol/L) - 1

Biochemistry

Not a 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

Cardiac biomarkers

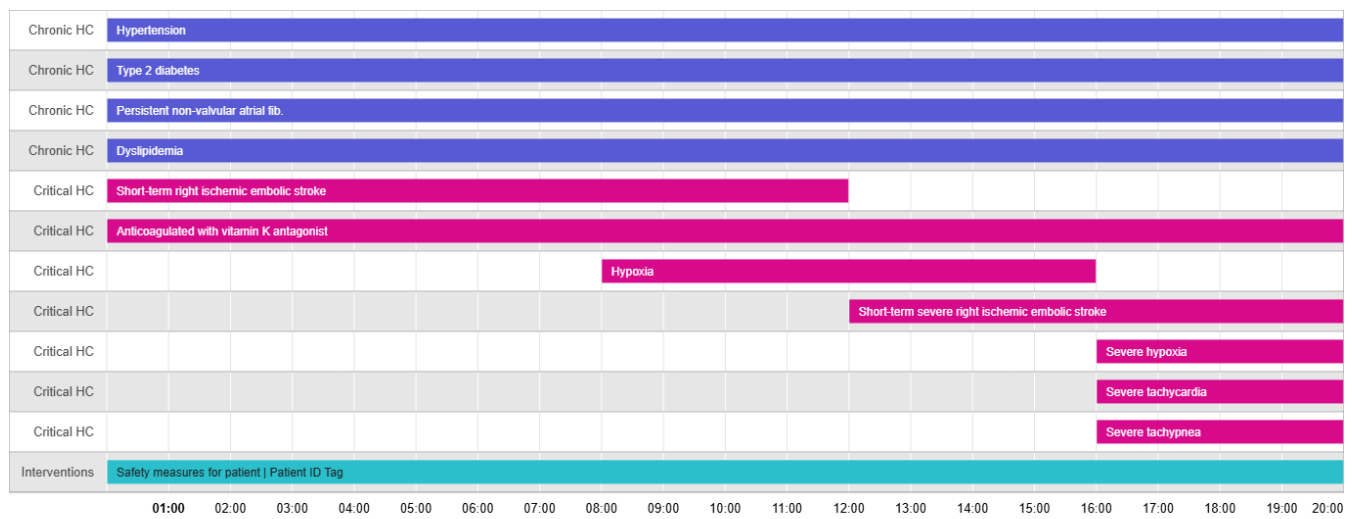
Not a priority

CK-MB Mass (ng/mL) - 2
Troponin I (ng/mL) - 0.01

Coagulation tests	1st Priority	Myoglobin (ng/mL) - 17 aPTT (s) - 36 INR - 3.5
Complete blood count	Not a priority	Leukocytes (/μL) - 8500 Neutrophils (/μL) - 4500 (53%) Lymphocytes (/μL) - 3200 (38%) Monocytes (/μL) - 410 (5%) Eosinophils (/μL) - 280 (3%) Basophils (/μL) - 110 (1%) Immature granulocytes (/μL) - 0 (0%) Erythrocytes (×10 ⁶ /μL) - 4.8 Hemoglobin (g/dL) - 14.9 Hematocrit (%) - 38.7 MCV (μm ³) - 92 MCH (pg/cell) - 30 MCHC (g/dL) - 35 RDW (%) - 12.0 Platelets (×10 ³ /μL) - 222
Lipid profile	Not a priority	Total cholesterol (mg/dL) - 207 Triglycerides (mg/dL) - 156 HDL cholesterol (mg/dL) - 31 LDL cholesterol (mg/dL) - 145 Cholesterol ratio - 6.7
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

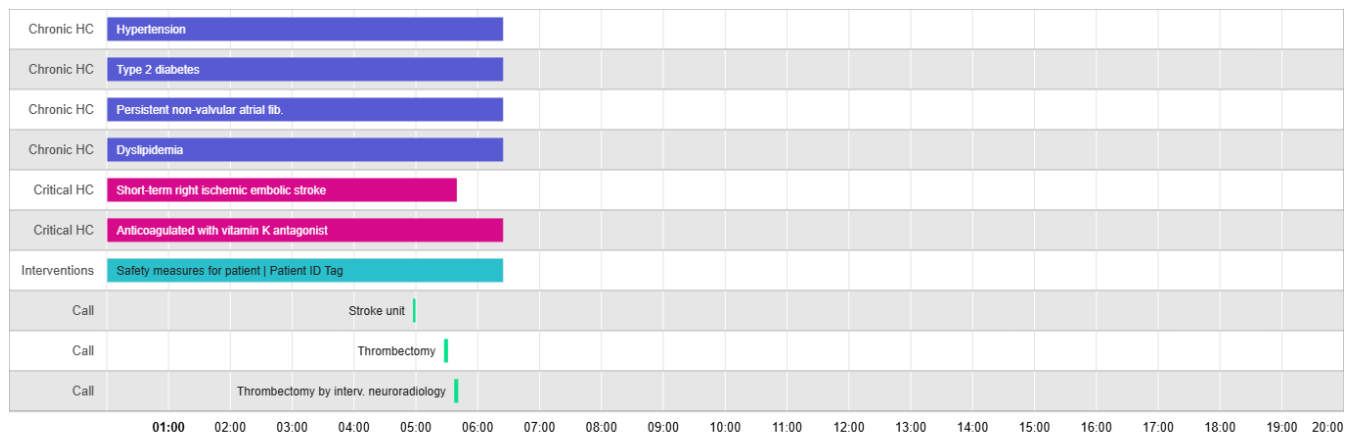
Baseline

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 - International

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.37 - To treat: Acute ischemic stroke/Severe acute ischemic stroke

1st Priority

Call | Thrombectomy

i.38 - To treat: Acute ischemic stroke/Severe acute ischemic stroke

1st Priority

Call | Stroke unit

i.39 - Thrombectomy by interv. neuroradiology

1st Priority

Call | Thrombectomy by interv. neuroradiology

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.

Cerebral CT angiography question:

Question

Which vascular lesion is visible?

Correct answer

Occlusion of the M1 segment of the right MCA

2 Incorrect answer(s)

No occlusion is visible

Occlusion of the M1 segment of the left MCA

Cerebral CT angiography question:

Question

What is the extent of the

established ischemic infarct in the CT scan?

Correct answer

No changes. ASPECTS: 10

2 Incorrect answer(s)

Moderate lesion. ASPECTS: 6

Large infarct. ASPECTS: 3

Cerebral CT angiography question:

Question

Does this patient have an indication for thrombectomy?

Correct answer

Yes

1 Incorrect answer(s)

No

Head CT question:

Question

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

Correct answer

Acute ischemic stroke

2 Incorrect answer(s)

Hemorrhagic stroke

Subdural hematoma

Head CT question:

Question

Does this CT have signs of any intracranial hemorrhage?

Correct answer

No

1 Incorrect answer(s)

Yes

Head CT question:

Question

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

Correct answer

Moderate stroke

2 Incorrect answer(s)

Minor stroke

Severe stroke

Head CT question:

Question

Are there any contraindications for thrombolysis?

Correct answer

Yes

1 Incorrect answer(s)

No

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

Ischemic stroke

3 Incorrect answer(s)

Multiple sclerosis

Brain tumor

Epileptic fit

Formative Multiple Choice

Question:

Question

Is it mandatory to reverse coagulation in this patient?

Correct answer

No

1 Incorrect answer(s)

Yes

**Formative Multiple Choice
Question:**

Question

At what level of INR is it safe to use thrombolysis in acute ischemic stroke?

Correct answer

< 1,7

2 Incorrect answer(s)

< 3

< 2,5

**Formative Multiple Choice
Question:**

Question

Consider the patient had a minor ischemic lesion (1cm) and no hemorrhagic transformation in the 24-h Head CT. When should he resume anticoagulation?

Correct answer

Within 48 hours after stroke

2 Incorrect answer(s)

7-14 days after stroke

More than 21 days after a stroke

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
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FAILURE	Failure	The case was not solved according to the guidelines' requirements.	
SUCCESS	Success	Your practice meets the guidelines' requirements.	Treating the patient's conditions according to guidelines.

References

1. ESO Executive Committee, ESO Writing Committee. Guidelines for management of ischaemic stroke and transient ischaemic attack 2008. *Cerebrovascular Diseases*. 2008;25(5):457-507.
2. Powers WJ, Rabinstein AA, Ackerson T, et al. 2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke*. March 2018.
3. Wahlgren N, Moreira T, Michel P, et al. Mechanical thrombectomy in acute ischemic stroke: Consensus statement by ESO-Karolinska Stroke Update 2014/2015, supported by ESO, ESMINT, ESNR and EAN. *International Journal of Stroke*. 2016;11(1):134-147.