

SECTION I: SCENARIO OVERVIEW

Scenario Title:	Heart Failure - Basic Hemodynamics
Original Scenario Developer(s):	Lindsey Shank RN MS CNS CCRN
Date - original scenario	12/07
Validation:	11/08 K. McDonald, RN
Revision Dates:	Transfer to new template 8/10; Update 2/13 bld, 3/18 A. Lucero, MSN, RN/mm
Pilot testing:	Approved 8/2010 cok
QSEN revision:	2/13 B. Durham MSN, CNE/mm
<u>Estimated Scenario Time:</u> 20 min <u>Debriefing time:</u> 30-45 min	
<p><u>Target group:</u> Beginning level critical care nurses meant to practice and/or validate orientees' ability to interpret hemodynamic measurement and identify appropriate treatments. Senior nursing students learning hemodynamic monitoring.</p> <p><u>Core case:</u> Basic Hemodynamics in patient with acute bi-ventricular heart failure</p> <p><u>QSEN Competencies:</u></p> <ul style="list-style-type: none"> • Teamwork and Collaboration • Evidence-Based Practice • Patient Centered Care • Safety <p><u>Brief Summary of Case:</u> Elroy Tyler is a 72-year-old male admitted yesterday evening with acute heart failure exacerbation. His previous medical history (PMH) includes: COPD, HTN and cardiomyopathy. PSH: none. Social history: Drinks 2 beers per night. Smokes 1 pack of cigarettes per day. Lives with wife. Has 5 children, all married. Shortly after admission, the Intensivist decided to place a pulmonary artery line to guide therapeutic interventions. You enter Mr. Tyler's room and observe him working very hard to breathe. He appears restless and anxious and is trying to pull out his IV.</p> <p><u>Key Contextual Details:</u> It is 0745. Report has just been completed. An experienced telemetry orientee working with you. Other resources include a charge nurse and resource nurse present on your side of the CCU. The Intensivist & residents are rounding on the other side of the unit and are available by phone.</p>	

EVIDENCE BASE / REFERENCES (APA Format)
Fundamental of Hemodynamic Monitoring: Self-study packet by Orlando Health, Education and Development (2011). https://yumpu.com/en/document/view/11653742/fundamentals-of-hemodynamic-monitoring-orlando-health .
Lewis, S. et. al. (2017) Medical-Surgical Nursing: Assessment and Management of Clinical Problems. 10 th Edition, Chapter 65., Elsevier.St.Louis
Dumitru, I. (2013). Heart Failure. Retrieved from Medscape Reference at http://emedicine.medscape.com/article/163062-overview (Or agency based protocols)
Gahart, B., et. al. (2018). Intravenous Medications. 34 th Edition.

SECTION II: CURRICULUM INTEGRATION

A. SCENARIO LEARNING OBJECTIVES	
Learning Outcomes	
1. Apply clinical decision making skills in interpreting and analyzing data in evolving situations.	
2. Apply principles of pharmacology and medication safety to patient situation.	
3. Communicate with team members, adapting own style of communicating to needs of team/ situation.	
4. Prioritize interventions based on accurate interpretation of assessment data	
5. Base individualized care plan on patient values, clinical expertise and evidence.	
Specific Learning Objectives	
1. Apply principles of hand hygiene, infection control and personal protection.	
2. Correctly identify patient and introduces team	
3. Demonstrate accurate assessment of the client with focus on the cardiovascular and respiratory system.	
4. Demonstrate situational awareness and immediately applies O ₂ during patient assessment.	
5. Communicate effectively with patient and family to decrease anxiety and inform about plan of care.	
6. Communicate status to physician using standardized SBAR tool.	
7. Understand principles of hemodynamic monitoring.	
Critical Learner Actions	
1. Perform hand hygiene, introduce self and role, identify patient using two patient identifiers	
2. Recognize clinical manifestations; prioritize nursing interventions for patients with ↓ cardiac output.	
3. Communicate with family to decreased anxiety and allay concerns.	
4. Address oxygen supply and demand issues.	
5. Determine abnormal hemodynamic parameters that need manipulation to improve patient's condition.	
6. Make accurate recommendations for pharmacological therapy for a patient in acute decompensated HF.	
7. Administer drugs using standard safety protocols & document accurately.	

B. PRE-SCENARIO LEARNER ACTIVITIES	
Prerequisite Competencies	
Knowledge	Skills/ Attitudes
<input type="checkbox"/> Completion of ECCO PACEP Modules	<input type="checkbox"/> Pulmonary artery set-up and maintenance
<input type="checkbox"/> Interpretation of pulmonary artery measurements	<input type="checkbox"/> Pulmonary artery measurements; hemodynamic calculations.
<input type="checkbox"/> Interprofessional communication with physician regarding change of status.	<input type="checkbox"/> Medication/titratable administration; IV Therapy
<input type="checkbox"/> Hemodynamic Monitoring SOP	<input type="checkbox"/> SBAR communication in evolving situations
<input type="checkbox"/> Pulmonary Artery SOP	<input type="checkbox"/> Protocol for taking verbal (telephone) orders
<input type="checkbox"/> Continuous arterial pressure monitoring	<input type="checkbox"/> Patient/family communication in evolving situations
	<input type="checkbox"/> Arterial pressure monitoring range & maintenance

SECTION III: SCENARIO SCRIPT

A. Case summary

Elroy Tyler is a 72-year-old male admitted yesterday evening with acute heart failure exacerbation. His previous medical history (PMH) includes: COPD, HTN and cardiomyopathy. PSH: none. Social history: Drinks 2 beers per night. Smokes 1 pack of cigarettes per day. Lives with wife. Has 5 children, all married. Shortly after admission, the Intensivist decided to place a pulmonary artery line to guide therapeutic interventions.

B. Key contextual details

It is 0745 in your unit and you have just completed report. You enter Mr. Tyler's room and observe him working very hard to breathe. He appears restless and anxious and is trying to pull out his IV. You have an orientee working with you who is an experienced Telemetry nurse. There is also a charge and resource nurse present on your side of the CCU. The Intensivist and residents are rounding on patients on the other side of the unit and are available by phone.

C. Scenario Cast

Patient/	<input type="checkbox"/> High fidelity simulator	
	<input type="checkbox"/> Mid-level simulator	
	<input type="checkbox"/> Task trainer	
	<input type="checkbox"/> Hybrid (Blended simulator)	
	<input type="checkbox"/> Standardized patient	
Role	Brief Descriptor (Optional)	Standardized Participant (SP) or Learner (L)
Primary Nurse		Learner
Orientee		Learner
Resource Nurse		Learner
Charge Nurse		Learner
Intensivist	Available by phone. Asks nurse to get a new set of hemodynamic measurements. Ask nurse to interpret PA numbers. Speak into phone while ordering 1 liter fluid bolus for another patient to see if nurse will question rationale.	Standardized Participant
Wife	Use to practice patient/family centered care. In room sitting next to patient. Asks nurse, "What is going on here. Do you people know what you're doing? My husband is getting worse.	Standardized Participant

D. Patient/Client Profile				
Last name:	Tyler		First name:	Elroy
Gender: Male	Age: 72	Ht: 65 in	Wt: 79.1 kg/29 BMI	Code Status: Full
Spiritual Practice: Christian		Ethnicity: Caucasian		Primary Language spoken: English
1. History of present illness				
Mr. Tyler was brought in by ambulance yesterday after a 1 day history of shortness of breath, dry cough, pedal edema, +JVD. And extreme fatigue. Mr. Tyler stopped taking his medications after experiencing impotence last week that he attributed to the medications used to treat his heart failure				
Primary Medical Diagnosis		Acute Bi-ventricular Heart Failure		

2. Review of Systems	
CNS	Awake, alert & oriented x 4. MAE w/o difficulty, pupils, equal, round, reactive to light. No deficits. Denies all pain or discomfort.
Cardiovascular	S ₁ S ₂ , S ₃ , no murmurs, bruits, or thrills, positive JVD, 3+ pedal edema in bilateral lower extremities, peripheral pulses (radial & pedal), capillary refill prolonged (5 seconds), skin, pale, cool, moist and intact. PCXR shows LV hypertrophy, bilaterally pleural effusions and vascular congestion. ECG shows sinus tachycardia (rate 123) and ventricular hypertrophy. Patient has rare multifocal PVCs, no Q wave, and no BBB.
Pulmonary	Respirations rapid, labored with use of accessory muscles. C/O SOB. Lungs: coarse crackles bilaterally.
Renal/Hepatic	Foley catheter with small amount of cloudy, yellow urine.
Gastrointestinal	WNL
Endocrine	Last BS taken at 1730 (124)
Heme/Coag	WNL
Musculoskeletal	WNL
Integument	Skin, pale, cool, moist and intact.
Developmental Hx	Hx of noncompliance with outpatient treatment regimen. Currently cooperative with hospital care.
Psychiatric Hx	None reported.
Social Hx	Married with 5 grown children, Retired salesman. Drinks 2 beers per night. Smokes 1 pack cigarettes per day.
Alternative/ Complementary Medicine Hx	None

Medication allergies:	Sulfa	Reaction:	Skin rash
Food/other allergies:	NKFA	Reaction:	

3. Current medications	Drug	Dose	Route	Frequency
	Nesiritide (Natrecor) to be started	0.01 mcg/kg/min.	IV gtt	Continuous gtt
	Alternate* Nitroglycerin (Tridil)	10-200 mcg/min	IV gtt	Continuous gtt/titrate to desired effect
	Lasix	80 mg	IVP	BID
	Dobutamine	5 mcg/kg/min	IV gtt	Continuous gtt

CSA REV template (12/15/08; 5/09; 12/09; 4/11, 1/15, 4/18)

ALL DATA IN THIS SCENARIO IS FICTITIOUS

4. Laboratory, Diagnostic Study Results					
Na: 145	K: 4.5	Cl: 105	HCO ₃ : 28	BUN: 25	Cr: 1.5
Ca:	Mg: 2.2	Phos:	Glucose: 106	HgA1C:	
Hgb: 15.2	Hct: 43.3	Plt: 340k	WBC: 7.9	BNP: 345 (>100=HF)	
ALT 56		Cholesterol 300	LDL 200	HDL 25	
PT 19.3	PTT 22	INR 1.1	Troponin:		
Ammonia:	Amylase:	Lipase:	Albumin:	Lactate:	
ABG-pH: 7.3	paO ₂ : 65	paCO ₂ : 52	HCO ₃ /BE: 34/-6	SaO ₂ : 90%	
VDRL:	GBS:	Herpes:	HIV:		
CXR: LV hypertrophy, bilateral pleural effusions and vascular congestion				Fraction 29%	
CT:		MRI:			

E. Baseline Simulator/Standardized Patient State (This may vary from the baseline data provided to learners)					
1. Initial physical appearance					
Gender: Male	Attire:				
Alterations in appearance (moulage): Ice bags to face, chest, arms and lower legs for 15 minutes prior to start of simulation. Bluish coloration around mouth and ear lobes. Water/glycerin spray just prior to scenario starting. Bed clothing & bed side table-disarray.					
x	ID band present, accurate information		ID band present, inaccurate information		ID band absent or not applicable
x	Allergy band present, accurate information		Allergy band present, inaccurate information		Allergy band absent or not applicable

2. Initial Vital Signs Monitor display in simulation action room:					
	No monitor display		Monitor on, but no data displayed	x	Monitor on, standard display

BP: 88/51	HR: 123	RR: 28	T: 97.6F	SpO ₂ : 90
CVP: 18	PAS: 55	PAD: 27	PCWP: 26	CO: 2.48 L/min
AIRWAY:	ETCO ₂ :	FHR:		
Lungs: Sounds/mechanics	Left: Course Crackles		Right: Course Crackles	
Heart:	Sounds:	S1, S2, S3		
	ECG rhythm:	ST w/few multifocal PVCs		
	Other:	Additional Hemodynamic measures: CI 1.32, PVR 322, SVR 1857, RVSWI 6.2, LVSWI 30.7		
Bowel sounds:	hypoactive		Other:	

3. Initial Intravenous line set up							
	Saline lock #1	Site:				IV patent (Y/N)	
X	IV #1	Site:	RFA	Fluid type: Natreacor 1.5 mg in 250 ml NS	Initial rate: 0.01 mcg/kg/min 8ml.hr	X	IV patent (Y/N) Yes
X	Main						
	Piggyback						
x	IV #2	Site:	RH	Fluid type: Dobutamine 1,000 mg in 250 ml NS	Initial rate: 5 mcg/kg/min 6ml/hr	x	IV patent (Y/N) Use with caution – pt. has sulfa allergy
	Main						
	Piggyback						
4. Initial Non-invasive monitors set up							
x	NIBP	x	ECG First lead: II	x	ECG Second lead: V1		
x	Pulse oximeter	x	Temp monitor/type: Blood temp		Other:		
5. Initial Hemodynamic monitors set up							
x	A-line Site:		Catheter/tubing Patency (Y/N) YES	CVP Site: PAC	PAC Site: RSC		
6. Other monitors/devices							
x	Foley catheter	Amount: 75ml	Appearance of urine: amber, concentrated urine				
	Epidural catheter	X	Infusion pump: 3 channel	Pump settings: Natreacor: 8 ml/hr; Dobutamine: 6 ml/hr			
	Fetal Heart rate monitor/tocometer		Internal	External			
Environment, Equipment, Essential props							
Recommend standardized set ups for each commonly Standardized environment							
1. Scenario setting: (example: patient room, home, ED, lobby)							
ICU patient room							

2. Equipment, supplies, monitors						
(In simulation action room or available in adjacent core storage rooms)						
	Bedpan/ Urinal	x	Foley catheter kit		Straight cath. kit	Incentive spirometer
x	IV Infusion pump		Feeding pump	x	Pressure bag x 2	x Wall suction
	Nasogastric tube		ETT suction catheters	x	Oral suction catheters	Chest tube insertion kit
x	Defibrillator	x	Code Cart		12-lead ECG	Chest tube equip
	PCA infusion pump		Epidural infusion pump		Central line Insertion Kit	Dressing Δ equipment
	IV fluid Type:	NS Primary, secondary; Pressure tubing	IV fluid additives:		Strips for CVP, PAP, PAOP that are close to the parameters given on the monitor- E2	Blood product ABO Type: # of units:

3. Respiratory therapy equipment/devices							
X	Nasal cannula		Face tent	x	Simple Face Mask	x	Non re-breather mask
x	BVM/Ambu bag		Nebulizer tx kit		Flowmeters (extra supply)		

4. Documentation and Order Forms							
x	Health Care Provider orders	x	Med Admin Record	x	H & P	x	Lab Results
x	Progress Notes	x	Graphic record		Anesthesia/PACU record		ED Record
x	Medication reconciliation		Transfer orders		Standing (protocol) orders		ICU flow sheet
x	Nurses' Notes		Dx test reports		Code Record		Prenatal record
x	Actual medical record binder, constructed per institutional guidelines			X	Describe: CVP, PAOP, PAP & Hemodynamic numbers with same values from scenario.		

5. Medications (to be available in sim action room)								
#	Medication	Dosage	Route		#	Medication	Dosage	Route
	Dobutamine gtt 1,000 mg in 250 ml NS	5 mcg/kg/ min 6ml/hr	IV					
	Natrecor gtt 1.5 mg in 250 ml NS	0.01 mcg/kg/m in 8ml/hr	IV	<i>or</i>		NTG (Tridil) drip See previous page		
	Lasix 100 mg vial	80 mg	IV					
	Hydralazine	20 mg – 40 mg	IV					

Pt weight = 79.1 kg

CASE FLOW / TRIGGERS/ SCENARIO DEVELOPMENT STATES			
<p>Initiation of Scenario: Report from off-going night nurse @0745: Mr. Tyler was brought in by ambulance yesterday after a 1 day history of shortness of breath, dry cough, pedal edema, +JVD and extreme fatigue. Mr. Tyler stopped taking his medications after experiencing impotence last week that he attributed to the medications used to treat his heart failure. Shortly after admission, the Intensivist decided to place a pulmonary artery line to guide therapeutic interventions. Social history: Mr. Tyler drinks 2 beers per night, smokes 1 pack of cigarettes per day and lives with wife. He has 5 grown children.</p> <p>Past Medical History: includes COPD, HTN and LV hypertrophy. Past Surgical History: none.</p> <p>VS upon admission were BP 180/98, HR 115, RR 24, T 99.4 ECG shows ST with LV hypertrophy.</p>			
STATE / PATIENT STATUS	DESIRED LEARNER ACTIONS & TRIGGERS TO MOVE TO NEXT STATE		
<p>1. Baseline Pt. demonstrates extreme effort to breathe w/ HOB ↑30° Appears restless and anxious ... verbalizes wanting IV out. (trying to pull out IV) <i>Wife at bedside will verbalize this to nurses.</i></p> <p>Dobutamine infusing per MD order</p> <p><i>Wife at bedside sitting next to patient. Very anxious - Asks nurse, "What is going on here. Do you people know what you're doing? My husband is getting worse. He keeps trying to pull this IV out".</i></p>	<p>Operator Vital Signs: BP 88/51; HR 123, RR 28; SpO2 90%, T 97.6° F, Lung sounds: Course crackles Hemodynamic numbers: Initial: PAP 58/29; CVP 18, PAOP 27 CO 2.52; CI 1.32, PVR 368, SVR 1923, RVSWI 6.1, LVSWI 20.</p> <p>Triggers: Completes Learner Actions within 5 minutes.</p>	<p>Learner Actions</p> <ul style="list-style-type: none"> • Washes hands, identifies self and team members • Focused cardiovascular & respiratory assessments. • Increase O₂ delivery using face mask or 100% non-re-breather mask (NRB). • Changes position to improve oxygenation • Confirms transducers are level with phlebostatic axis, performs square wave test, re-zeros transducer after repositioning patient. • Analyzes and interprets hemodynamic values • Communicate with pt./ family members to ↓ their anxiety while monitoring 	<p>Debriefing Points:</p> <ul style="list-style-type: none"> • Strategies for complying with NPSG's in acute situations • Signs and symptoms of decreasing cardiac output and hemodynamic compromise (pt is experiencing acute decompensated heart failure) • Discuss NYHA classes • Significance of clinical findings • Strategies for communicating with family to minimize fears and anxiety during emergent situation

STATE / PATIENT STATUS	DESIRED ACTIONS & TRIGGERS TO MOVE TO NEXT STATE		
<p>2.</p> <p>Patient remains in the same state.</p> <p>Patient is less confused and agitated as SpO2 increases.</p>	<p>Operator:</p> <p>Vital Signs: BP 86/49; T 97.6° F. HR 125, RR 28 SpO2 90% if oxygen has not yet been increased SpO2 92% if O2↑ to face mask SpO2 94% if NRB.</p> <p>Hemodynamic readings: <i>After zero and reposition:</i> PAP 60/31; CVP 20, PAOP 30 CO 2.22; CI 1.12, PVR 378, SVR 2067, RVSWI 5.9, LVSWI 20.4</p> <p>Triggers: MD arrives-gives orders to perform all actions in listed in Learner Actions if Learners had not already done.</p>	<p>Learner Actions:</p> <ul style="list-style-type: none"> • Obtain new set of hemodynamic numbers. • Identifies hemodynamic parameters that need to be manipulated in order to improve patient condition (CVP). • Notify MD of patient status-communicate using ISBAR. (reports CVP and recommends Lasix to ↓ preload or Hydralazine ↓afterload or NTG or Nesiritide to ↓ both) • Follows read back and verify when obtaining MD orders • Continue assessment • Continue communicating with family to keep apprised of the situation. 	<p>Debriefing Points:</p> <ul style="list-style-type: none"> • Immediate nursing intervention for patients with hemodynamic compromise <ul style="list-style-type: none"> ○ need to ↓preload to improve CVP, PAP and wedge pressure ○ by ↓ afterload, contractility and ventricular stroke work index will improve • Strategies for communicating with physician to minimize risks of error during reporting change of status • Rationale for recommended pharmacological therapy (<i>see above</i>) •

STATE / PATIENT STATUS	DESIRED ACTIONS & TRIGGERS TO MOVE TO NEXT STATE		
<p>3.</p> <p>Patient remains in the same state.</p> <p>Continues with increased WOB, until approx. 5 min after Lasix given, patient will be able to breathe easier.</p>	<p>Operator:</p> <p>After Lasix given: Vital Signs: BP 86/49; T 97.6° F. HR 115, RR 24 SpO2 45% if O2↑ to face mask SpO2 96% if NRB.</p> <p>Hemodynamic readings: After Lasix: PAP 57/27, CVP 18, PAOP 28</p> <p>Triggers: Learner actions complete within 10 minutes MD orders</p>	<p>Learner Actions:</p> <ul style="list-style-type: none"> • Administer Lasix IVP first then establish Nesiritide drip • Obtain new set of hemodynamic numbers. • Reassesses patient following medication administration • Provide patient information and education in a manner clearly understood by the patient/family 	<p>Debriefing Points:</p> <ul style="list-style-type: none"> • Decision-making and priority setting in regards to interventions to be carried out first • Evaluate effectiveness of interventions by reassessing critical parameters • Importance of continued reassessment of unstable patient
<p>Scenario End Point: Treatment team perform all of the actions that are listed or when MD orders them (MD will order actions if treatment team has failed to do so after 15 minutes. After debrief, consider running the same scenario so the participants have the opportunity to execute the behaviors they have learned.</p>			
<p>Suggestions to <u>decrease</u> complexity: Change hemodynamic values to normal and have orientee practice zeroing and leveling the transducer; or keep same values and provide MD orders to be carried out. Suggestions to <u>increase</u> complexity: Progress patient to full decompensated HF requiring intubation and mechanical ventilation.</p>			
<p>Normal Hemodynamic Values: CVP 0-8 mm Hg, CO 4-8 L/min, CI 2.5-4.5 L/min/m², PAP 15-30/8-15 mmHg, PAOP (wedge) 8-12 mmHg, PVR 120-200 dynes, SVR 800-1200 dynes, SV 50-100 ml/beat, LVSWI 43-62 g/m/ m², RVSWI 7-12 g/m/ m²</p>			

APPENDIX B: Digital images of manikin and/or scenario milieu	
Insert digital photo here	Insert digital photo here
Insert digital photo here	Insert digital photo here

APPENDIX C: DEBRIEFING GUIDE

General Debriefing Plan			
<input type="checkbox"/> Individual	<input type="checkbox"/> Group	<input type="checkbox"/> With Video	<input type="checkbox"/> Without Video
Debriefing Materials			
<input type="checkbox"/> Debriefing Guide	<input type="checkbox"/> Objectives	<input type="checkbox"/> Debriefing Points	<input type="checkbox"/> QSEN
QSEN Competencies to consider for debriefing scenarios			
<input type="checkbox"/> Patient Centered Care	<input type="checkbox"/> Teamwork/Collaboration	<input type="checkbox"/> Evidence-based Practice	
<input type="checkbox"/> Safety	<input type="checkbox"/> Quality Improvement	<input type="checkbox"/> Informatics	
Sample Questions for Debriefing			
<ol style="list-style-type: none"> 1. How did the experience of caring for this patient feel for you and the team? 2. Did you have the knowledge and skills to meet the learning objectives of the scenario? 3. What GAPS did you identify in your own knowledge base and/or preparation for the simulation experience? 4. What RELEVANT information was missing from the scenario that impacted your performance? How did you attempt to fill in the GAP? 5. How would you handle the scenario differently if you could? 6. In what ways did you check feel the need to check ACCURACY of the data you were given? 7. In what ways did you perform well? 8. What communication strategies did you use to validate ACCURACY of your information or decisions with your team members? 9. What three factors were most SIGNIFICANT that you will transfer to the clinical setting? 10. At what points in the scenario were your nursing actions specifically directed toward PREVENTION of a negative outcome? 11. Discuss actual experiences with diverse patient populations. 12. Discuss roles and responsibilities during a crisis. 13. Discuss how current nursing practice continues to evolve in light of new evidence. 14. Consider potential safety risks and how to avoid them. 15. Discuss the nurses' role in design, implementation, and evaluation of information technologies to support patient care. 			
Notes for future sessions:			