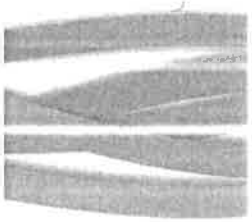


Case Study 26 Mechanically Ventilated Patient #1

Difficulty: Intermediate
Setting: Intensive care unit
Index Words: mechanical ventilation, endotracheal tube (ETT), assessment, acute respiratory failure (ARF), arterial blood gases (ABGs)
Giddens Concepts: Clinical Judgment, Collaboration, Gas Exchange, Oxygenation, Safety
HESI Concepts: Assessment, Clinical Decision Making—Clinical Judgment, Collaboration/Managing Care, Gas Exchange, Nursing Interventions, Oxygenation, Safety

Scenario

P.R., a 66-year-old woman who has no history of respiratory disease, is being admitted to your intensive care unit (ICU) from the emergency department (ED) with a diagnosis of pneumonia and acute respiratory failure (ARF). The ED nurse tells you that P.R. was stuporous and cyanotic on her arrival to the ED. Her initial vital signs were 90/68, 134, 38, 101° F (38.3° C) with an Spo_2 of 53%. She was endotracheally intubated orally and placed on mechanical ventilation and has equal breath sounds. Her ventilator settings are synchronized intermittent mandatory ventilation of 12/min, tidal volume (V_T) 700 mL, Fio_2 0.50, positive end-expiratory pressure (PEEP) 5 cm H_2O. The nurse tells you P.R. had an initial chest x-ray (CXR) examination that confirmed the diagnosis of pneumonia, but she needs an additional CXR examination stat.

1. Describe the pathophysiology of ARF.

2. How does the underlying pathophysiology relate to P.R.'s presenting signs and symptoms?

3. Describe each of P.R.'s ventilator settings and the rationale for the selection of each.

4. Why does P.R. need a second CXR examination?

Chart View

Arterial Blood Gases (ABGs)

pH	7.28
$Paco_2$	62 mm Hg
HCO_3	26 ol/L
Pao_2	48 mm Hg
Spo_2	53%

5. The ABG results from the sample drawn in the ED before intubation are sent to you. Interpret P.R.'s ABG results.

6. List eight collaborative care interventions that would be implemented for P.R. and the rationale for each.

7. What is your priority nursing goal at this time?

8. Describe six interventions you will perform over the next two hour based on this priority.

9. P.R. is not heavily sedated and seems anxious about all that is going on. Describe how you can help her.

Chart View

Arterial Blood Gases

pH	7.30
$Paco_2$	5 mm Hg
HCO_3	22 ol/L
Pao_2	70 mm Hg
Spo_2	88%

10. ABGs are redrawn after P.R. has been on mechanical ventilation for 2 hours. What ventilator setting changes do you anticipate based on your interpretation of these values? Select all that apply, and explain your rationale.

a. Increasing the PEEP to 10 cm
b. Increasing the rate on the ventilator to 16/min
c. Increasing the V_T to 850 mL
d. Changing to continuous mandatory ventilation

11. Evaluate each of the following statements about caring for P.R. or a similar patient receiving mechanical ventilation with an endotracheal tube (ETT). Enter *T* for true or *F* for false. Discuss why the false statements are incorrect.

____ 1. Administer muscle-paralyzing agents to keep P.R. from "fighting the vent."
____ 2. Check ventilator settings at the beginning of each shift and then hourly.
____ 3. When suctioning the ETT, each pass should not exceed 15 seconds.
____ 4. Assign experienced nursing assistive personnel (NAP) to take vital signs every 2 to 4 hours.
____ 5. Perform a respiratory assessment once per shift.
____ 6. Empty excess water as it collects in the ventilation tubing back into the humidifier.
____ 7. Keep a resuscitation bag at the bedside.
____ 8. Monitor the cuff pressure of the ETT every 8 hours.
____ 9. Keep ventilator alarms silenced when in the room to maintain a quiet environment.
____10. Change the ventilator tubing every 12 hours.

12. You hear the high pressure alarm sounding on the mechanical ventilator and see that P.R.'s Sao_2 is 80%. What are the potential causes of this problem?

13. You determine that P.R. needs to be suctioned. Place in order the steps for safely performing in-line or closed suctioning.

____1. Hyperoxygenate patient.
____2. Use 5 to 10 mL of saline to rinse the catheter clear of secretions.
____3. Insert catheter until resistance is met or patient coughs.
____4. Assess patient's status and document procedure.
____5. Put on clean gloves and face shield; attach suction.
____6. Apply suction as you withdraw the catheter, not exceeding 10 seconds.
____7. Reassess patient status and suction again as needed.

CASE STUDY PROGRESS

As P.R.'s primary nurse, you are responsible for her nursing care plan. Although the primary concern is her respiratory status, you are concerned about hydration, nutrition, oral hygiene, and skin integrity and decide to address each of these areas in P.R.'s plan of care.

14. Discuss five indicators you can use to assess her fluid status.

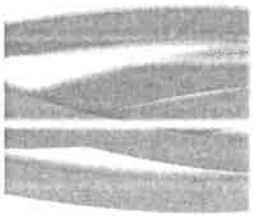
15. Write a nutrition-related outcome for P.R.

16. Describe five interventions that could assist in meeting P.R.'s nutrition goals.

17. The goals for P.R.'s mouth care are to preserve the oral mucosa and dentition and prevent P.R. from developing a secondary ventilator-assisted pneumonia. Identify three strategies for providing oral hygiene with an ETT in place.

18. Identify three treatment goals related to skin and positioning.

19. You plan to assess P.R.'s skin every 4 hours. What are four other strategies that will facilitate the expected outcome of maintaining skin integrity?



Case Study 27 Mechanically Ventilated Patient #2

Difficulty: Advanced
Setting: Extended care facility
Index Words: Guillain-Barré syndrome (GBS), sedation, tracheostomy care, mechanical ventilation, symptom management, crisis management, *Clostridium difficile* infection
Giddens Concepts: Clinical Judgment, Collaboration, Gas Exchange, Infection, Oxygenation, Patient Education, Safety
HESI Concepts: Assessment, Clinical Decision Making—Clinical Judgment, Collaboration/Managing Care, Gas Exchange, Infection, Nursing Interventions, Oxygenation, Patient Education, Safety

Scenario

P.W., a 33-year-old woman diagnosed with Guillain-Barré syndrome (GBS), is being cared for on a special ventilator unit of an extended care facility because she requires 24-hour-a-day nursing coverage. She has been intubated and mechanically ventilated for 2 weeks and has shown no signs of improvement in respiratory muscle strength. Her ventilator settings are assist-control (A/C) of 12/min, tidal volume (V_T) 700 mL, Fio_2 0.50, and positive end-expiratory pressure (PEEP) 5 cm H_2O. She is receiving enteral nutri- tion with Ensure Plus by PEG (percutaneous endoscopic gastrostomy [with a transjejunal limb]) tube (2800 kcal/24 hr). The NAP (nursing assistive personnel) reports that P.W.'s morning vital signs are 108/64,118, 12, 100.6° F (38.1° C) and that P.W. may have diarrhea.

1. Do any of P.W.'s vital signs concern you and why?

2. Why is P.W.'s respiratory rate 12 breaths per minute?

3. What are common causes of enteral nutrition diarrhea?

4. Describe the assessment you need to perform at this time.

5. While you are assessing P.W., she has an explosive, watery stool. Because her other assessment findings are unremarkable, you believe a gastrointestinal infection, possibly *Clostridium difficile,* is responsible for the onset of the fever and the diarrhea. Based on this premise, what actions do you need to take?

6. Because she had diarrhea, you decide to give P.W. a bath. You note that her cheeks are billowing slightly outward each time the ventilator delivers a breath. What could cause this phenomenon?

7. Describe how you can determine the cause of the problem.

CASE STUDY PROGRESS

You believe that P.W. has developed an air leak, and you insert more air in the cuff to seal the leak. This temporarily corrects the problem, but over the next 24 hours, the leak returns and becomes worse, and the ventilator's low exhaled volume alarm begins to sound frequently.

8. What action will you take?

9. The physician elects to insert a No. 8 Shiley tracheostomy ("trach") tube with a disposable inner cannula. P.W. becomes increasingly anxious after receiving the news. How would you prepare P.W. and her husband for the tracheostomy?

10. What are three evidence-based practices you will need to continue or implement to prevent ventilator-assisted pneumonia after she has the tracheostomy?

CASE STUDY PROGRESS

P.W. undergoes the tracheostomy procedure without complications. In the interim, the cultures come back confirming the presence of a *C. difficile* infection and she is started on antibiotic therapy. When you return the morning after the tracheostomy procedure and assess the new tracheostomy, you note that the trach tape looks tight. You are unable to insert one finger between P.W.'s neck and the trach tape. You note that the tissue surrounding the incision is edematous. As you palpate the area, your fingers sink into the skin, and you auscultate a popping sound through your stethoscope.

11. Discuss the significance of these assessment findings.

12. What should be your next actions?

13. P.W.'s husband arrives and you speak with him about her having developed subcutaneous emphysema. He collapses into the nearest chair, tears begin to roll down his cheeks, and he says, "It's been almost a month now, and all these things keep happening. Are you sure she'll recover?" How would you respond?

14. P.W. has been receiving lorazepam (Ativan) 1 mg IV every 4 hours to reduce her anxiety. Given her current situation and her husband's distress, describe six nonpharmacologic options you could use to promote the well-being of P.W. and her husband.

CASE STUDY PROGRESS

Over the next several weeks, P.W. progressively regains neurologic functioning.

15. What factors would be considered in determining when P.W. is ready to be weaned from mechanical ventilation?

16. What are your responsibilities during the weaning process?

17. Which assessment finding during the weaning process would indicate P.W. should be placed back on the ventilator?
    a. Heart rate 92 beats/min
    b. Temperature 99.3° F (37.4° C)
    c. Respiratory rate 34 breaths/min
    d. Sao_2 of 94%