Simulation and Clinical Learning
Tillamook Healthcare Simulation Program
Pulmonary Embolus

Simulation Objective:
Demonstrate management of a patient experiencing an acute pulmonary embolus.

Scenario: Physiologic System
Pulmonary embolism occurs when there is an obstruction in the pulmonary vascular bed. The acute events of PE are subject to rapid change as resolution of the embolism proceeds.

Predisposing factors:
- Post-op
- Obesity
- DM
- Venous stasis secondary to immobility
- Infection
- Postpartum
- High concentration of estrogen
- Occult carcinoma
- Oral contraceptives
- Trauma to vessel walls
- Varicose Veins
- Other circulatory disorders

Once a thrombus has developed, it may loosen and break from its attachment. It then travels to the pulmonary vasculature and is lodged in the vessel. This will produce alveolar dead space because it results in a lung zone that is ventilated but not perfused. Alveolar dead space refers to a portion of tidal volume that ventilated alveoli that have a reduced or nonexistent flow of blood. So, there is not gas exchange at this lung space. Overall ventilation in the uninvolved lung zones must be increased to maintain normal gas exchange. For this reason, dispend and tachyon are common in patients with PE.

Pulmonary surfactant (a lipoprotein that stabilizes the alveoli) decreases and causes the alveoli to collapse.

The increased work on the right side of the heart due to the embolus blocking the pulmonary can lead to right sided heart failure, reduced left ventricular filling and systemic hypotension. A pulmonary infarct may be indicated by the triad of cough, hemoptysis, and pleuritic pain.
Scenario: Skills
Use of SCDs
Starting heparin gtt
Place Oxygen
Position patient
Communication with MD
Establish scenario urgency
Patient Teaching
Identification of PE evolution

Learning Objectives:
Define Pulmonary Embolus (PE) pathophysiology.
Explain the signs and symptoms of PE.
Explain what will initial nursing cares be for a patient experiencing PE?
Explain what will you tell the physician when you call him/her?
Demonstrate the set-up of oxygen.

Reference:
Patient Data:
Account Number: 3133090
Medical Record Number: 01-02-03
Name: Felicia Felangie
Birthdate: July 15, 1956

Patient Case History (brief past medical history of present illness)
Mrs. Falangie is a 50 year old female admitted for elective cholecystectomy. Multiple stones and chronic inflammatory changes were found in the gallbladder. After the operation, which was uncomplicated, SCDs was put on Mrs. Falangie, and she was given lovinox 30 mg subcutaneously every 12 hours. Because of Mrs. Falangie’s pain from her incision, she refused to get out of bed or cough and deep breath on her own. Only when encouraged by staff will she perform these tasks.

No c/o calf tenderness – Report to nurse an increase in size of left ankle noted.

Third Post-op day

Pt drug allergies
NKDA

Lab and other information available to participant upon request
**Scenario Flow** *(desired course events during scenario: changes in VS and assessments)*

<table>
<thead>
<tr>
<th>Notice/Interpret</th>
<th>Interpretation</th>
<th>Outcome</th>
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<tbody>
<tr>
<td>Pt starts out being restless and c/o a bit of a headache. She increases to more anxiety with a headache. At the same time, she is C/O pain on inner aspect of left thigh (use make-up to draw a red area where thrombophlebitis is found)</td>
<td>Place oxygen Place SpO2 monitor See IV patency Elevate HOB Patient assessment and vital signs place telemetry to see rhythm Call for assistance from charge nurse Call MD with data: Pain, SpO2, VS, Lung assessment, skin color, sputum, cough</td>
<td>SpO2 – 90 Assess for hypoxia (restlessness, headache, apprehension, euphoria, pallor/cyanosis), Inspect for peripheral edema distended neck veins, BP 140/90 Pulse 120 T. 100 Respiration 30 Course rales in both bases Pleural friction rub noted</td>
</tr>
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<td>-----------------</td>
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<tr>
<td>Doc orders :</td>
<td></td>
<td>ABG –</td>
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<tr>
<td>ABG</td>
<td></td>
<td>PO2 – 74 (80 – 100)</td>
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<tr>
<td>Heparin gtt</td>
<td></td>
<td>PCO2 – 34 (35 – 45)</td>
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<tr>
<td>Ask for ABG noting the FiO2</td>
<td>Low PCO2 is caused by hyperventilation caused by pain and anxiety</td>
<td>pH – 7.48 (7.35 – 7.45)</td>
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<td>Ask for CXR</td>
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<td>Prepare for possible transfer to ICU</td>
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If does not respond to all interventions, patient BP continues to rise and heart rate increases and RR.

**How will participants be introduced to the case (Report)?**
Mrs. Felangie had her gallbladder removed two days ago. It was a laparoscopic procedure. She has been sleeping all night. Her pain has been under control and she has used her PCA without any difficulty. She got up to void once 300ml. Her IV is P56 at 100ml per hour. She is on Demerol PCA - 10 mg every 10 min with a 400mg max every 4 hours.

**Manikin used and initial computer set-up (v.s. and assessment information for beginning of scenario: SpO2%, temperature, heart rate, blood pressure, heart, lung and bowel sounds)**

Initial Computer Set-up:
SpO2 – 90% on room air
Assess for hypoxia (restlessness, headache, apprehension, euphoria, pallor/cyanosis),
Inspect for peripheral edema or distended neck veins,
BP 140/90
Pulse 120
T. 100
Respiration 30
Course rales in both bases
Pleural friction rub noted

**Equipment and props needed:**
Have SCDs at foot of bed.
Make-up on left inner leg for thrombophlebitis
Make-up for varicose veins
Swelling on Left ankle
Bandages on abdomen where gallbladder taken out
Supplies/Equipment needed for set-up

Meds:
- Lovinox 30 mg SQ q 12 x 7 days.
- Heparin bag (ready to be hung)
- IVF P 56 at 100ml/hour
- PCA Demerol

Equipment:
- IV Pump
- PCA Pump
- SCDs and pump (not on patient)
- O2 tubing (not on patient)

Paperwork and documentation:

Personnel and actors (numbers, roles, and instructions)

Orders (if applicable)

Additional teaching tools needed