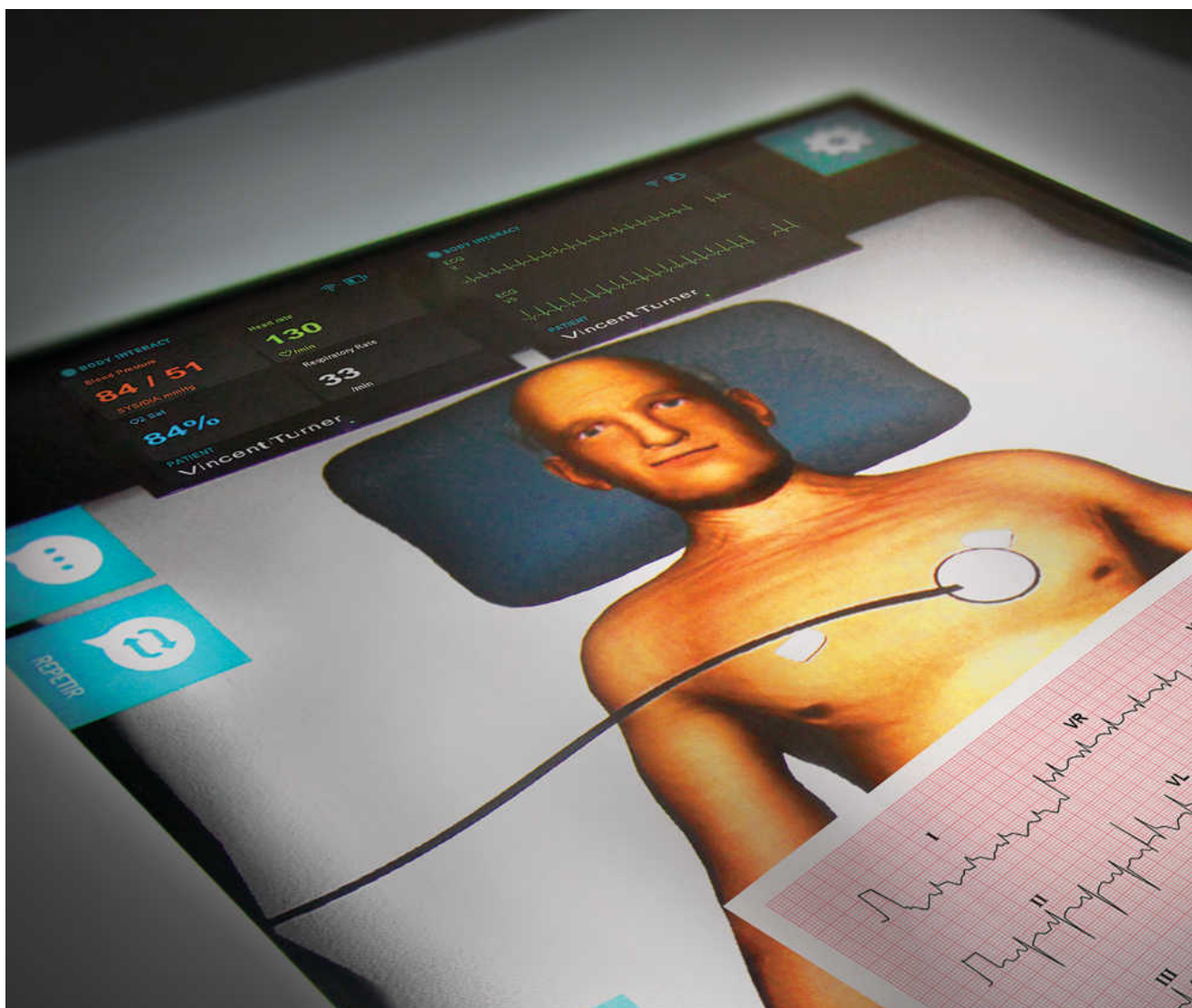


# BODY INTERACT™

CLINICAL REASONING EDUCATION



## SCENARIO 68 - BRIDGETTE THATCHER

MEDICAL CATEGORY: NEUROLOGY

CASE DIFFICULTY: ADVANCED

SIMULATION ENVIRONMENT: EMERGENCY ROOM

These patients are not real patients and their clinical cases, whilst clinically plausible, are fictional.

Case 68  
Bridgette Thatcher

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Version: V4

Date: 19/05/2017

Body Interact v5

OVERVIEW



This case features a patient that has non-valvular atrial fibrillation, and as such is taking a vitamin K antagonist (VKA) for thrombotic prophylaxis. The patient suffered an acute stroke and needs assistance that takes into consideration her VKA prescription.

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, aged 78 years. The patient was just admitted to the emergency room due to sudden onset of slurred speech and motor impairment in the left arm. The symptoms started two hours ago.			
LEARNING OBJECTIVES	GENERAL	Management of coagulation in a VKA treated patient with intracranial hemorrhage.			
	SPECIFIC	Recognize an hemorrhagic stroke. Administer treatment adequate for a hemorrhagic stroke in a patient treated with VKA.			
PATIENT CHARACTERIZATION		Patient name:	Bridgette Thatcher	Age (years):	78
		BMI:	31.3 (obesity)	Sex:	Female
		Weight (kg):	80	Height (cm):	160
		Weight (lb):	176	Height (in):	63
		Chronic conditions:	Non-valvular atrial fibrillation; Hypertension; Bilateral hip osteoarthritis.		

Notes: These patients are not real patients and their clinical cases, whilst clinically plausible, are fictional.

ABCDE ASSESSMENT

CATEGORY	PARAMETERS	EVALUATION	PRIORITY
AIRWAY	Upper airway noises	Normal	1st Priority
	Airway observation	Clear	1st Priority
BREATHING	Signs of respiratory distress	Normal	1st Priority
	Respiratory rate	12/min	1st Priority
	Chest excursion	Normal	1st Priority
	Chest deformity, raised JVP, chest drains	Normal	1st Priority
	O2 Sat	99%	1st Priority
	Chest percussion	<b>Right:</b> 1R- resonance; 2R- resonance; 3R- resonance; 4R- resonance; 5R - dullness. <b>Left:</b> 1L- resonance; 2L- resonance; 3L- superficial cardiac dullness; 4L- superficial cardiac dullness; 5L- resonance	2nd Priority
	Chest palpation	2L- normal; 2R- normal	2nd Priority
	Pulmonary auscultation	Normal	2nd Priority
CIRCULATION	Hands and digits	Pink and warm	1st Priority
	Heart rate	80 bpm	1st Priority
	Peripheral pulses	<b>Carotid-</b> Amplitude: strong; Rhythm: regular; <b>Radial-</b> Amplitude: strong; Rhythm: regular, equal on both sides; <b>Femoral-</b> Amplitude: strong; Rhythm: regular, equal on both sides; <b>Dorsalis pedis-</b> Amplitude: strong; Rhythm: regular, equal on both sides	1st Priority
	Blood pressure	182 / 109 mmHg	1st Priority
	Capillary refill time (CRT)	1.3 seconds	1st Priority
	Heart auscultation	Irregular heart rate due to atrial fibrillation	2nd Priority
	Urinary output	0.7 mL/kg/h / 56 mL/h	2nd Priority
	External hemorrhage (wounds), drains, concealed hemorrhage	Right intracerebral hemorrhage	1st Priority
DISABILITY	<u>Pupils (size, equality and reaction to light)*</u>	Diminished corneal reflex	1st Priority
	Glasgow Coma Scale	15 (E4-V5-M6)	1st Priority
	Blood Glucose	131 mg/dL / 7.3 mmol/L	Not a Priority
	<u>Full body (front)*</u>	Normal	2nd Priority
	<u>Full body (back)*</u>	Normal	2nd Priority

**Case 68**  
**Bridgette Thatcher**

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Version: V4

Date: 19/05/2017

Body Interact v5

<b>EXPOSURE</b>	Abdomen percussion	<b>6R-</b> tympanic; <b>7R-</b> tympanic; <b>6L-</b> tympanic; <b>7L-</b> tympanic	2nd Priority
	Abdomen palpation	Normal	2nd Priority
	Temperature	36.5 °C / 98 °F	Not a Priority

Note: \* In the current version of the case, these procedures are not implemented.

**DIALOGUES**

Specification of dialogues with the patient during simulation:

CATEGORY	Question Availability	#	QUESTION	PATIENT REPLY	REPLY CONDITIONAL	PRIORITY
Medical condition	-	1	Currently, how do you feel?	Taa pii.....  I am not feeling well because my voice is strange and I have difficulty moving my left arm.	Patient has severe consciousness impairment.  -	1st Priority
	-	2	Feeling pain?	Noo...diseeaass...  No.	Patient has severe consciousness impairment.  -	2nd Priority
	-	3	Concomitant health conditions?	Noo...beenn...  I have a heart condition and also arthritis.	Patient has severe consciousness impairment.  -	1st Priority
	-	4	What cardiovascular disease?	Boo... streen...  My heart condition, it is called atrial fibrillation.	Patient has severe consciousness impairment.  -	1st Priority
	-	5	How long has heart condition endured?	Mmaa...bbuu...  For some years now, I can't say for sure.	Patient has severe consciousness impairment.  -	2nd Priority
	-	6	History of severe illness?	I'mm... eeaatt...  Besides what happened to me now, not really.	Patient has severe consciousness impairment.  -	2nd Priority
	-	7	Any recent weight changes?	linn...ttoo...  No.	Patient has severe consciousness impairment.  -	Not a Priority
	-	8	Taking any medication?	Diabee...know..  Warfarin, as directed by my doctor, Amlodipine 5 mg daily, Bisoprolol 5 mg daily, Indapamide 1.5 mg daily.	Patient has severe consciousness impairment.  -	1st Priority
	-	9	Have you taken exactly the same doses that your doctor instructed you to take?	Wii...thaa...  Yesterday I forgot to take one, so today I took it twice.	Patient has severe consciousness impairment.  -	1st Priority

Case 68  
Bridgette Thatcher

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Version: V4

Date: 19/05/2017

Body Interact v5

	-	10	Medication side-effects present?	Noo... too...	Patient has severe consciousness impairment.	Not a Priority
				No.	-	
Nutrition	-	11	Describe your diet.	Mmaa...bbuu...	Patient has severe consciousness impairment.	Not a Priority
				I eat about everything. I'm not picky.	-	
	-	12	How many meals per day?	Doocc...thaa...	Patient has severe consciousness impairment.	Not a Priority
				I have three meals a day.	-	
	-	13	Snacks between meals?	Noo...diseeaass...	Patient has severe consciousness impairment.	Not a Priority
				No. I don't usually eat snacks.	-	
	-	14	Do you take dietary supplements?	linn...ttoo...	Patient has severe consciousness impairment.	Not a Priority
				No, I am not taking any supplements.	-	
-	15	Have there been changes in appetite?	Ussuu...eeaat...	Patient has severe consciousness impairment.	Not a Priority	
			I think my appetite has been the same.	-		
	-	16	Last time you ate?	Haavv... laa...	Patient has severe consciousness impairment.	Not a Priority
				I dined just an hour ago.	-	
Activity	-	17	Do you exercise often?	Tiimm... haavv...	Patient has severe consciousness impairment.	Not a Priority
				Well, I'm not very active. For example, I only go for a walk very occasionally.	-	
	-	18	What were you doing when you felt ill?	Doocc...thaa...	Patient has severe consciousness impairment.	Not a Priority
				I was talking with my family.	-	
	-	19	What is your job?	Diabee...knoww..	Patient has severe consciousness impairment.	Not a Priority
				I am retired.	-	
	-	20	Recently under stress?	Noo...diseeaass...	Patient has severe consciousness impairment.	Not a Priority
				No.	-	
Risk factors	-	21	Frequency of alcohol consumption?	Ussuu...eeaat...	Patient has severe consciousness impairment.	Not a Priority
				No, I don't drink at all.	-	

Case 68  
Bridgette Thatcher

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Version: V4

Date: 19/05/2017

Body Interact v5

-	22	Are you hypertensive?	Yes. Yes.	- -	2nd Priority
-	23	High cholesterol present?	Yee...knnoo... No.	Patient has severe consciousness impairment. -	Not a Priority
-	24	Do you smoke?	Haavv... laa... No, I never smoked in my life.	Patient has severe consciousness impairment. -	Not a Priority

INITIAL SIMULATION CONDITIONS

CATEGORY	DESIGNATION	COMMENTS
Signs & symptoms	Mouth deviation towards the right side	Due to right intracerebral hemorrhage
Acute conditions at case start	Right intracerebral hemorrhage	-
	Hypertension	-
Parameters at case start:	Blood pressure (mmHg): 182 / 109	
	Heart rate (bpm): 80	
	Respiratory rate (/min): 12	
	O <sub>2</sub> saturation (%): 99	
	Blood glucose (mg/dL): 131	Blood glucose (mmol/L): 7.27
	Temperature (°C): 36.5	Temperature (°F): 98
	Hemoglobin (g/dL): 14.3	
Urinary output (mL/kg/h): 0.7		

SEQUENCING OF CLINICAL CONDITIONS

Description of the predefined evolution of the patient's state:

SIMULATION TIME (MIN)	EVENT
0	Initial conditions: - Right intracerebral hemorrhage; - Hypertension (SAP 165-189 mmHg; SBP 95-114 mmHg)
1	
2	
3	
4	
5	
6	
7	
8	- Right intracerebral hemorrhage leads to Hypertensive crisis / Severe hypertension (200/115 mmHg); - Severe hypertension leads to anuria (200/115 mmHg)
9	
10	
11	
12	
13	
14	
15	- Right intracerebral hemorrhage leads to coma (if at least one of the following is untreated: coagulation, BP)
16	
17	
18	- Cardiac arrest (irreversible)
19	
20	

EXAMINATION PROCEDURES

Examination procedures relevant for the case with detailed results:



Case 68  
Bridgette Thatcher

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Version: V4

Date: 19/05/2017

Body Interact v5

	<b>Head CT</b>	<b>Deterioration to Coma*</b>	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 or fractures.		<b>1st Priority</b>	
		<b>After neurosurgery</b>	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 or fractures.			
<b>Lab tests</b>	<b>Arterial blood gas</b>		No significant changes		Not a Priority	
	<b>Biochemistry</b>		No significant changes		<b>1st Priority</b>	
	<b>Complete blood count</b>		No significant changes		2nd Priority	
	<b>Coagulation Tests</b>		All normal except Increased INR of 3.5		<b>1st Priority</b>	
	<b>Lipid profile</b>		No significant changes		Not a Priority	
	<b>Urinalysis</b>		No significant changes		Not a Priority	
<b>Electrophysiology</b>	<b>Electrocardiogram</b>		Atrial fibrillation		Not a Priority	
<b>Decision aids</b>	<b>Stroke Scale (NIHSS)</b>	<b>Right intracerebral hemorrhage</b>	1a.	Level of consciousness	0	<b>1st Priority</b>
			1b.	LOC - Questions (month and age)	0	
			1c.	LOC - Verbal commands (open/close eyes, grip/release non-paretic hand)	0	
			2.	Best gaze (Only horizontal eye movements, voluntary or reflexive)	0	
			3.	Visual fields (stimuli or threats in each eye's 4 quadrants)	0	
			4.	Facial palsy	1 (Left)	
			5a.	Motor right arm (10" sitting at 90°, supine at 45°)	0	
			5b.	Motor left arm (10" sitting at 90°, supine at 45°)	2	
			6a.	Motor right leg (5" lying at 30°)	0	
			6b.	Motor left leg (5" lying at 30°)	1	
			7.	Limb ataxia (finger-nose-finger; heel-shin)	0	
			8.	Sensory (sensation to pinprick when tested or withdrawal from noxious stimulus)	1	
			9.	Best language (name items, describe a picture, read sentences)	0	
			10.	Dysarthria (clarity of articulation of speech when reading or repeating words)	1	
		11.	Extinction and inattention (simultaneous bilateral visual and tactile stimuli; anosagnosia)	1		
			<b>Total</b>	<b>7</b>		
			1a.	Level of consciousness	2	
			1b.	LOC - Questions (month and age)	2	
			1c.	LOC - Verbal commands (open/close eyes, grip/release non-paretic hand)	2	
			2.	Best gaze (Only horizontal eye movements, voluntary or reflexive)	2	
			3.	Visual fields (stimuli or threats in each eye's 4 quadrants)	2	
			4.	Facial palsy	2 (Left)	
			5a.	Motor right arm (10" sitting at 90°, supine at 45°)	1	
			5b.	Motor left arm (10" sitting at 90°, supine at 45°)	4	
			6a.	Motor right leg (5" lying at 30°)	1	
			6b.	Motor left leg (5" lying at 30°)	4	
			7.	Limb ataxia (finger-nose-finger; heel-shin)	0	
	8.	Sensory (sensation to pinprick when tested or withdrawal from noxious stimulus)	2			
	9.	Best language (name items, describe a picture, read sentences)	3			
	10.	Dysarthria (clarity of articulation of speech when reading or repeating words)	2			
	11.	Extinction and inattention (simultaneous bilateral visual and tactile stimuli; anosagnosia)	1			
		<b>Total</b>	<b>30</b>			



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Bridgette Thatcher**

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Version: V4

Date: 19/05/2017

Body Interact v5

		After neurosurgery	1a.	Level of consciousness	1	
			1b.	LOC - Questions (month and age)	0	
			1c.	LOC - Verbal commands (open/close eyes, grip/release non-paretic hand)	0	
			2.	Best gaze (Only horizontal eye movements, voluntary or reflexive)	1	
			3.	Visual fields (stimuli or threats in each eye's 4 quadrants)	0	
			4.	Facial palsy	2 (Left)	
			5a.	Motor right arm (10" sitting at 90°, supine at 45°)	0	
			5b.	Motor left arm (10" sitting at 90°, supine at 45°)	2	
			6a.	Motor right leg (5" lying at 30°)	0	
			6b.	Motor left leg (5" lying at 30°)	2	
			7.	Limb ataxia (finger-nose-finger; heel-shin)	0	
8.	Sensory (sensation to pinprick when tested or withdrawal from noxious stimulus)	1				
9.	Best language (name items, describe a picture, read sentences)	0				
10.	Dysarthria (clarity of articulation of speech when reading or repeating words)	1				
11.	Extinction and inattention (simultaneous bilateral visual and tactile stimuli; anosagnosia)	1				
Total				11		

Notes: CT = computed tomography; TE = transesophageal; TT = transthoracic  
 NIHSS = National Institutes of Health Stroke Scale  
 \*Occurs only if hemostasis and BP are not controlled. If hemostasis and BP are controlled CT will remain unchanged.

**TREATMENT / INTERVENTION OPTIONS**

Medication / intervention options to treat all patient's conditions.

This table contains treatments required to treat all relevant acute health conditions present in this case.

Each cell in the first column designates a condition and the cells to the right describe its treatment options.

The "type" and "category" columns refer to the location of the treatment item in Body Interact user interface (to be filled in only by the Body Interact team).

To treat:	TYPE	CATEGORY	DESIGNATION	DOSE	UNIT	ROUTE OF ADMINISTRATION	PRIORITY
RIGHT INTRACEREBRAL HEMORRHAGE (in context of vitamin K anticoagulant)	MEDICATION	COAGULATION (vitamin K and one of the other 3 reversal agents)	Vitamin K	10	mg/1h	IV infusion	1st Priority
			Activated prothrombin complex concentrate	35	un./kg	IV bolus	1st Priority
			Prothrombin complex concentrate	35	un./kg	IV bolus	
			Fresh-frozen plasma	20	ml/kg	IV bolus	

To treat:	TYPE	CATEGORY	DESIGNATION	DOSE	UNIT	ROUTE OF ADMINISTRATION	PRIORITY
HYPERTENSION / SEVERE HYPERTENSION	MEDICATION	ANTI-HYPERTENSIVE VASODILATOR	Labetalol	10 - 20	mg	IV bolus	1st Priority
			Urapidil	10 - 20	mg	IV bolus	1st Priority
			Nitroglycerin	10 - 40	µg/min	IV infusion	1st Priority

To treat:	TYPE	CATEGORY	DESCRIPTION	PRIORITY
COMA	CALL	NEUROSURGEON	Neurosurgeon operates in situation of coma	1st Priority

Notes: 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.

Notes:



Case 68  
Bridgette Thatcher

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Version: V4

Date: 19/05/2017

Body Interact v5

• If neurosurgeon is called before coma, the neurosurgeon says:

***“The patient is fully awake and neurologically stable, therefore, at this stage, he does not have indication for neurosurgery.” [2]***

• If patient is in a coma and both coagulation and blood pressure status are unsuitable for neurosurgery (no anticoagulant reversal agent administered and patient is hypertensive), neurosurgeon says:

***“I cannot operate the patient on this condition. Please address coagulation status and blood pressure.” [2]***

• If patient is in a coma and coagulation status is unsuitable for neurosurgery (no anticoagulant reversal agent administered), neurosurgeon says:

***“I cannot operate the patient on this condition. Please address coagulation status.” [2]***

• If patient is in a coma and blood pressure status is unsuitable for neurosurgery (patient is hypertensive), neurosurgeon says:

***“I cannot operate the patient on this condition. Please address blood pressure.” [2]***

• If patient is in a coma and both pressure and coagulation status are suitable for neurosurgery, neurosurgeon says:

***“The patient has indication and is ready for urgent neurosurgery. Please send patient to operation room.” [2]***  
***At this point the trainee can press CONFIRM and send patient to surgery.***

After pressing CONFIRM, surgery is performed. The Neurosurgeon will report the following:

***“Neurosurgery was successful. No complications occurred during procedure.”***

Notes: In real clinical practice a neurosurgeon following current guidelines would delay surgery until coagulation is normalized so as to prevent bleeding during surgery. Following surgery, user can request a control post-op head CT.

### ENDING MESSAGES

Each ending message text is required to have no more than 200 characters (including spaces).

TYPE	CONDITIONAL	MESSAGE
Success	Treating the patient's conditions according to guidelines	Congratulations, your practice meets the guidelines' requirements.
Failure	Leave untreated Right intracerebral hemorrhage	Unfortunately your patient didn't make it. Try again!

### DIFFERENTIAL DIAGNOSIS

Indication of the options of diagnostic answers that the user will be presented at the end of the simulation (multiple choice question):

DIFFERENTIAL DIAGNOSIS MULTIPLE CHOICE QUESTION	Correct answer	Intracerebral hemorrhage
	3 incorrect answers	Cerebral venous thrombosis
	Acute ischemic stroke	
	Cerebral abscess	

### REFERENCES

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- Anderson et al., Rapid Blood-Pressure Lowering in Patients with Acute Intracerebral Hemorrhage. N Engl J Med. 2013 Jun 20;368(25):2355-65