

SCRIPT

ACUTE ISCHEMIC STROKE IN CAROTID SEVERE STENOSIS



SCENARIO

#293

NAME

FRANK BUTLER

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

Acute ischemic stroke in carotid severe stenosis

Context

Mr Frank Butler was at home with his wife when he suddenly had difficulty moving his left limbs. In the previous few days, there had been two similar episodes but he recovered spontaneously and did not seek medical attention.

Briefing

Male, 75 years old. Admitted to the emergency room due to a sudden onset of left hemiparesis. Mentions similar symptoms that resolved in the previous days.

General learning objective

Select adequate reperfusion therapy treatments in acute stroke situations.

Specific learning objectives

Recognize signs of an acute stroke

Identify the indications and contra-indications to intravenous thrombolysis and thrombectomy

Relate recurrence of symptoms within the same arterial territory as suggestive of arterial disease

Implement optimal therapeutical approach for acute stroke situations

Pre-simulation notes

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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

Frank Butler

Age

75 years

Race/Ethnicity

European/Caucasian

Smoker

No

Sedated

No

Agitated

No

Facial palsy

-100

Eyelid closure

0

Gender

Male

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)

156

Heart rate (bpm)

75

Respiratory rate (/min)

13

Temperature (°C)

36

Urinary output (mL/kg/h)

0.6

Height (cm)

160

Diastolic arterial blood pressure (mmHg)

101

O2 saturation (%)

97

Blood glucose (mg/dL)

133

Hemoglobin (g/dL)

15

Weight (kg)

70

BMI

27.3

Potassium (mEq/L)

4.1

Sodium (mEq/L)

139

Speech rate (speed multiplier)

1

Physical examination

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

Airway

Airway observation

2nd Priority

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

Breathing

Chest palpation

Not a priority

Normal: 2L - normal; 2R - normal

Chest percussion

Not a 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

2nd Priority

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

Respiratory rate (/min)

2nd Priority

13

Circulation

Blood pressure (mmHg)

1st Priority

156/101

Capillary refill time (s)

Not a priority

1.3

Cardiac auscultation

2nd Priority

Irregular rhythm.

Heart rate (bpm)

1st Priority

75

Pulse palpation

Not a priority

Carotid - Amplitude: normal; Arrhythmic
Radial - Amplitude: normal; Arrhythmic;
Femoral - Amplitude: normal; Arrhythmic;
Dorsalis pedis & Posterior tibial -

Urinary output (mL/kg/h)	Not a priority	Amplitude: normal; Arrhythmic; Popliteal - Amplitude: normal; Arrhythmic. 0.6
Disability		
Blood glucose (mg/dL)	1st Priority	133
Glasgow Coma Scale	1st Priority	15 (E-4; V-5; M-6)
Pupil light reflex	2nd 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	Not a priority	Normal hydro-aerial sounds without abdominal murmurs.
Abdominal palpation	Not a priority	No rigidity. No pain. No guarding or signs of peritoneal irritation. No masses or palpable organomegalies.
Abdominal percussion	Not a priority	6R - tympanic; 7R - tympanic; 6L - tympanic; 7L - tympanic
Rectal examination	Not a priority	
Temperature (°C)	2nd 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. How are you feeling?	2nd Priority	I am not feeling too well. I have difficulty moving my left arm and leg.
02. What happened to you?	1st Priority	I was at home with my wife when I suddenly felt difficulty moving my left limbs.

History of Present Illness

03. Are you in pain at all?

No, not really.

2nd Priority

04. When did your symptoms start?

Approximately five hours ago.

1st Priority

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

Two hours ago.

Not a priority

06. Have you had any similar symptoms before?

Yes. Three days ago and yesterday I also had difficulty moving my left arm, but it lasted only about 15 minutes.

1st Priority

Past Medical/Surgical History

07. Do you have high blood pressure?

Yes, I do.

Not a priority

08. Do you have high cholesterol?

I don't think so.

Not a priority

09. Do you have any other health problems?

I have high blood pressure and a small tumor in my urinary bladder.

2nd Priority

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

Well... I have this tumor in my bladder, but they say it is controlled and only in my bladder.

2nd Priority

11. Have you ever been hospitalized?

Yes, I did a minor intervention to my bladder two weeks ago.

2nd Priority

Medications and Allergies

12. What medication have you been taking?

I am taking a pill for my blood pressure. I was also taking aspirin, but I stopped after the bladder intervention and have not restarted yet.

1st Priority

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

No.

Not a priority

14. Have you been taking your medication properly?

Well... I stopped the aspirin and I still haven't asked when I should restart it.

Not a priority

Social history

15. Can you please say what you usually eat?

Relatively normal.

Not a priority

16. Do you get much exercise?

No, not really.

Not a priority

17. How many meals do you have a day?

Five.

Not a priority

18. Have you felt any changes to your appetite?

No.

Not a priority

19. Have you been under any stress lately?

Nothing out of the ordinary.

	Not a priority	
20. How often do you have an alcoholic drink?		No, never.
	Not a priority	
21. Do you smoke?		Not now, but I have smoked before when I was younger.
	Not a priority	
22. Any recent weight changes?		No.
	Not a priority	

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	Blood samples were collected and sent to microbiology lab. Complete results are due in four days.
Urine culture	Not a priority	Samples were collected and sent to microbiology lab. Complete results are due in four days.

Decision aids

Stroke scale (NIHSS)	1st Priority	8 - Initial 17 - After aggravation 4 - After thrombectomy
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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:
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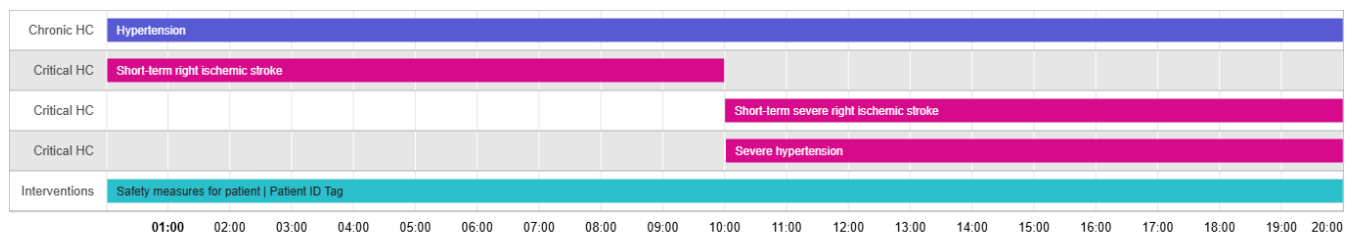
		no ascites or free air; no fluid collection. Vessels: normal. Retroperitoneum: normal. Abdominal wall: normal. Bones: normal.
Abdominal ultrasound	Not a priority	Assessed abdominal structures present no alterations.
Abdominal X-Ray	Not a priority	No visible alterations.
AP pelvis X-Ray	Not a priority	No significant skeletal alterations.
Cerebral CT angiography	1st Priority	A severe carotid atherosclerotic stenosis is observed in the post-bulbar segment of the right internal carotid artery. It shows irregular outline and causes a maximum stenosis of 80%.
		The remaining supra-aortic vessels are all patent, showing minor atherosclerotic plaques without significant arterial stenosis (<50%).
Chest CT	Not a priority	Absence of significant changes of pulmonary parenchyma density and pleural effusion.
Chest X-Ray	Not a priority	No visible alterations.
Coronary angiography	Not a priority	No coronary occlusions found.
CT pulmonary angiogram	Not a priority	No presence of thrombus. No evidence of aortic dissection.
Head CT	1st Priority	No parenchymal changes.
Lower limbs CT	Not a priority	No significant alterations.
Lower limbs ecodoppler	Not a priority	No significant changes.
Neck Doppler ultrasound	2nd Priority	Severe stenosis causing near occlusion of the right Internal Carotid Artery just after its beginning in the carotid bulb.
Pelvic CT	Not a priority	No enlarged retroperitoneal or pelvic lymph nodes. No ascites or free air. No other fluid collection. Blood vessels normal. Bone structures normal. Retroperitoneum normal.
Transcranial Doppler	2nd Priority	Occlusion of the right Middle Cerebral Artery in its M1 segment. All other intracranial arteries are visible and

Transesophageal echocardiogram	Not a priority	permeable. No alterations.
Transthoracic echocardiogram	Not a priority	No alterations found to cardiac morphology. Normal left ventricular systolic function.
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	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 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	2nd Priority	aPTT (s) - 36 Prothrombin time (s) - 12.0 INR - 1.0 D-Dimer (ug/mL) - 0.058
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 (×10 ⁶ /μL) - 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 (x10 ³ /μL) - 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	Due to simulation of test imprecision, there may be slight differences in the actual results. 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
Urinary antigens	Not a priority	Streptococcus pneumoniae - Negative Legionella pneumophila - Negative

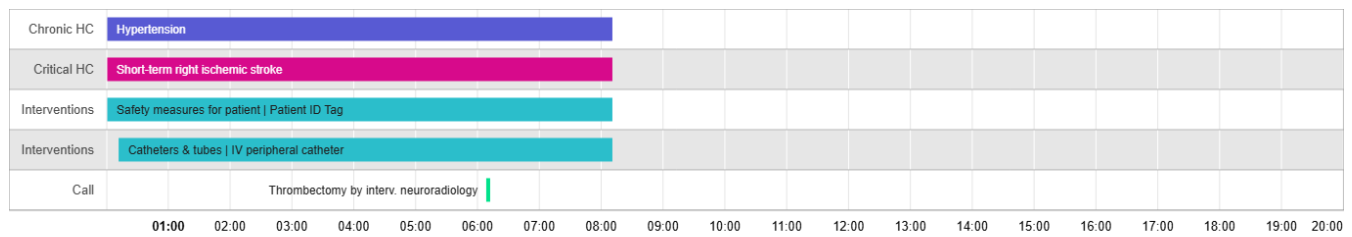
Baseline

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.26

2nd Priority

Acetylsalicylic acid (oral, between 75 and 300 mg)
Clopidogrel (oral, 75 or 300 mg)

Medications | Antiplatelets |
Acetylsalicylic acid

Medications | Antiplatelets |
Clopidogrel

i.27 - Thrombectomy

1st Priority

Initially, occlusion of the proximal M1 segment of the right Middle Cerebral Artery is visible (TICI 0).
After stentriever, full recanalization was observed (TICI 3).

Call | Thrombectomy by interv.
neuroradiology

i.28 - Carotid stenting

2nd Priority

The right common carotid artery was catheterized by retrograde approach through the right femoral artery. A severe stenosis was observed in the post-bulbar segment of the right internal carotid artery. A stent was implanted in the right internal and common carotid arteries. The final post-procedural angiogram showed permeable internal carotid artery. No relevant complications occurred.

Call | Carotid stenting 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.

**"What medication have you
been taking?" dialogue
question:**

Question

Are reperfusion therapies (thrombolysis and/or thrombectomy) contraindicated in the presence of a bladder tumor?

Correct answer

No

1 Incorrect answer(s)

Yes

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 basilar artery

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: 7

Large infarct. ASPECTS: 4

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

Migraine with aura

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

Right hemisphere ischemic stroke

3 Incorrect answer(s)

Basilar artery stroke

Right hemisphere hemorrhagic stroke

Brain tumor

Formative Multiple Choice Question:

Question

This patient had similar recurrent episodes in the past days. How does this impact the clinical approach?

Correct answer

There is likely a significant stenosis in the symptomatic artery that should be studied and treated

2 Incorrect answer(s)

There is no impact on clinical decision

There is likely a cardiac source of emboli that should be studied and treated

Formative Multiple Choice Question:

Question

What is the recommended approach to the symptomatic stenosis in the internal carotid artery?

Correct answer

Endarterectomy or carotid stenting in the first 14 days

2 Incorrect answer(s)

Low-dose statin

Aggressive blood pressure control

Formative Multiple Choice Question:

Question

Which of the following antiplatelet regimens is recommended in case of acute carotid stenting?

Correct answer

Double antiplatelet with aspirin and clopidogrel starting with loading dosages

2 Incorrect answer(s)

Single antiplatelet with aspirin

Double antiplatelet with aspirin and clopidogrel, not using loading dosages

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
Thrombectomy + stenting (with medication)	Success	You have solved the case with clinical success.	Case ends in 30 seconds if, after doing a thrombectomy and a carotid stenting, it's given to the patient acetylsalicylic

			acid (oral, between 75 and 300 mg) or clopidogrel (oral, 75 or 300 mg).
Thrombectomy + stenting (without medication)	Success	You have solved the case with clinical success. However, your medical approach to stenting was not ideal.	Case ends in 120 seconds if, after doing a thrombectomy and a carotid stenting, no medication is given.
Only thrombectomy (success)	Success	You have solved the case according to treatment guidelines, with clinical success.	Case ends in 120 seconds, after the thrombectomy.
Thrombectomy not performed	Failure	You didn't follow the guidelines nor had clinical success. Try again!	Case ends after 900 seconds if a thrombectomy is not conducted in that interval.

References

1. Committee TESO (ESO) EC and the EW. 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*. 2018;49(3):e46-e99.
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.