

SIMULATION CASE TITLE: Vasovagal Reaction and Syncope after CT IV contrast administration
AUTHOR: Kristina Siddall

CHIEF COMPLAINT: "I'm not feeling well"

Brief narrative description of case
Include the presenting patient chief complaint and overall learner goals for this case

32 year-old woman for outpatient CT scan of abdomen and pelvis to evaluate intermittent chronic abdominal pain. At beginning of scan, CT tech calls radiology resident and states the patient is "not feeling well."

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

- 1. Recognize presence and type of contrast reaction**
- 2. Initiate treatment**
- 3. Recognize change in patient condition**

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.

1. Effectively communicates with patient, tech and team
2. Perform a focused history and physical examination
3. Elevate legs
4. Perform ABC assessment and vital signs, place patient on cardiac monitor
5. Initiate fluid resuscitation, O2, atropine
6. Documents event in medical record

INITIAL PRESENTATION

Initial vital signs
 (if attached)

N/A

Overall Appearance <i>What do learners see when they first enter the room?</i>	Anxious diaphoretic patient. "What's happening to me? I'm feeling a little dizzy. I feel like I'm going to pass out."		
HPI <i>Please specify info here and below, what must be asked versus what is volunteered by patient or other participants</i>	Any other symptoms or complaints? <i>No - Denies chest pain, shortness of breath, pruritus</i> Any drug or EtOH? Denies Prior contrast injection? No		
Past Medical/Surgical History	Medications	Allergies	Family History
Anxiety	MVI Xanax 0.5 mg tid prn	NKDA	None
Physical Examination			
General	Alert, anxious in appearance, otherwise intact, pale.		
HEENT/Neck	PERRLA		
Lungs	Clear		
Cardiovascular	Regular bradycardia, radial pulse 50.		
Abdomen	Soft		
Neuro/Psych	AOx3, moving all extremities; appropriate, polite		
Skin	Warm, intact, diaphoretic		
Extremities	IV still attached to contrast injector.		

INSTRUCTOR NOTES - CHANGES AND CASE BRANCH POINTS

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? There are a few examples given, but it is expected that most cases will have many more changes and potential branch points.

Intervention / Time point	Change in Case	Additional Information
Critical Actions: <ul style="list-style-type: none"> • Tells tech to stop scan • Asks tech whether contrast was given and what dose • Introduces himself to patient • Tells tech to call for help 		
Critical Action: <i>disconnects IV from injector, preserves IV access</i>		
Critical Action: <i>performs focused assessment</i>		
Critical Action: <i>Elevate legs at least 60 degrees, place patient in Trendelenburg position</i>	Patient feels “woozy”, still not feeling well, more diaphoretic, thready pulse, loses consciousness HR 45, RR 15, BP 82/60, O2 sat 98%	
Critical Action: <i>put on monitor or obtain blood pressure; evaluate pulse or attach pulse oximetry</i>	HR 45, RR 15, BP 72/50, O2 sat 92%	
Critical Action: <i>rapid fluid replacement – 1L LR or NS</i>	HR 45, RR 15, BP 106/74, O2 sat 98%	
Critical Action: <i>O2 via NRB, 6-10 L/min by mask</i>		
Critical Action: <i>call RRT or code</i>		
Critical Action: <i>administer atropine 0.6-1mg slow IV into running fluids</i>	“I’m feeling much better now.” HR 74, RR 18, BP 122/70, O2 sat 99%	
Critical Action: <i>contrast reaction documented in patient record</i>		

- A. Ideal Scenario Flow
 - a. CT tech calls radiology resident
 - b. Physician: stops scan, asks tech to disconnect IV from injector, preserve IV access; introduces himself, does focused assessment – ABC, calls nurse for help
 - c. Nursing/Tech
 - i. Place patient on a monitor
 - d. Radiology resident identifies vasovagal reaction as cause of bradycardia
 - i. Elevates legs: no change, then LOC and hypotension
 - ii. Fluid bolus: blood pressure improves, persistent LOC
 - iii. Atropine: bradycardia resolves, patient regains consciousness
 - iv. O2 – pulse ox improves

- B. Anticipated Management Mistakes
 - a. **Failure to identify vagal reaction**
 - i. Tech can ask: “why is her pulse so low”
 - b. **Failure to elevate legs**
 - i. Tech can say “Her heart rate is still low, is there anything we can do?”
 - c. **Administration of Benadryl in hypotensive patient**
 - i. Tech can say, “Is this safe in patients with low blood pressure?”
 - d. **Failure to give fluid bolus**
 - i. Is there an order we have to give fluid?
 - e. **Administration of epinephrine in bradycardic patient**
 - i. Tech can say, “Is this safe in patients with bradycardia?”

- C. Staff information
 - a. **Confederates needed – Tech/nurse**
 - b. **Confederate dialogue/actions**
 - i. **Tech/nurse**
 1. **If they request vital signs: vital signs as above on the monitor**
 2. **If they request IV fluid**
 - a. **“How would you like it given?”**
 3. **If they request EKG, please show on the screen**
 4. **If they request medication**
 - a. **RN “what dose would you like?”**
 - b. **“what route should it be given?”**
 - c. **Mannequin needs**
 - i. **Right antecubital IV**
 - ii. **Lying supine on stretcher**
 - d. **Supply needs**
 - i. **Injector, IV tubing, 60 cc syringe**
 - ii. **O2**
 - iii. **Atropine**
 - iv. **1L fluid**
 - v. **Stretcher**
 - e. **Images – EKG in NSR or sinus bradycardia, patient CT questionnaire**

SIMULATION CASE TITLE: Severe acute contrast reaction
AUTHOR: Kristina Siddall

CHIEF COMPLAINT: "Funny sensation in my throat"

Brief narrative description of case
Include the presenting patient chief complaint and overall learner goals for this case

42-year-old man with asthma has just completed a contrast-enhanced CT for right lower quadrant abdominal pain. CT tech calls radiology resident and states the patient is feeling short of breath and has "funny sensation in his throat." IV still attached to contrast injector. Wife distractor.

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

- 1. Recognize presence and type of contrast reaction**
- 2. Recognize unstable patient**
- 3. Initiate treatment**
- 4. Recognize change in patient condition**

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.

1. Effectively communicates with patient, tech and team
2. Adequate past medical history and discovery of premedication and previous contrast reaction
3. Perform a focused history and physical examination
4. Perform ABC assessment and vital signs, place patient on cardiac monitor
5. Initiate O2
6. Treat with epinephrine
7. Treat with albuterol
8. Documents reaction in medical record

INITIAL PRESENTATION			
Initial vital signs (if attached)	HR – 125 (tachycardia) RR – 25 (tachypnea) BP –142/70 O2 sat – 85%		
Overall Appearance <i>What do learners see when they first enter the room?</i>	Hoarse patient with muffled speech.		
HPI <i>Please specify what info here and below must be asked vs what is volunteered by patient or other participants</i>	Any other symptoms or complaints? No Any drug or EtOH? Denies Received premedication - Hives after IV contrast on scan 1 year ago		
Past Medical/Surgical History	Medications	Allergies	Family History
Asthma	-Albuterol inhaler prn -Prednisone 50 mg po 13 hours, 7 hours and 1 hour before scan -Diphenhydramine 50 mg po 1 hour before scan	IV contrast	None
Physical Examination			
General	Hoarse, difficult to understand, muffled speech		
HEENT/Neck	Tongue and laryngeal edema		
Lungs	Diffuse wheezing		
Cardiovascular	Regular tachycardia		
Abdomen	Soft		
Neuro/Psych	Confused		
Skin	Warm, intact		
Musculoskeletal	Moving all extremities		

INSTRUCTOR NOTES - CHANGES AND CASE BRANCH POINTS

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? There are a few examples given, but it is expected that most cases will have many more changes and potential branch points.

Intervention / Time point	Change in Case	Additional Information
Critical Action: <ul style="list-style-type: none"> • Responds efficiently to call for physician • Tells tech to stop scan • Asks tech whether contrast was given and what dose • Introduces himself to patient • Tells tech to call for help 		
Critical Action: <i>disconnects IV from injector, preserves IV access</i>		
Critical Action: <i>performs focused assessment, identifies prior contrast reaction and premedication</i>		
Critical Action: <i>obtain VS and connect to monitor</i>	<i>Stridor develops, declining consciousness</i>	
Critical Action: <i>administers O2 by NRB and albuterol</i>		
Critical Action: <i>administers IM 0.3 ml epi (0.3 mg) (1:1000 dilution), can repeat q5 min up to 1 mL</i>	Patient becomes hypotensive – give IV epi b/c poorly perfused extremities	
Critical Action: <i>administers IV 1ml epinephrine of 1:10,000 dilution (0.1mg) into running IV or saline flush, can repeat every few minutes as needed up to 10 ml (1mg) total</i>		
Critical Action: <i>administers benadryl and solumedrol or hydrocortisone</i>		
Critical Action: <i>contrast reaction documented in patient record, educates patient's wife on contrast reaction (will not be able to receive IV contrast in the future)</i>		

- A. Ideal Scenario Flow
 - a. CT tech calls radiology resident
 - b. Physician: stops scan, asks tech to disconnect IV from injector, preserve IV access; introduces himself, does focused assessment – ABC, calls for help
 - c. Nursing/Tech
 - i. Place patient on a monitor
 - d. Radiology resident identifies severe contrast reaction as cause of laryngeal edema and bronchospasm (identifies previous contrast reaction and current medications
 - i. Calls RRT
 - ii. Epinephrine 0.5 mg IM: tongue swelling improves
 - iii. Albuterol: wheezing
 - iv. O2 – pulse ox improves.
- B. Anticipated Management Mistakes
 - a. **Failure to identify previous contrast reaction and premedication**
 - i. RN can ask: “does the patient take any medications”
 - b. **Failure to identify tongue edema**
 - i. RN can ask: “why does his voice sound like that”
 - c. **Failure to treat with epinephrine**
 - d. **Failure to apply O2**
 - i. Is the patient breathing OK?
 - e. **Wrong dose of epinephrine**
 - i. Is the patient getting better?
- C. Broward staff information
 - a. **Confederates needed – Tech/nurse; hysterical wife (what is happening to my husband)**
 - b. **Confederate dialogue/actions**
 - i. **Tech/nurse**
 1. **If they request vital signs: vital signs as above on the monitor**
 2. **If they request IV fluid**
 - a. **“How would you like it given?”**
 3. **If they request EKG, please show on the screen.**
 4. **If they request medication**
 - a. **“what dose would you like?”**
 - b. **“what route should it be given?”**
 - c. **Mannequin needs**
 - i. **Right antecubital IV**
 - ii. **Sitting on stretcher**
 - d. **Supply needs**
 - i. **Injector, IV tubing, 60 cc syringe, saline flush**
 - ii. **O2**
 - iii. **10 ml (1mg) vial of 1:10,000 concentration epinephrine - IV**
 - iv. **1 ml (1mg) vial of 1:1000 concentration epinephrine – IM**
 - v. **Epi-pen – adult epinephrine auto-injector (0.30 mL = 0.3mg)**
 - vi. **Albuterol inhaler – 90 mcg/puff**
 - vii. **Albuterol nebulizer**
 - e. **Images**
 - i. **EKG**
 - ii. **Patient questionnaire**

SIMULATION CASE TITLE: MILD CONTRAST REACTION TO GADOLINIUM, PROGRESSING TO MODERATE REACTION

AUTHOR: Kristina Siddall

CHIEF COMPLAINT: "my back itches"

Brief narrative description of case
Include the presenting patient chief complaint and overall learner goals for this case

65-year-old woman smoker undergoing MRI-guided breast biopsy positioned prone. Given pre-procedural Ativan 1mg po for claustrophobia. During gadolinium injection, presses call button stating she has an itch on her back and wants to move arms to scratch. Radiology resident and MRI tech sitting at console outside room.

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

- 1. Recognize presence and type of contrast reaction**
- 2. Move patient from magnet**
- 3. Initiate treatment**
- 4. Recognize change in patient condition and adjust treatment accordingly**

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.

1. Effectively communicates with patient, tech and team
2. Perform a focused history and physical examination
3. Treats with diphenhydramine
4. Perform ABC assessment and vital signs, place patient on cardiac monitor
5. Initiate O2
6. Treat with epinephrine
7. Treat with albuterol
8. Documents reaction in medical record

INITIAL PRESENTATION			
Initial vital signs	N/A		
Overall Appearance <i>What do learners see when they first enter the room?</i>	Patient positioned prone. "My back is itchy. Can I move my arm to scratch my back?"		
HPI <i>Please specify what info here and below must be asked versus what is volunteered by patient or other participants</i>	Initial history: "My nose is running too. Can someone get me a tissue?" Any other symptoms or complaints? No chest pain or dyspnea		
Past Medical/Surgical History	Medications	Allergies	Family History
Left breast cancer	Ativan 1 mg po 30 minutes prior to procedure	NKDA	Breast cancer
Physical Examination			
General	Alert, anxious		
HEENT/Neck	PERRLA, rhinorrhea		
Lungs	Clear		
Cardiovascular	RRR		
Abdomen	Soft		
Neuro/Psych	AOx3		
Skin	Raised wheals on back (see picture)		
Musculoskeletal	Moving all extremities		

INSTRUCTOR NOTES - CHANGES AND CASE BRANCH POINTS

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? There are a few examples given, but it is expected that most cases will have many more changes and potential branch points.

Intervention / Time point	Change in Case	Additional Information
<p>Critical Action:</p> <ul style="list-style-type: none"> • Responds efficiently, promptly enters room • Tells tech to stop scan • <i>Recognizes and maintains MRI safety protocols</i> 		
<p>Critical Action: <i>disconnects IV from injector, preserves IV access, helps patient off table and outside room</i></p>		
<p>Critical Action: <i>performs focused assessment, PMH</i></p>		
<p>Critical Action: <i>identifies back hives and nasal congestion</i></p>		
<p>Critical Action: <i>observes or administers diphenhydramine 50mg po or diphenhydramine 25mg slow over 1-2min</i></p>	<p><i>After 5 minutes, patient has increased urticaria (see picture), wheezing, chest tightness, and cough</i></p>	
<p>Critical Action: <i>ABC check, put on monitor, and recognizes progression of contrast reaction with new bronchospasm, ensures patent airway</i></p>	<p><i>RR 25, alternating O2 sat 90-93%; PE: anxious, audible wheeze, coughing spell; diffuse wheeze on lung exam</i></p>	
<p>Critical Action: <i>designates team member to administer O2</i></p>	<p><i>Pox improves to 95%, wheezing increases, RR still at 25</i></p>	
<p>Critical Action: <i>Administer B-agonist nebulizer/inhaler and/or IM/SQ epi</i></p>	<p><i>Symptoms and VS unchanged</i></p>	
<p>Critical Action: <i>Administer IV epi</i></p>	<p><i>Patient feels better and symptoms resolve</i></p>	
<p>Critical Action: <i>contrast reaction documented in patient record, educates patient that this was contrast reaction and she will need premedication in the future</i></p>		

- A. Ideal Scenario Flow
 - a. Physician: stops scan, asks tech to disconnect IV from injector, preserve IV access, does focused assessment
 - b. Radiologist identifies urticaria and nasal congestion and treats with Benadryl IV/IM/PO
 - c. Radiologist identifies bronchospasm
 - i. Calls RRT
 - ii. O2 – pulse ox improves
 - iii. Albuterol: wheezing
 - iv. Epinephrine IM: no change
 - v. Epinephrine IV (gtt/dose?): symptoms resolve

- B. Anticipated Management Mistakes
 - a. **Failure to identify urticaria**
 - i. Tech can ask: “why is the patient itching?”
 - b. **Failure to treat with benadryl**
 - i. RN can say “does the patient need to be medicated?”
 - c. **Failure to apply O2**
 - i. Is the patient breathing OK?
 - d. **Wrong dose of epinephrine**
 - i. Is the patient getting better?

- C. Staff information
 - a. **Confederates needed – Tech/nurse**
 - b. **Confederate dialogue/actions**
 - i. **Tech/nurse**
 1. **If they request vital signs: vital signs as above on the monitor**
 2. **If they request IV fluid**
 - a. Tech “How would you like it given?”
 3. **If they request medication**
 - a. Tech “What dose would you like?”
 - b. “What route should it be given?”
 - c. **Mannequin needs**
 - i. **Left antecubital IV**
 - ii. **Lying on stretcher**
 - d. **Supply needs**
 - i. **Injector, IV tubing, 60 cc syringe**
 - ii. **O2**
 - iii. **Saline flush**
 - iv. **Po and IV diphenhydramine**
 - v. **10 ml (1mg) vial of 1:10,000 concentration epinephrine - IV**
 - vi. **1 ml (1mg) vial of 1:1000 concentration epinephrine – IM**
 - vii. **Epi-pen – adult epinephrine auto-injector (0.30 mL = 0.3mg)**
 - viii. **Albuterol inhaler – 90 mcg/puff; Albuterol nebulizer**
 - ix. **MRI questionnaire and gadolinium approval form**
 - e. **Images**
 - i. **Back urticaria**
 - ii. **Gadolinium approval form**
 - iii. **Patient MRI questionnaire**

SIMULATION CASE TITLE: Mild contrast reaction in Spanish-speaking patient
AUTHOR: Kristina Siddall

CHIEF COMPLAINT: "My neck and chest are itching"

Brief narrative description of case
Include the presenting patient chief complaint and overall learner goals for this case

46 year-old Spanish-speaking woman lying supine on CT scanner complaining of itching on chest and neck. IV has already been disconnected and removed. CTA of chest was performed for PE evaluation. CT tech calls radiology resident to evaluate. Spanish-speaking tech.

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

- 1. Recognize presence and type of contrast reaction**
- 2. Initiate treatment**
- 3. Recognize limits when communicating with Spanish-speaking patients**

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.

1. Effectively communicates with patient
2. Effectively communicates with tech
3. Perform a focused history and physical examination
4. Treats with diphenhydramine
5. Documents reaction in medical record

INITIAL PRESENTATION			
Initial vital signs	N/A		
Overall Appearance <i>What do learners see when they first enter the room?</i>	Anxious patient. In Spanish, hysterically, "my chest and neck are itching!" – which could be confused as itchy throat		
HPI <i>Please specify what info here and below must be asked versus what is volunteered by patient or other participants</i>	Any other symptoms or complaints? Unable to determine until translator on line		
Past Medical/Surgical History	Medications	Allergies	Family History
Hypothyroidism	Synthroid	Penicillin	Hypertension
Physical Examination			
General	Alert, anxious		
HEENT/Neck	PERRLA		
Lungs	Clear		
Cardiovascular	RRR		
Abdomen	Soft		
Neuro/Psych	AOx3, agitated		
Skin	Urticaria neck and upper chest		
Musculoskeletal	Moving all extremities		

INSTRUCTOR NOTES - CHANGES AND CASE BRANCH POINTS

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? There are a few examples given, but it is expected that most cases will have many more changes and potential branch points.

Intervention / Time point	Change in Case	Additional Information
Critical Action: <ul style="list-style-type: none">• Responds efficiently to call for physician• Asks tech whether contrast was given and what dose• Calls translation line• Introduces himself to patient		
Critical Action: calls translation line, does not use tech to translate	<i>If tries to use tech, tech refuses</i>	
Critical Action: performs focused assessment, examine throat to exclude laryngeal/tongue edema		
Critical Action: explains to patient she is having contrast reaction and administers diphenhydramine 25-50mg po		
Critical Action: observe patient	<i>Urticaria resolves</i>	
Critical Action: contrast reaction documented in patient record, communicates to patient that this was contrast reaction and she will need premedication in the future		

- A. Ideal Scenario Flow
 - a. CT tech calls radiology resident
 - b. Radiology resident calls translation line
 - c. Physician: does focused assessment
 - d. Radiologist identifies urticaria and treats with po Benadryl, observes patient for resolution

- B. Anticipated Management Mistakes
 - a. **Failure to call translation line**
 - i. Tech can say: "I can't be used as a translator"
 - b. **Failure to identify urticaria**
 - i. RN can say: ""Why is the patient itching?"
 - c. **Failure to evaluate throat** – patient repeatedly says neck is itching

- C. Staff information
 - a. **Confederates needed – Tech/nurse**
 - b. **Confederate dialogue/actions**
 - i. **Tech/nurse**
 - 1. **If they request vital signs: vital signs as above on the monitor**
 - 2. **If they request medication**
 - a. **Tech: "What dose would you like?"**
 - b. **Tech: "What route should it be given?"**
 - c. **Mannequin needs**
 - i. **Sitting on stretcher**
 - d. **Supply needs**
 - i. **Injector, IV tubing, 60 cc syringe**
 - ii. **Diphenhydramine 25mg po x 2 tablets**
 - iii. **Phone**
 - iv. **Contrast questionnaire sheet**
 - e. **Images**
 - i. **Urticaria**
 - ii. **Contrast questionnaire**

SIMULATION CASE TITLE: INTRAVENOUS CONTRAST EXTRAVASATION
AUTHOR: Kristina Siddall

CHIEF COMPLAINT: "My left arm hurts, my chest hurts"

Brief narrative description of case
Include the presenting patient chief complaint and overall learner goals for this case

58 year-old man with IDDM complaining of chest and left arm pain. Received 90 cc of nonionic IV contrast undergoing CT chest, abdomen and pelvis for staging of left lung cancer. Left antecubital IV still attached to contrast injector.

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

- 1. Recognize presence and degree of contrast extravasation**
- 2. Initiate treatment**
- 3. Recognize change in patient condition and adjust treatment accordingly**

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.

1. Effectively communicates with patient, tech and team
2. Perform a focused history and physical examination
3. Elevates arm, marks area of erythema
4. Obtains plastic surgery consult
5. Documents extravasation in medical record
6. Calls referring physician with report and finding of PE

INITIAL PRESENTATION			
Initial vital signs (if attached)	N/A		
Overall Appearance <i>What do learners see when they first enter the room?</i>	My arm hurts and feels tight. Owwww, my arms hurts!		
HPI <i>Please specify what info here and below must be asked versus what is volunteered by patient or other participants</i>	Initial history: prior IV contrast without incident, left shoulder pain, not true chest pain, no SOB, no urticarial; + "Tingling" sensation in fingers; intermittent right leg pain for last week		
Past Medical/Surgical History	Medications	Allergies	Family History
IDDM Lung Cancer	Insulin	NKDA	None
Physical Examination			
General	Alert, in mild distress		
HEENT/Neck	PERRLA		
Lungs	Clear		
Cardiovascular	RRR		
Abdomen	Soft		
Neuro/Psych	AOx3		
Skin	At site of IV, left antecubital edema, erythema and tenderness to palpation (see picture)		

INSTRUCTOR NOTES - CHANGES AND CASE BRANCH POINTS

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? There are a few examples given, but it is expected that most cases will have many more changes and potential branch points.

Intervention / Time point	Change in Case	Additional Information
<p>Critical Action:</p> <ul style="list-style-type: none"> • Responds efficiently to call for physician • Tells tech to stop scan • Asks tech whether contrast was given and what dose • Inquires if contrast seen on the scan (asks to see image) • Introduces himself to patient 	Identifies PE on chest CT images	
<p>Critical Action: disconnects IV from injector, focused assessment, marks area on skin</p>		
<p>Critical Action: Evaluates for altered tissue perfusion – checks capillary refill, pulse</p>		
<p>Critical Action: asks patient to elevate arm above heart</p>	Decreased then increased pain	
<p>Critical Action: asks team member to get cold compress/ice pack</p>	Decreased then increased pain	
<p>Critical Action: observation</p>	Area of erythema increases, increased firmness at site, left radial pulse and capillary refill decreased, decreased sensation in left fingers on neurologic exam	
<p>Critical Action: Evaluates for altered tissue perfusion again, designates a team member to contact plastic surgery for consultation</p>		
<p>Critical Action: Document in medical record, contact referring physician about extravasation and PE</p>		

- A. Ideal Scenario Flow
 - a. CT tech calls radiology resident
 - b. Radiology resident responds promptly, evaluate patient
 - c. Reviews CT image and sees clot in LPA
 - d. Resident has patient elevate arm, applies cold compress
 - e. Symptoms worsen, resident repeats physical exam, calls plastic surgery and referring clinician

- B. Anticipated Management Mistakes
 - a. **Failure to identify extravasation and do appropriate physical exam**
 - i. Patient "my fingers feel stiff"
 - b. **Failure to elevate arm**
 - c. **Failure to ask for CT images**
 - i. Is there anything you need from the control area?

- C. Staff information
 - a. **Confederates needed**
 - i. **Tech role**
 - b. **Confederate dialogue/actions**
 - i. **Tech/nurse**
 1. **If they request CT images, show scout and axial slice**
 2. **If request arm x-ray, show image**
 3. **If they request medication**
 - a. Tech "what dose would you like?"
 - b. "what route should it be given?"
 - c. **Mannequin needs**
 - i. **Lying on stretcher**
 - ii. **Left antecubital IV**
 - d. **Supply needs**
 - i. **Injector, IV tubing, 60 cc syringe**
 - ii. **O2**
 - iii. **Saline flush**
 - iv. **Cold compress**
 - v. **Marker**
 - vi. **Contrast questionnaire**
 - e. **Images**
 - i. **Left antecubital IV skin changes**
 - ii. **X-ray Left elbow with extravasation antecubital contrast**
 - iii. **CT chest scout image**
 - iv. **Axial chest CT image without contrast showing hyperdense clot in MPA, LPA or RPA**