

Virtual Clinical – Melba’s COPD Acute Respiratory Failure Case Study

Explain the pathophysiology of Acute Respiratory failure in your own words:

List signs and symptoms:



Read the Case Study and complete the following questions and activities

Melba B., a 75-year-old female, is admitted to the critical care unit (CCU) in acute respiratory failure. M.B. has a 15-year history of chronic obstructive pulmonary disease (COPD). She smoked 2 packs of cigarettes/day for over 50 years. She quit just 4 years ago after suffering a myocardial infarction (MI) and undergoing a triple coronary artery bypass graft (CABG) surgery. Her past medical history is positive for hypertension, glaucoma, type 2 diabetes, and coronary artery disease. She also suffers from atypical musculoskeletal chest pain occurring after her CABG surgery. Her current medications include metoprolol 100 mg bid, fluticasone/salmeterol (Advair) one inhalation bid, albuterol/ipratropium (Combivent) 3 mL via nebulizer every 4 hours prn, metformin 500 mg bid, codeine 30 mg PO prn pain, lorazepam (Ativan) 1 mg PO prn anxiety, and betaxolol ophthalmic drops (Betoptic).

Melba contracted acute pneumonia 3 weeks ago. She completed a 10-day course of antibiotics, but her dyspnea has become progressively worse. Initially, she was able to function by using her nebulizer treatments every 3 hours. However, this afternoon her husband called 911 when Melba stated, "I can't breathe."

In the following table list a minimum of 3 actual or potential nursing problems appropriate for this patient. Which problem would be the priority? List 3 nursing interventions related to each of the problems.

Nursing Problems and Interventions

| |
|----|
| 1. |
| a. |
| b. |
| c. |
| 2. |
| a. |
| b. |
| c. |
| 3. |
| a. |
| b. |
| c. |

Melba's Medications: complete the information

| Drug | Drug class | Reason for med | Patient teaching | Nursing concerns |
|-----------------------------------|------------|----------------|------------------|------------------|
| metoprolol | | | | |
| fluticasone/salmeterol (Advair) | | | | |
| albuterol/ipratropium (Combivent) | | | | |
| metformin | | | | |
| codeine | | | | |
| lorazepam | | | | |

1. Before planning care for Melba you have reviewed the underlying pathophysiology for her respiratory failure. Realizing that many patients suffer from a combination of hypoxemic and hypercapnic failure, you review both classifications. Place an X in the correct column that corresponds with the condition.

| | Hypoxemic (Oxygenation failure) | Hypercapnic (Ventilation failure) |
|-------------------------------------|---------------------------------|-----------------------------------|
| Acute respiratory distress syndrome | | |
| COPD | | |
| Pneumonia | | |
| Sedative and opioid overdose | | |
| Spinal cord injury | | |
| Pulmonary emboli | | |
| Cardiogenic pulmonary edema | | |
| Toxic inhalation | | |
| Asthma | | |
| Pain | | |
| Severe head injury | | |
| Severe obesity | | |

2. Select the *four* factors that may have contributed to Melba's respiratory problem.

COPD

Pulmonary emboli

Acute respiratory distress syndrome

Cardiogenic pulmonary edema

Pneumonia

Toxic inhalation

Sedative and opioid overdose

Asthma

Spinal cord injury

Pain

3. On Melba's admission to the CCU, you review lab work obtained in the emergency department (ED). Baseline (pre-intubation) arterial blood gas (ABG) results on 4 L of O₂ were as follows: pH 7.28, PaO₂ 60 mm Hg, PaCO₂ 62 mm Hg, HCO₃ 32 mEq/L, and O₂ saturation 84%.

What do these ABG's suggest?

4. What other diagnostic studies would you also expect the health care provider to have ordered in the ED?

There are 7 correct answers.

Complete blood count (CBC)

Urinalysis

Complete metabolic panel

Sputum culture

Liver enzymes

Alkaline phosphatase

12-lead electrocardiogram (ECG)

Chest x-ray

CT scan of the brain

Blood culture

5. Melba was intubated in the ED and placed on the ventilator. What other interventions would you anticipate being ordered for Melba? Select all that apply

Antibiotic therapy

Position patient with head of bed (HOB) up 30 degrees

IV methylprednisolone (Solu-Medrol)

Chest physiotherapy

Bronchodilator therapy

IV analgesia

Fluid Restriction

Position patient with good lung up

IV sedation

6. Melba's ventilator settings are as follows: Mode: assist/control (ACV), VT 450, FIO2 60%, PEEP 5 cm, & RR 18. Which of the following statements correctly describes the ACV mode setting on the ventilator?

A. The ventilator delivers breaths at a set rate per minute and VT that are independent of patient's ventilatory efforts.

B. The ventilator delivers a preset VT at a preset frequency in synchrony with the patient's spontaneous breathing. The patient self-regulates any additional breaths.

C. The ventilator delivers a preset VT at a preset frequency, and when the patient initiates additional breaths, the preset VT is delivered.

D. The ventilator delivers continuous positive pressure with an initial rapid flow rate whenever the patient initiates a spontaneous breath.

7. With initial application of PEEP, which assessment will be of highest priority?

Heart rate

Peripheral pulses

Urinary output

Blood pressure

8. After you suction Melba and clear the ventilator tubing of fluid, the high pressure alarm continues to sound, and the patient's respiratory rate increases to 32 breaths/minute. Lung sounds reveal bibasilar crackles and her oxygen saturation is 95%. Which drugs would be appropriate to give at this point? Select all that apply

lorazepam (Ativan) 0.5 mg IV

Adenosine 6 mg IV

methylprednisolone (Solu-Medrol) 120 mg IV

Sodium bicarbonate 50 mEq IV

Morphine sulfate 2 mg IV

9. Melba is finally calmer, and you perform a thorough assessment. You recognize the importance of monitoring Melba closely for potential complications of mechanical ventilation. Select potential ventilator-associated complications. There are 6 correct answers

Barotrauma

Alveolar hyperventilation

Diarrhea

Focal seizures

Pneumonia

Sodium and water retention

Fluid volume deficit

Stress ulcers

Alveolar hypoventilation

10. Which of the following interventions are helpful in preventing VAP? Select all that apply

HOB elevation at a minimum of 30 to 45 degrees

Drain condensation in ventilator tubing once a day

Change ventilator tubing q48hr

Provide frequent mouth and oral hygiene

Put HOB flat whenever turning patient

Allow for daily spontaneous awakening trials

Practice effective hand washing before and after suctioning

Provide peptic ulcer prophylaxis

Use ET tubes with subglottic secretion drainage port

Assess readiness to wean

Consider early and progressive ambulation

11. You recognize that Melba's history of COPD makes her lungs more compliant and thus increases her risk for injury related to mechanical ventilation. You monitor her closely for which clinical manifestations of barotrauma? Select all that apply

Hypocapnia

Unilateral decreased or absent breath sounds

Subcutaneous emphysema

Bradypnea

Increase in rhonchi and/or crackles

Tachycardia

12. Melba responds to antibiotic therapy and her respiratory status improves. She is currently being weaned from the ventilator. During the weaning trial, you monitor her closely for any signs or symptoms of weaning failure that would necessitate returning to previous ventilator settings. Select assessment findings that would indicate intolerance to weaning. There are 11 correct answers.

Tachypnea

Hypertension

Dyspnea

Decreased bowel sounds

Decreased urine output

Hypotension

Tachycardia

Agitation

Dysrhythmias

Diaphoresis

Hypothermia

Anxiety

Sustained oxygen desaturation

13. During the weaning process, you appropriately delegate which nursing activity to unlicensed assistive personnel (UAP)?

Explain the weaning process to M.B.'s family

Assess patient for subtle changes in behavior

Obtain and document vital signs q15min

Titrate oxygen according to results of pulse oximetry

Peripheral pulses

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