ACEP Simulation Case Template

SIMULATION CASE TITLE: Cardiac Arrest: Aortic Dissection
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PATIENT NAME: Terrence Heartfield
PATIENT AGE: 67
CHIEF COMPLAINT: Right sided weakness

Brief narrative description of case *Include the presenting patient chief complaint and overall learner goals for this case*	67 year old male presenting for right arm weakness and chest pain. The patient will become unstable, unconscious, and require intubation. The learner will need to identify the cause and make the appropriate management decisions
Primary Learning Objectives *What should the learners gain in terms of knowledge and skill from this case? Use action verbs and utilize Bloom's Taxonomy as a conceptual guide*	- Analyze the patient's chief complaint - Evaluate for causes of the patient's sudden decompensation - Create and implement an appropriate management plan
Critical Actions *List which steps the participants should take to successfully manage the simulated patient. These should be listed as concrete actions that are distinct from the overall learning objectives of the case.*	- Place the patient on a monitor and obtain IV access - Obtain history of weakness and chest pain - Identify the patient's decompensation begin resuscitation - Perform TEE - Identify aortic dissection flap - Consult cardiothoracic surgery
Learner Preparation *What information should the learners be given prior to initiation of the case?*	**Learners should be familiar with the basics of TEE**

Required Equipment *What equipment is necessary for the case?*	Monitor TEE simulator

INITIAL PRESENTATION			
Initial vital signs	HR: 123 BP: 203/119 RR: 24 O_2SAT: 95% T: 37.4 ^oC		
Overall Appearance *What do learners see when they first enter the room?*	Patient in moderate distress, breathing heavily, sitting forward, holding his chest with his left hand.		
Actors and roles in the room at case start *Who is present at the beginning and what is their role? Who may play them?*	Ex: EMS, family		
HPI *Please specify what info here and below must be asked vs what is volunteered by patient or other participants*	67 year old male presenting via EMS as a stroke alert for right sided weakness. LKWT 30 minutes ago, stroke alert activated, but CT scanner is occupied so starting initial evaluation in the resus bay. If asked: Right arm and right leg feel weak No difficulty with speech or facial droop Severe chest pain started just before the weakness did Otherwise, the patient was in their normal state of health		
Past Medical/Surg History	**Medications**	**Allergies**	**Family History**
HTN, HLD, DM	Amlodipine, Atorvastatin	None	HTN, DM
Physical Examination			
General	Moderate distress, breathing heavily, sitting forward, holding his chest with his left hand		
HEENT	Normal		
Neck	Normal		
Lungs	Normal		

Cardiovascular	Systolic murmur on auscultation. Decreased pulse of right radial and right DP
Abdomen	Normal
Neurological	4/5 weakness of right upper and right lower extremities. Decreased sensation to right upper and right lower extremities.
Skin	Normal
GU	Normal
Psychiatric	Normal

1) **SCENARIO STATES, MODIFIERS AND TRIGGERS**
2) *This section should be a list with detailed description of each step than may happen during the case. If medications are given, what is the response? Do changes occur at certain time points? Should the nurse or other participant prompt the learners at given points? Should new actors or participants enter, and when? Are there specific things the patient will say or do at given times?*

PATIENT STATUS	**LEARNER ACTIONS, MODIFIERS & TRIGGERS TO MOVE TO THE NEXT STATE**	
1. Baseline State Rhythm: Sinus tach HR: 123 203/119 RR: 24 O_2SAT: 95% T: 37.4 ^oC	<u>Learner Actions</u> ● Place patient on monitor ● Obtain IV access ● Obtain EKG ● Obtain history of chest pain with weakness ● Identify pulse deficit ● Obtain blood pressure on right upper extremity	<u>Modifiers</u> *Changes to patient condition based on learner action* • If patient goes straight to CT scanner, patient will code unexpectedly during the head CT. • If learner is on track to diagnose aortic dissection (noticing pulse deficit and asymmetric blood pressures), the patient will say "I really don't feel good" and become unresponsive. <u>Triggers</u> *For progression to next state* ● If the patient goes to CT, he will go into cardiac arrest during his scan. ● If the learner is picking up clues of aortic dissection, the patient will become unresponsive.

2. Rhythm: Sinus tach HR: 143 BP: 223/130 RR: 0 O_2SAT: 92% T: 37.4 ^oC	<u>Learner Actions</u> ● Perform intubation (including pre-oxygenation with BVM) ● Begin CPR ● Perform TEE ● Identify aortic dissection ● Begin norepinephrine ● Begin esmolol to control heart rate	<u>Modifiers</u> • If patient codes in CT scanner, patient will expire. • After intubation, patient will code. • If no TEE if performed, patient will expire. <u>Triggers</u> ● Unresponsiveness should prompt intubation. ● Loss of pulses after intubation ● TEE images should be shown when learner decides to perform TEE. ● Learner should make management decisions once aortic dissection is identified.
3. Rhythm: Sinus rhythm HR: 80 BP: 100/62 RR: 15 O_2SAT: 100% T: 37 ^oC	<u>Learner Actions</u> ● Insert arterial line (left upper extremity) ● Consult cardiothoracic surgery	<u>Modifiers</u> • If cardiology is consulted, they will refuse to do anything. <u>Triggers</u> ● END OF CASE after cardiothoracic consult and patient is on appropriate medication—titrating HR to less than 80 and BP to less than 120 systolic in left upper extremity

SUPPORTING DOCUMENTS, LAB RESULTS AND MULTIMEDIA	
Lab Results	CBC: Leukocytosis CMP: AKI Troponin: Normal (not enough time for elevation) Lactate: 4.1 D-dimer: 2.1 Others: normal
EKG	Sinus tachycardia with strain pattern
CXR CT imaging	Mediastinal widening No CT images: patient will expire if he goes to CT

Ultrasound Video Files	TEE images with aortic dissection flap TTE with dilated aortic root

SAMPLE QUESTIONS FOR DEBRIEFING
1) How does aortic dissection present? (Usually sharp, sudden onset, severe, tearing chest pain. If the patient has chest pain AND a neurologic deficit, dissection should be high on the differential) **2) Why is TEE so useful in this case? (The patient is not stable enough to go to the CT scanner. TEE can be used to diagnose the etiology without moving the patient from the resuscitation bay in the setting of hemodynamic instability or cardiac arrest)** **3) Describe the ways to visualize the aorta using TEE. (The operator can use the left atrium as a landmark. Keep the probe at 0 degrees omniplane and rotate to probe to the patient's left. This should obtain the descending aorta in the short axis. You can then begin to withdraw the probe following the course of the aorta retrograde up to the arch and rotate to the patient's right to view the ascending aorta).** **4) How would you manage a patient with aortic dissection? (Primary ED objective: control heart rate and blood pressure. Keep heart rate below 80 or 100 and keep blood pressure below 120 systolic. Use esmolol first to control heart rate and nicardipine/clevidipine to control blood pressure. If a Type A dissection is diagnosed, contact cardiothoracic surgery).**

Ideal Scenario Flow

The patient should be evaluated promptly. The learner should identify that the patient has severe, tearing chest pain in association with his weakness and identify a pulse deficit on exam. The learner should notice the abnormal vital signs (consistent with dissection) and also identify a blood pressure discrepancy in the right upper extremity compared to the left. This should lead the learner to have a high suspicion for aortic dissection rather than ischemic stroke as the etiology of his symptoms. Because this case highlights TEE, the patient will become unresponsive and require intubation. With intubation, the patient will code and CPR will be initiated. Ultrasound (TEE) should be used to investigate for the etiology of cardiac arrest. The learner should identify the aortic dissection, manage heart rate and blood pressure appropriately, start an arterial line, and consult cardiothoracic surgery for an ascending type A aortic dissection.

Anticipated Management Mistakes

The learner may overlook the chest pain, vital signs, and exam findings that suggest aortic dissection and try to send the patient to the scanner immediately to rule out hemorrhagic stroke for TNK administration.
The learner may not perform TEE to identify the cause of arrest.
The learner may not make the appropriate management decisions in treating the patient.

Numbered list, example below

1. *<u>Difficulty with TEE</u>: It may be beneficial to give some education on TEE prior to the case.*

2. *Lack of familiarity with physical exam findings of aortic dissection*: It may be beneficial to review presentation of aortic dissection.
3. *Lack of familiarity with management of aortic dissection*: It may be beneficial to review management of aortic dissection